World Health Organization
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The Integration of Health into Environmental Assessments

with a special focus on Strategic Environmental Assessment

ABSTRACT

This research project examines the integration of health into environmental assessment such as EIA and SEA and analyses the challenges and opportunities that EIA and SEA offer to further address health issues. The overall objective of the research was to identify the main methods, tools, institutional and procedural factors that facilitate the integration of environmental health aspects into environmental assessments such as SEA. For this five research questions were formulated regarding: 1) the environmental health aspects mainly considered in environmental assessments and specifically in SEAs; 2) the way of how these aspects are considered; 3) if and how these aspects are considered in guidelines on SEA; 4) the main barriers and facilitators for the integration of health in environmental assessments; and 5) the kind of capacity building activities needed to further support the integration of assessing health impacts into environmental assessments.

Keywords

Environmental Health

Environmental Monitoring

Health Impact Assessment

Public Health

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“Good health and well-being require a clean and harmonious environment in which physical, psychological, social and aesthetic factors are all given their due importance.”

European Charter on Environment and Health, Frankfurt, 1989

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Acronyms and abbreviations

%	per cent
(IMP)3	IMProving the IMPlementation of Environmental IMPact Assessment
ARI	acute respiratory infections
Art.	Article
ca.	circa (lat.) – about
CBEH	Capacity Building in Environment and Health
CI	confidence interval
COPD	chronic obstructive pulmonary disease
CSDH	Commission on Social Determinants of Health
DALYs	disability-adjusted life years
DG Sanco	Directorate General for Health and Consumers (now DG SANTE see below)
DG SANTE	Directorate General for Health and Food Safety
DPSEA	Driving force – State – Effect – Action
DPSEEA	Driving force – State – Exposure – Effect – Action
EA	environmental assessment
EBoD	Environmental burden of disease
EC	European Commission
ECEH	WHO European Centre for Environment and Health
ed.	Editor
EEA	European Economic Area
EHIA	environmental and health impact assessment
EHS	Environmental, Health and Safety Guidelines
EIA	environmental impact assessment
EIS	environmental impact statement
EPHO	Essential Public Health Operations
ESHIA	environmental, social and health impact assessment
et al.	et alia (lat.) – and others
etc.	et cetera (lat.) – and so forth
EU	European Union
EU 13	countries joining the European Union as Member countries in 2004, 2007 or 2013
EU 15	Member countries of the European Union before 2004
EUPHA	European Public Health Association
f./ff.	on the following page/s
HEIA	health equity impact assessments
HfA	Health for All
HIA	health impact assessment
HiAP	Health in All Policies
HIC	high income countries
HIV/AIDS	human immunodeficiency virus/acquired immunodeficiency syndrome
HNA	health needs assessment

HRA	health risk assessment [1]
HTA	health technology assessment
i.e.	id est (lat.) – that is
IAIA	International Association for Impact Assessment
ibid.	ibidem (lat.) – at the same place
ICMM	International Council on Mining and Minerals
IEHIA	integrated environmental and health impact assessment
IESHIA	integrated environmental, social and health impact assessment
IFC	International Finance Corporation
IFI	International Finance Institution
LMIC	low and middle income countries
MDGs	Millennium Development Goals
NCDs	noncommunicable diseases
NCEA	Netherlands Commission for Environmental Assessment / Commissie voor de milieueffectrapportage (m.e.r.)
NEHAP	National Environment and Health Action Plan
NEPA	National Environmental Policy Act, USA
NGO	non-governmental organization
NIS	Newly Independent States
OECD	Organisation for Economic Co-operation and Development
p./pp.	page/pages
PH	public health
PSR	Pressure – State – Response
QRA	quantitative risk assessment
SDG	Sustainable Development Goal
SDH	social determinants of health
SEA	strategic environmental assessment
STD	sexually transmitted diseases
SWOT	Strength-Weakness-Opportunities-Threats
UN	United Nations
UNCBD	United Nations Convention on Biological Diversity
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USA	United States of America
WCED	World Commission on Environment and Development
WHA	World Health Assembly
WHO	World Health Organization
WSSD	World Summit on Sustainable Development

[1] In this publication not to confuse with HRA in the meaning of habitats regulations assessment

About this publication

This publication presents the doctoral thesis of Julia Nowacki, submitted to the Faculty of Health Sciences – Bielefeld School of Public Health, University Bielefeld, Germany, in partial fulfilment of the requirement for the degree of Doctor of Public Health, on 01 September 2017 by Dipl. Päd. Julia Nowacki, MPH. Prof. Dr. med. Rainer Fehr, MPH, Ph.D., Faculty of Health Sciences, University Bielefeld, Germany, served as the first supervisor of the doctoral thesis and Prof. Dr. Claudia Hornberg, Dipl.-Biol. Dipl.-Ökol., Faculty of Health Sciences, University Bielefeld, Germany, as the second supervisor. The examination and thesis defense committee was completed by Dr. Thomas Claßen, Landeszentrum Gesundheit North Rhine-Westphalia, Bochum, Germany.

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Executive summary

Background

It is by now well acknowledged that health is affected by policies, plans, programmes and projects planned and implemented not just within the health sector and relating to health systems, health financing and health care, but also in other sectors concerned with environmental policies and at the junction of environmental and health policy. This is in lines with the broader concept of the environmental and social determinants of health and gives considerable scope for action outside the health sector to prevent ill health and promote good health.

Several approaches and tools have been developed to support such actions, such as the 'Health for All' strategy of the of the WHO Regional Office for Europe, further developed into the whole-of-government and whole-of-society approach of Health 2020, the health policy framework and strategy of the Regional Office since 2012. Furthermore, since the First European Ministerial Conference on Environment and Health, 1989 in Frankfurt am Main, Germany, the 53 Member States of the WHO European Region have recognized the importance of integrating health and environment more into policies of other sectors. Thus, they are committed to working together on crosscutting issues and address the broader environmental health aspects, determined by natural (biological, chemical, physical), built, social and behavioural factors.

To protect the environment and the health of the population different strategic instruments have been developed such as environmental impact assessments (EIA), strategic environmental assessments (SEA), and health impact assessments (HIA). In almost all countries of the world some kind of legal regulation is in place for environmental assessments, such as the Directives of the European Union on EIA (Directive 2014/53/EU) and on SEA (Directive 2001/42/EC), or the United Nations Economic Commission of Europe (UNECE) Espoo Convention EIA in a Transboundary Context (1991) with its Protocol on SEA (2003). Meanwhile, only in a few countries exist legal obligations at different administrative levels for HIA, for example, in Lithuania, Slovakia, or Spain. Health is among the factors that should be assessed in these environmental assessments. However, first research on the inclusion of health in environmental assessment demonstrates that environmental assessments still seem to lack consideration of all environmental health aspects, and only a limited number of SEAs involve health experts in the process. Additionally, there seems to be a persisting need to further raise the profile of health issues in environmental assessments within the health, environment and strategic planning sectors.

Objectives

This research examines the integration of health into environmental assessment such as EIA and SEA and analyses the challenges and opportunities that EIA and SEA offer to further address health issues. The overall objective of the research is to identify the main methods, tools, institutional and procedural factors that facilitate the integration of environmental health aspects into environmental assessments such as SEA. For this five research questions

were formulated regarding: 1) the environmental health aspects mainly considered in environmental assessments and specifically in SEAs; 2) the way of how these aspects are considered; 3) if and how these aspects are considered in guidelines on SEA; 4) the main barriers and facilitators for the integration of health in environmental-assessments; and 5) the kind of capacity building activities needed to further support the integration of assessing health impacts into environmental assessments.

Methods

To answer the research questions a mixed method approach has been developed comprised of five parts: 1. a generic iterative literature review of key developments in the integration of health determinants into environmental assessments and into legally binding international regulations for EIA and SEA; 2. a literature and internet review on the inclusion of health in SEA guidelines; 3. a document analysis of SEA guidelines; 4. a case study evaluation; and 5. an online questionnaire on the implementation of HIA and health in environmental assessments.

Results

The findings of the research can be summarized as follows:

(1) In environmental assessments mainly factors of the natural and built environments are considered. Other determinants are less often assessed, depending heavily on the proposals as well as on the experience of the assessor. Out of these, behavioural factors such as physical activity are more often considered and most of the health factors are only described but not further linked to possible health outcomes.
(2) In many countries the need for assessing health in environmental assessments is included in environmental laws; nevertheless, there is a limited inclusion of public health experts or health authorities in the process, and if so mainly at a later stage of the assessment.
(3) Health aspects are mentioned in SEA guidelines, but again the focus is on factors of the natural and built environment and further information on what is needed to do a meaningful health assessment is limited, if included at all.
(4) A variety of facilitating factors for HIA and the integration of health in environmental assessments have been identified:
    (a) further awareness raising on the broader aspects of health outside the health sector;
    (b) increasing awareness on HIA and health assessment among all stakeholders through further intersectoral and interdepartmental cooperation, as well as political and institutional support;
    (c) managing what can be expected from the health assessment through clear responsibilities, guidance and legal regulations;
    (d) learning from experiences from other sectors assessments, and applications in other countries or regions, as well as through joint projects;
    (e) capacity building is regarded as the main facilitating factor and should integrate the different groups of health experts as well as for environmental experts and planners;
    (f) increasing the evidence base through further joint research, better accessibility of already existing databases, open dissemination of assessment results and monitoring of the proposal implementation and long term outcomes; and
    (g) appropriate financing of personnel capacities as well as of the health assessment itself.

(5) Even though in many countries capacity building activities already exist, they are mainly done on an ad hoc basis, therefore further capacity building for the different groups of health experts as well as for environmental experts and planners is needed and should preferably be done regularly, jointly and integrated into the vocational training of health and environmental assessors.

Conclusions

The research project has shown that still a lot needs to be done for a meaningful assessment of the broader environmental health determinants in environmental assessments such as EIA and SEA. While the discussion assessing health has been taking place in different forms since the introduction of environmental assessment and some progress has been made, the overarching question – why is there still this a lack of integration – cannot be answered through this research. However, various barriers have been identified, such as a lack of awareness and knowledge on the broader aspects of health and on different impact assessment approaches. Also, differences in priorities, instead of a joint vision, and limited funding, contribute to the current situation.

A new push for further integration of the broader environmental health factors in environmental assessment and for standalone HIA could come through the 2030 Agenda for Sustainable Development with its SDGs. In all of the 17 SDGs health relevant targets can be found; additionally, EIA and SEA can contribute to at least nine SDGs, such as SDG 7 on affordable and clean energy, SDG 9 on industry, innovation and infrastructure, or SDG 11 on sustainable cities and communities.

In light of the many tasks still to be accomplished, it seems desirable to

- ensure that every policy, plan, programme and project contributes to a desirable and durable future through the consideration of environmental, social and health impacts in any impact assessment – EIA, SEA, HIA, SIA or sustainability assessments;
- further develop capacity building activities and training materials on HIA and the integration of health into environmental assessments, which also integrate sustainability assessment imperatives;
- further develop good quality criteria for health assessments within environmental assessments;
- develop action briefs on integrating health in environmental assessments of different sectors based on good practice examples;
- develop criteria and checklists which support to determine which health determinants need to be considered in which kind of environmental assessment; and
- develop an open access online knowledge exchange platform for environmental assessment and HIA.

1 Introduction

Health was defined by the World Health Organization (WHO) in 1946 as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (WHO, 1946). This broad definition, together with the conceptualization of health through multiple environmental and social determinants in the 1970s, has led to the concept of health as an outcome of a multitude of significant influences, be it positive or negative – the so-called ‘determinants of health’.

Determinants of health include many factors: biological and genetic, individual lifestyle, the natural and built environment, structure of society, policies and societal factors such as those described by Dahlgren and Whitehead (1991), and further developed by Barton and Grant (2006). Health is effected by policies, plans, programmes and projects planned and implemented not just within the health sector and relating to health systems, health financing and health care, but also in other sectors concerned with environmental policies and at the junction of environmental and health policy. Not only does this give considerable scope for action outside the health sector to prevent ill health and promote good health, but by recognizing the environmental burden of disease (EBoD) the return on investments in the environmental domain through interventions addressing the environmental root causes of disease can be considerable. Findings of the updated assessment of the burden of disease due to environmental risk factors estimated that in 2012 “23% of global deaths and 26% of deaths among children under five [were].. due to modifiable environmental factors” (Prüss-Üstün et al., 2016). In other words, 12.6 million deaths globally could have been prevented if risks related to the environment had been removed. When calculating death and diseases it is estimated that 22% of the global burden of disease is attributable to environmental factors (Prüss-Üstün et al., 2016).

The need for better integration of social and environmental determinants into policies and programmes to improve public health is reflected in Europe in supranational treaties and policy strategies, for example, through the Amsterdam Treaty establishing the European Community (1997) and its succeeding treaty, the Treaty of Lisbon (2007), which states that a “high level of human health protection shall be ensured in the definition and implementation of all Union policies and activities” (EU, 2007, Article 168). Additionally, as early as 1981, the ‘Health for All’ (HFA) strategy of the WHO Regional Office for Europe (WHO, 1981) and the ‘Health in All Policies’ (HiAP) strategy (Ståhl et al., 2006) emphasized the importance of other sectors in health policy-making and stressed the necessity of health prevention and the health conduciveness of lifestyle dimension (Sihto, Ollila & Koivusalo, 2006). A whole-of-government and whole-of-society approach is further promoted by the WHO Regional Office for Europe through Health 2020, the health policy framework and strategy. Health 2020 aims to support integrated action to address all determinants of health, both within and beyond the health sector, including the economic, social and environmental elements (WHO Regional Office for Europe, 2013a).

Furthermore, the European Environment and Health Process, established in 1989 and coordinated by the WHO Regional Office for Europe, brings together the environment and

health sectors of the 53 WHO European Member States to work together on crosscutting issues and address the environmental determinants of health. As early as 1989, in the Environment and Health Charter, the declaration of the First European Ministerial Conference on Environment and Health, WHO European Member States recognized the "dependence of human health on a wide range of crucial environmental factors" (WHO Regional Office for Europe, 1989) as well as the importance of integrating health and environment more into the policy of other sectors:

3. "All sections of society are responsible for protecting the environment and health as an intersectoral matter involving many disciplines, (…)
4. Every public authority and agency at different levels, in its daily work, should cooperate with other sectors in order to resolve problems of the environment and health." (WHO Regional Office for Europe, 1989)

To protect health different strategic instruments are mentioned in the Charter, for example, development of appropriate control measures, application of better methods of prevention, strengthening information systems or better integration of health aspects into environmental impact assessment (EIA) (WHO Regional Office for Europe, 1989). The declarations of ensuing conferences in London (1999a) and Budapest (2004) reconfirmed the need to fully integrate health into EIA and to conduct strategic environmental assessments (SEA) of proposed policies, plans, programmes and general rules.

The protection of health as a primary concern in environmental assessments is established in the four major international agreements on environmental assessments, namely the European Union (EU) in the EIA Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment (EU, 1985), reinforced in the amended Directive 2014/53/EU (EU, 2014), as well as in the SEA Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (EU, 2001), and in the United Nations Economic Commission of Europe (UNECE) Protocol on SEA to the Espoo Convention on Environmental Assessment in a Transboundary Context (2003)[2].

However, recent research on the inclusion of health in impact assessment demonstrates that environmental assessments still seem to lack consideration of all environmental health aspects, determined by the natural (biological, chemical, physical), built, social and behavioural factors, and, only a limited number of SEAs involve health experts in the process. Additionally, a need to further raise the profile of health issues in environmental assessments within the health, environment and strategic planning sectors, has been identified by numerous authors such as Breeze and Lock, 2001; Douglas, Carver and Katikreddi, 2011; Fehr et al., 2014; Fischer, 2014; Fischer, Martuzzi and Nowacki, 2009; Harris et al., 2009; Kørnøv, 2009; Nowacki, Martuzzi and Fischer 2010.

This research examines the integration of health into environmental assessment such as EIA and SEA and analyzes the challenges and opportunities that EIA and SEA offer to further address health issues. A special focus is on SEA as one of the tools offering the potential for

[2] In the following text called 'Protocol on SEA'

enhanced integration of health into the higher level of the environmental policy and decision-making process.

As this research not only deals with issues within the public health community, but also with cross-sectoral issues such as planning and policy-making, its aim is twofold: on the one hand to answer the research questions, as further defined in chapter 3, and on the other hand to introduce the subject, including major historic development, to a broader audience than the public health sector, to bridge the divide and contribute to further understanding and acknowledgement in other sectors of the public health aspects in implementing health inclusive environmental assessments.

The publication is divided into 10 chapters, with CHAPTER 1 being this introduction.

CHAPTER 2 defines the broader context of the publication, giving an overview on public health and environmental health concepts which form the basis of the research, including some historic developments. Furthermore, it describes the conceptual frameworks relevant for environmental and health impact assessment, and finally introduces the different forms of environmental, social and health assessments.

CHAPTER 3 defines the overall aim and the research questions.

CHAPTER 4 describes the methodological approach applied and methods used in order to provide answers to the research questions.

CHAPTERS 5, 6 and 7 present the results of the research methods used, with CHAPTER 5 focusing on how health is dealt with in environmental assessments as documented in literature and through online research on SEA guidelines; CHAPTER 6 presenting the results of a project on capacity building in environment and health; and CHAPTER 7 describing the results of an online questionnaire on HIA implementation and the integration of health into environmental assessment across the WHO European Region.

In CHAPTER 8 the results of the research described in chapters 5 to 7 are summarized and discussed in relation to the research questions.

CHAPTER 9 concludes the research and CHAPTER 10 gives an outlook on further opportunities to enhance the integration of health into environmental assessments such as EIA and SEA.

2 Theoretical background, public health relevance and key terminology

The following chapter gives an overview of the relationship between health and the environment and the relevance of the environment for public health in general. It presents selected political frameworks and structural models which build the backbone for environmental and health assessments, and the most widely recognized impact assessment approaches (Bond & Pope, 2012) are introduced. The chapter also introduces the subject to a broader audience with no public health background. Hence, the most important concepts in the areas of environment and health, and of impact assessments, are introduced, including key historic developments. Furthermore, the chapter presents the main definitions and important key terminology, on which this research is based.

2.1 Generic literature review

The theoretical background of the research is based on standard references on public health, and on environment and health concepts. These references have been expanded through an iterative literature research process using references in obtained literature as well as online databases such as PubMed, Web of Science Database, Scopus, and Google Scholar, to take account of recent developments in the area of environment and health as presented in scientific journals and books. Additionally, grey literature in the form of various conference reports, declarations, or action plans, as well as legal documents such as Directives of the EU, were included in the literature research to give a comprehensive overview on historic developments.

Furthermore, an iterative literature research on different impact assessment forms was conducted. The research was based on standard literature on environmental impact assessment (EIA), strategic environmental assessment (SEA), health impact assessment (HIA), and social impact assessment (SIA), and sustainability assessment, as the impact assessment forms most often referred to. After defining the different types of impact assessment, their main differences and their relation to health, the search then focused mainly on papers published within the last 15 years on the implementation of SEA and the inclusion of health.

2.2 Health and the environment – the conceptual basis

Health has always been important, not only for the individual, but also for the community as a whole. It has even been defined as a human right in itself. In this regard the World Health Organization (WHO) acknowledges in its Constitution (1946) that the "enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition" (WHO, 1946). The universal definition of health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity"[3] (WHO, 1946) sets an ideal goal for WHO Member States and society at large. Even though this definition has been widely

[3] "The Constitution was adopted by the International Health Conference held in New York from 19 June to 22 July 1946, signed on 22 July 1946 by the representatives of 61 States […], and entered into force on 7 April 1948" (WHO, 1946).

criticized as being too utopian, too focused on the individual, too static, and unmeasurable, it is seen as the only definition on which the world's largest expert group has ever been able to agree upon, and hence it is widely accepted and used (Franke, 2012; Hurrelmann, Laaser & Razum, 2016; Labisch & Woelk, 2016; Schnabel, 2015; White, Stallones & Last, 2013).

This does not mean that many other definitions of health have not been developed in an attempt to refine WHO's definition. They reveal a broad spectrum of aspects that are important for individuals, for different professional groups as well as for society in general. From a purely medical perspective, health is often described as being free from any physical or mental dysfunction. This perspective is based on the assumption that a clear differentiation can be made between a state of health and a state of non-health.[4] This has by now been challenged in many ways, for example, through research on the psychological and social function of health and conditions to sustain it. Hence, other definitions of health emphasize the importance to be able to fulfil a role or specific function, further supporting the significance of well-being, mentioned in the WHO definition, or they describe health as a state of equilibrium (Franke, 2012). In this regard, Antonovsky (1987) described health not as a complete state but rather as a state on a continuum between ill-health and good health, a state which needs to be balanced and renewed in each period of life (Antonovsky, 1997, 1987). Accordingly, health can be seen as a result of the production and conservation of the social, psychological and physical capabilities of a person (Hurrelmann, 1994) and as "a state of equilibrium of risk factors and protective factors, which occurs when a person can manage both internal and external demands" (translated from Hurrelmann, 2006; cited in Franke, 2012).

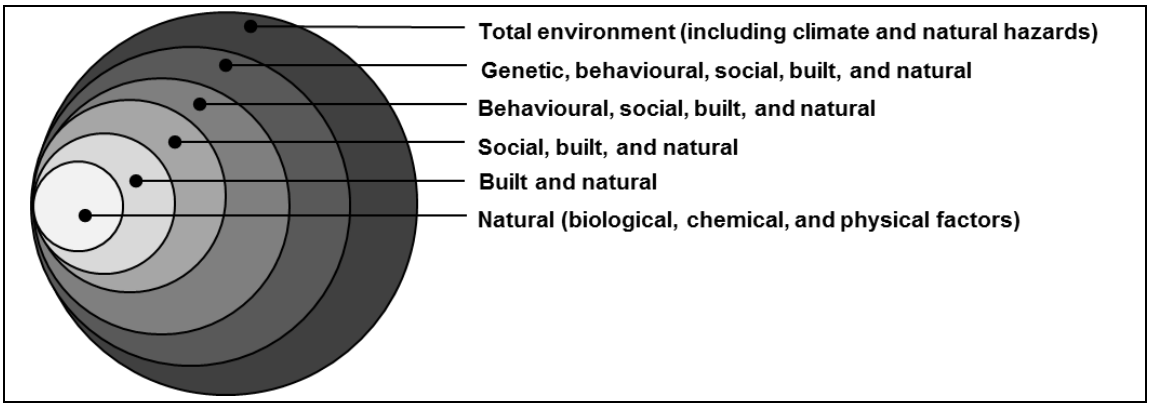
A further broad definition has been developed by Stokes, Noren and Shindell (1982) with health as a "state characterized by anatomic, physiologic and psychological integrity; ability to perform personally valued family, work and community roles; ability to deal with physical, biologic, psychological and social stress; a feeling of well-being; and freedom from the risk of disease and untimely death" (Stokes, Noren & Shindell, 1982; cited in Porta et al., 2014). Last (2007) has taken a more ecological view on health as being a "sustainable state of equilibrium or harmony between humans and their physical, biological, and social environments that enables them to coexist indefinitely" (Last, 2007).

Not only health, but also environment, can be defined narrowly and broadly. In its broadest definition "environmental factors include all those that affect the organism after conception regardless of whether they are mediated by social conditions and individual choice or through environmental media" (Smith, Corvalán & Kjellström, 1999). Narrow definitions focus more on the natural environment, composed of biological, chemical and physical agents in air, water and soil, and might also include the man-made/built environment composed of factors such as

[4] While in German only one term is used for a state of non-health "Krankheit" in English a state of non-health is described through the terms disease, illness, and sickness which, according to Porta (2014), should not be used synonymous: "i. Disease is the biological dimension of non-health, an essentially physiological dysfunction. ii. Illness is a subjective or psychological state of the person who feels aware of not being well; the experience of a person with a disease; a social construct fashioned out of transactions between healers and patients in the context of their common culture. iii. Sickness is a state of social dysfunction of a person with a disease; the role that the individual assumes when ill; a result of being defined by others as 'unhealthy'" (Porta et al., 2014).

"housing, transportation, urban [and rural] development, land use, industry, and agriculture" (U.S. Department of Health and Human Services, 2000). These factors are further reflected in the social environment and not only result in "exposures such as work-related stress, injury, and violence" (ibid.) but also include "influences upon the individual that arise from societal and cultural factors" (Friis, 2012), such as opportunities for recreational and leisure activities. Hence, broader definitions in the field of environment and health also include social risk factors such as crime, stress or war, and sometimes behavioural factors such as personal hygiene, nutrition or exposure to second hand-smoke; they also sometimes embrace natural hazards like earthquakes, or factors related to climate change, such as floods, droughts or other inclement weather conditions (Smith, Corvalán & Kjellström, 1999). These different layers are shown in Fig. 1. below.

Fig. 1. Layers of the environment



(Source: based on Smith, Corvalán & Kjellström, 1999)

As this research is focused on environment and health, it will use the WHO definition of health as society's goal to enable its members to achieve the highest health status possible, complemented by Last's ecological view on health (Last, 2007). Accordingly, the definition of environment used for this research focuses on those factors external to the person, represented in the inner four layers of Fig. 1: the natural environment (biological, chemical, physical), built environment, and (parts of) the social and behavioural environments.

The wide-ranging diversity of the definitions of health and the influence of environmental factors on health are also reflected in the history of public health, as briefly described in the following subchapters, which focuses on the role of environmental factors in the development of public health.

2.2.1 Public health and environmental factors

Public health has been defined by Sir Donald Acheson as "the science and art of preventing disease, prolonging life and promoting health through organized efforts of society" (Acheson, 1988). This definition has been taken up by the WHO Regional Office for Europe as a generic definition which contains the most important characteristics of public health. Thus, if viewed together with WHO's definition of health, public health is concerned with the well-being and health of a population; with knowledge and evidence generation, and using this evidence for action to tackle threats to health and major health issues. It is prospective and future oriented,

and concerned with health systems, health governance as well as intersectoral action (Marks, Hunter & Alderslade, 2011).

Basic concepts of these functions of public health, as well as linkages of environmental factors to health can be retraced to early civilizations such as ancient Indian cities in the Indus valley and Punjab region, ancient Egypt or the civilizations of ancient Greece and Rome (Rosen, 1993; Schnabel, 2015). The attention given to major health problems in communities has always varied, but the problems themselves were always "the control of transmissible disease, the control and improvement of physical environment (sanitation), the provision of water and food of good quality and in sufficient supply, the provision of medical care, and the relief of disability and destitution" (Rosen, 1993).

The idea that individual health can only improve through both individual and community action has always been widely accepted, but according to Hamlin (2015), the involvement and actions taken by a government in times of crisis are more to preserve its power than for humanitarian reasons. For example, during the plague in medieval Europe or cholera pandemics in the 1830s government intervention was to keep the state functioning (Hamlin, 2015).

From the 16th century onwards, the dominating concepts of health protection, dietetics and hygiene were overshadowed by new developments in natural sciences and epidemiology of a more biomedically oriented nature, focusing mainly on the discovery and treatment of diseases (Schnabel, 2015). Community health and especially occupational health still had its role to play, but mainly in securing and maintaining a healthy workforce, and thus securing the economic development and strength of the state (Rosen, 1993). Hamlin (2015) emphasizes that for a state "the efforts to combat epidemic disease were not reflective of a sense of obligation to the health of individuals. The welfare of individual subjects was incidental" (Hamlin, 2015; see also Labisch & Woelk, 2016).

According to Rosen (1993), public health as we know it today developed out of the sanitary reform movement of 19th century England and mainly as a consequence of the extremely unhealthy urban conditions resulting from the Industrial Revolution. Uncontrolled and unregulated growth of the urban population led to cities which were "extremely unsanitary, dirty and pervaded by nauseating smells" (Rosen, 1993). The sanitary reformers strived to reduce the enormous human cost of industrialization: ill-health and premature death. The growing modern urban environments, the increasing number of factories, and increasing migration to cities resulted in the vast majority of the population living in overcrowded districts and under extremely dirty and insanitary conditions.[5] These conditions led to the need for disease prevention and protection of health and, amongst other things, to the development of the 'sanitary idea' by Edwin Chadwick in the late 1830s. Chadwick argued that public investment in water and sewerage systems would not only save lives but also lower the costs for supporting widows and orphans as well as "remoralize the underclass" (Hamlin,

[5] for example, a census of 1841 in the city of Liverpool, England, revealed that out of population of 223 054 over 70% belonged to the working class (160 000) and out of these 60% lived in unhealthy conditions, with 40 000 people living in cellars and 60 000 in close courts. Parts of the latter were usually also used as cesspool or dunghill (Rosen, 1993).

2015). Such investment for the improvement of environmental factors was still for the purpose of keeping the control with the authorities.

In the 19th and 20th centuries, progress in microbiology and immunology revealed that specific organisms were responsible for diseases such as typhoid fever and cholera. Discoveries in the role of animal vectors, and how then infections could be prevented, led among other things to the development of vaccinations (Rosen, 1993). In addition, according to Hamlin, public health saw advancements in two areas: the science and practice of eugenics, focusing on the "human genotype and the inadequacy of public health programmes that ignored heredity"[6], and the rise of nutritional science (Hamlin, 2015).

Additionally, also according to Hamlin (2015), in the 19th century states no longer viewed investment in public health actions to combat epidemics as a means of sustaining the state, but as a means "by which the state served its sovereign citizens with an (increasing) standard of health that they (increasingly) took as a right of citizenship" (Hamlin, 2015).

The 20th century has not only seen further advances in health technologies and further emphasis on individual health, but also a shift in the more developed countries from communicable and/or infectious disease to noncommunicable diseases (NCDs), such as cancers and cardiovascular diseases, and an increase in chronic diseases. This change is further compounded by increased longevity and decreasing birth rates resulting in an increasingly ageing population (Detels & Tan, 2015).

While the biomedical paradigm became the leading paradigm with a focus on treatment and curing of diseases, McKeown (1979) demonstrated that the major advances in health in the 20th century were achieved due to environmental changes, through improved water and sanitation systems, enhanced nutrition and living standards, and economic growth, rather than through medical enhancements. Additionally, the so-called modern public health was, according to Szreter (2002), from its beginnings characterized by "an accompanying redistributive social philosophy and practical politics" (Szreter, 2002) also seen in the rise of the welfare state in the 20th century. The development of public health from the 19th to the 21st century in the United Kingdom of Great Britain and Northern Ireland[7] is summarized in four waves and presented in Table 1.

Table 1. Four waves of public health development in the United Kingdom

Wave	Short description
1. Wave (~ 1830–1900)	Responses to the profound disruptions of the Industrial Revolution through classic public health interventions, such as water and sanitation, etc., and concerns with civil and social order
2. Wave (~ 1890–1950)	The emergence of medicine as science: scientific rationalism provides breakthroughs in many fields including manufacturing, medicine, engineering, transport, and communications, etc.
3. Wave (~ 1940–1980)	Redesign of social institutions and emergence of the welfare state and the post-war consensus: the National Health Service, social security, social housing, and universal education, etc.

[6] Eugenics is reflected in its most infamous application under the German Nazi regime and its acceptance of euthanasia and the institutionalization of death camps as facilities of state medicine, resulting in the Holocaust and its deathly campaigns against Jews, 'anti-social' subjects, and other non-Aryans.

[7] In the following text called United Kingdom

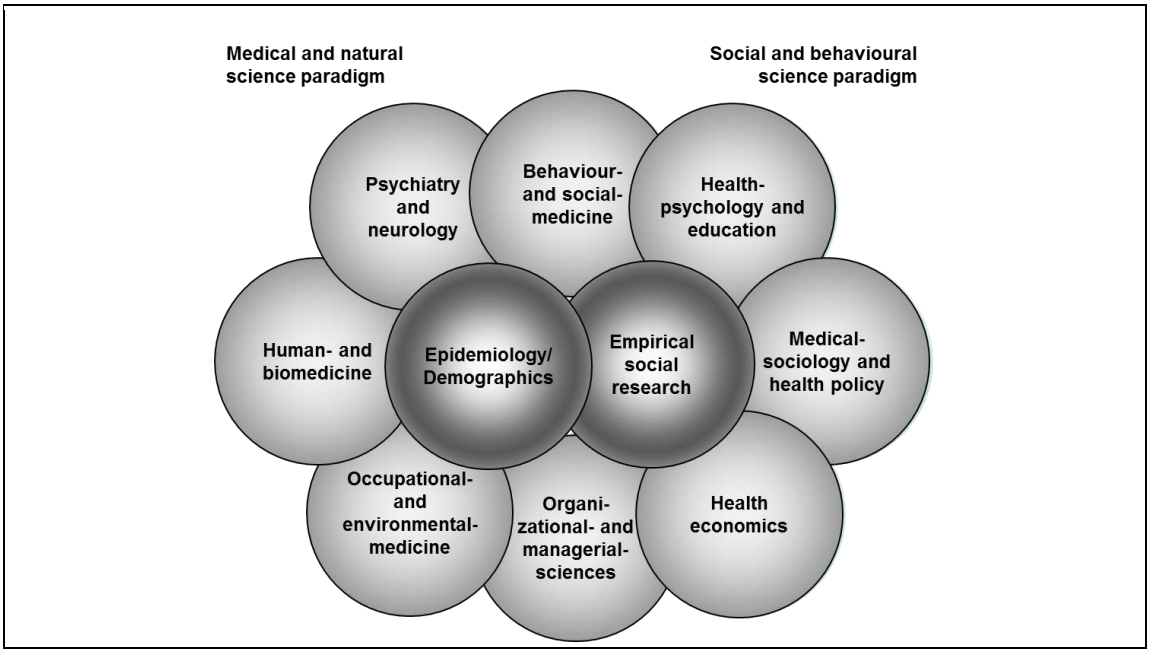
Table 1. contd.

Wave	Short description
4. Wave (~ 1960–present)	Combatting of disease risk factors and the emergence of systems thinking: effective health care interventions help to prolong life; risk factors and lifestyle becoming of central concern to public health; emergence of concerns regarding social inequalities in health

(Source: based on Hanlon et al., 2011; Davies et al., 2014)

In this regard, the fourth wave in the 21st century has seen a re-emphasis on environmental factors, but these factors have been (and often still are) seen as less controllable by an individual. Instead, the individual is perceived, or sees itself, as a victim of "corporate oligopolies and .. the government they influenced" (Hamlin, 2015). Examples of this can be seen in the cases of toxic chemicals in food, radiation and global climate change. Furthermore, besides the reinforced importance of biological, chemical and physical environmental factors, and enhanced knowledge of the diseases attributed to them, the importance of the broader social environmental factors was recognized. The latter has coincided with rising interest over the last ten years in a more integrated approach to the 'social determinants of health' (SDHs) to tackle health inequalities, an approach and process led by WHO (Hamlin, 2015; Schnabel, 2015).

Fig. 2. Main disciplines of public health



(Source: based on Hurrelmann, Laaser & Razum, 2016) © 1993, 2012 Beltz Juventa

The term 'New Public Health'[8] describes the interdisciplinary and multi-professional approach established after the Second World War, in which all population groups are taken into account and aiming at integrating a wide range of different disciplines such as medicine, epidemiology, psychology, and natural, social and economic sciences. Old and New Public Health have further been embedded in the even broader field of 'health sciences', which also

[8] 'old public health' was mainly concerned with population groups that do not have adequate access to health care and its main disciplines of hygiene, microbiology, epidemiology and prevention

incorporates the interrelation of theories and research of different scientific disciplines (Hurrelmann, Laaser & Razum, 2016). These different disciplines of public health or health sciences are shown in Fig. 2.

Accordingly, research and activities in the field of public health concentrate mainly on the acquisition of scientific knowledge regarding the determinants of health and illness, on solutions meeting the demand of the population, effectiveness and efficiency of health promotion, coping with disease, rehabilitation and health care, as well on the organisation and evaluation of health systems. Importantly, of utmost significance are both a pathogenic approach – i.e. why people get ill, and a salutogenic approach – i.e. what keeps people healthy (DGPH, 2012; Schnabel, 2015).

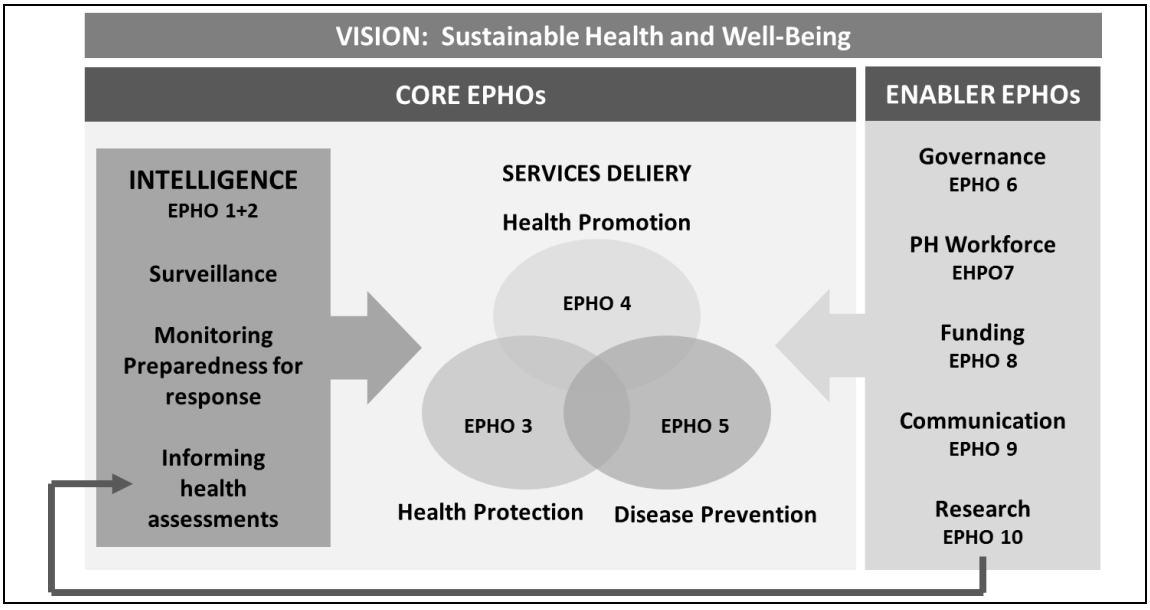
Based on the broad definitions of health and public health, as described above, WHO has developed the ten Essential Public Health Operations (EPHOs), which include environmental, occupational, and food safety factors to be considered for health protection. The EPHOs should be implemented by WHO European Member States in order to enhance population health and well-being, and to address health inequity. The ten EPHOs and their clusters are presented in Box 1 and Fig. 3 (WHO Regional Office for Europe, 2012).

Box 1. Ten essential public health operations (EPHOs)

1. Surveillance of population health and well-being
2. Monitoring and response to health hazards and emergencies
3. Health protection including environmental, occupational, food safety and others
4. Health promotion including action to address social determinants and health inequity
5. Disease prevention, including early detection of illness
6. Assuring governance for health and well-being
7. Assuring a sufficient and competent public health workforce
8. Assuring sustainable organizational structures and financing
9. Advocacy, communication and social mobilization for health
10. Advancing public health research to inform policy and practice

(Source: WHO Regional Office for Europe, 2012)

Fig. 3. Clustering of Essential Public Health Operations (EPHOs)



(Source: adjusted from WHO Regional Office for Europe, 2012)

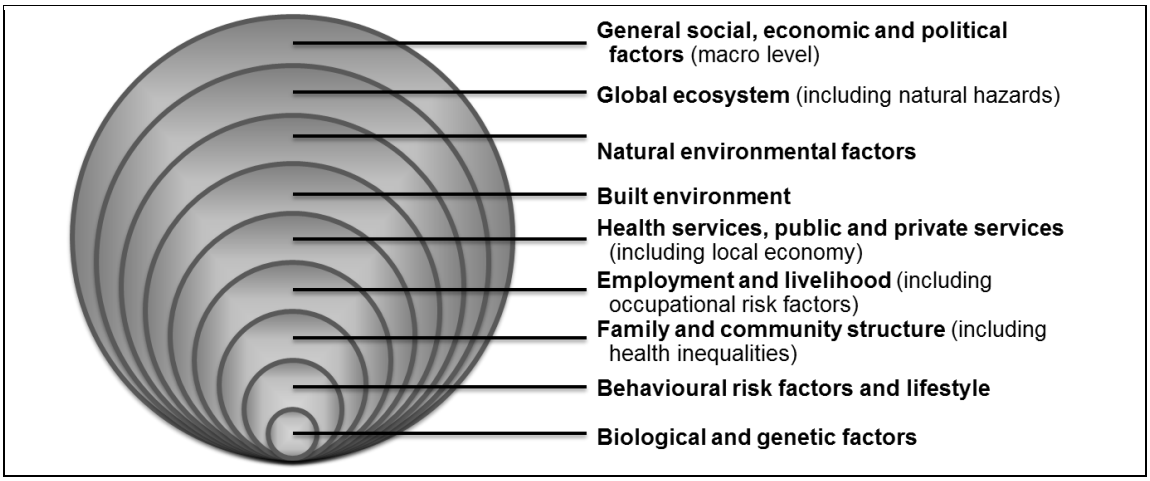
The EPHOs are clustered in core and enabler operations, with the core EPHOs covering health intelligence-related operations (population surveillance, monitoring of emergency preparedness and informing through health assessments), and those related to service delivery (health promotion, health protection, and disease prevention) while the enabler EPHOs relate to governance, public health workforce, communication, and research (WHO Regional Office for Europe, 2012). The clustering of the EPHOs is shown in Fig. 3 above.

As HIA and health in environmental assessments can be considered tools for health protection and promotion, and for the support of governance for health and well-being, this research will mainly consider EPHOs 3, 4, 6, 7 and 9.

2.2.2 Determinants of health

As described above there is a wide range of social, economic, environmental and cultural factors that form the scope for personal development options (Hurrelmann, 1994). These so-called determinants of health usually lie outside the health sector. They include biological, genetic and individual factors as well as individual lifestyle factors, and those relating to the natural and built environment, structures of society, policies and societal factors as, for example, described by Evans and Stoddart (1990) or compiled in the rainbow model by Dahlgren and Whitehead (1991), and further developed and discussed by Barton and Grant (2006) and many others. Fig. 4 below presents an overview of the main categories compiled out of selected publications presenting the determinants of health.

Fig. 4. The broad spectrum of environmental and social determinants of health and well-being



(Source: based on Barton & Grant, 2006; Bhatia, 2011; CSDH, 2008; Dahlgren & Whitehead, 1991; Human Impact Partners, 2011; Nowacki, Martín-Olmedo & Martuzzi; Public Health Advisory Committee, 2005; WHO Regional Office for Europe, 2013b,a, 2005)

As shown in the figure, a person's health and well-being is not only influenced by individual factors such as age, gender, existing health conditions or heredity, but also by behavioural risk factors and lifestyle (for example, diet, physical activity, work-life balance), the family and the surrounding community (social capital and networks, crime and violence), employment and livelihood (for example, employment status and job security, occupational hazards), as well as the public and private provision of health services, local economy (possibilities of wealth creation, underlying market structures) which in return influences the activity options of a

person (such as working, shopping, moving, living, playing, study). Furthermore the built (buildings, places, streets, routes, open spaces) and natural environments (natural habitat, air, water, soil) as well as the global ecosystem (for example climate change and biodiversity) and the macro level of general social, economic, and political factors all influence health and well-being over the life course; they are interlinked and interact with each other. Examples of the different factors are given in Table 2 below (Dahlgren & Whitehead, 1991; Barton & Grant, 2006; Friis, 2012).

Table 2. Categories and examples of the broader environmental and social determinants of health and well-being

Main category	Examples of determinants and factors influencing health and well-being
A. General social, economic and political factors (macro level)	1. discrimination / racism 2. economic, social, environmental and health trends 3. freedoms of speech and press 4. general inequalities 5. local and national priorities, policies, programmes and projects 6. political participation 7. poverty 8. social exclusion
B. Global ecosystem	1. biodiversity; natural spaces and habitats 2. climate change (including extreme weather events) 3. natural hazards (including earth quake, volcanos, wildfire, landslide hazards, etc.)
C. Natural environmental factors (biological, chemical and physical)	1. air quality 2. biological and chemical agents 3. disease vectors 4. food resources and safety 5. open and green space, landscape 6. radiation 7. soil (contamination) 8. water resources and safety
D. Built environment	1. housing safety 2. housing size and level of crowding 3. housing supply, affordability, and accessibility 4. indoor air quality 5. industrial areas – industrial contaminated sites 6. light pollution (e.g., reflections) 7. neighbourhood infrastructure and liveability 8. noise pollution 9. places 10. residential segregation 11. sites of cultural significance (sacred or historic) 12. smell/odours 13. streets and routes 14. urban green space, parks/landscape 15. vibrations
E. Services (location, access, for example, for disabled people or elderly, and cost)	Health services 1. emergency response 2. hospitals – access and quality 3. primary community and secondary health care – access and quality Public services 1. child care services – access and quality 2. educational – access and quality 3. police/security and emergency response 4. public transportation – access and quality 5. social services – access and quality 6. waste systems – waste disposal 7. water and sanitation systems

Table 2. contd.

Main category	Examples of determinants and factors influencing health and well-being
Services contd.	Private services and local economy 1. financial institutions 2. retail food resources 3. shopping – access and quality
F. Employment and livelihood	1. income and employment benefits 2. un-/employment and job security 3. workplace occupational hazards 4. workplace rewards and control
G. Family and community structure	1. community centres 2. crime and violence 3. cultural and spiritual participation 4. family structure and relationships 5. health inequalities (e.g., in different neighbourhoods) 6. health of minorities and vulnerable groups/impacts on different social groups 7. social support (neighbourliness, social networks and isolation) 8. voluntary group participation
H. Behavioural risk factors and lifestyle	1. alcohol consumption 2. diet 3. hygiene 4. leisure and recreational activity 5. physical activity/inactivity 6. smoking 7. substance abuse
I. Biological and genetic factors	1. age 2. existing health conditions and disabilities 3. gender

Note: examples in alphabetical order

(Source: based on Barton & Grant, 2006; Bhatia, 2011; CSDH, 2008; Dahlgren & Whitehead, 1991; Human Impact Partners, 2011; Nowacki, Martín-Olmedo & Martuzzi; Public Health Advisory Committee, 2005; WHO Regional Office for Europe, 2013b,a, 2005)

This research will mainly focus on the natural environmental factors (category C), the built environment (category D), and services (category E), but less on behavioural risk factors and lifestyle (category H). It will also discuss how these categories can directly affect factors of the employment and livelihood (categories F) and community structures (category G).

2.2.3 Environmental burden of disease (EBoD)

In a first calculation of how much ill-health is attributable[9] to environmental factors, the so-called EBoD, Smith, Corvalán and Kjellström (1999) concluded that, out of 22 health conditions[10] which can be linked to environmental factors, 25–33% of the global burden of disease could be attributed to these factors.[11] As a basic unit of ill-health the authors used the

[9] As attributable environmental risk Smith et al. (1999) defined "the percentage of a particular disease category that would be eliminated if environmental risk factors were reduced to their lowest feasible values" (Smith, Corvalán & Kjellström, 1999).

[10] acute respiratory infections (ARI), diarrhoea, perinatal conditions, child cluster (measles, pertussis, polio, tetanus, diphtheria), cancer, depression, malnutrition/anaemia (direct effects), heart (ischemic), stroke (cerebrovascular disease), tuberculosis, road accidents, congenital anomalies, Malaria, maternal conditions, sexually transmitted diseases (STDs) / human immunodeficiency virus (HIV), chronic obstructive pulmonary disease (COPD), falls, war, suicide, alcohol (direct effects), drowning (Smith, Corvalán & Kjellström, 1999).

[11] included in the analysis were the following environmental risk factors: non-nutritional elements of diet, including food additives, infectious agents, pesticides, etc., and passive smoking; behavioural factors related to

disability-adjusted life years (DALYs), "determined by summing the years of lost life due to premature deaths plus the weighted years of disability due to a particular disease or risk factor" (Smith, Corvalán & Kjellström, 1999). Their analysis also revealed that children under 5 years of age are particularly affected, for example, by acute respiratory infections with ambient air pollution and housing conditions being the main environmental risk factors, or by diarrhoea due to poor sanitation, hygiene and lack of access to safe water and food. Furthermore, the analysis showed that the EBoD is highest in the poorest countries and is significantly related to environmental quality problems (Smith, Corvalán & Kjellström, 1999).

These first findings where confirmed in 2006 and again in 2016: In 2006 Prüss-Üstün and Corvalán estimated that in the year 2002 "24% of the global burden of disease and 23% of all death can be attributed to environmental factors" (Prüss-Üstün & Corvalán, 2006), with the proportion of death among children aged 0–14 years as high as 36%. Out of a total of 102 disease categories defined in the World Health Report 2004 (WHO, 2004) the authors identified 26 diseases, for which environmental factors contributed significantly to the overall burden of disease, calculated in DALYs. The four diseases with the highest absolute burden attributable to modifiable environmental factors were diarrhoea, with 94% of the burden attributable to environmental risk factors like unsafe drinking water, poor sanitation and hygiene; lower respiratory infections, with 20% attributable to indoor and outdoor air pollution in developed countries and 42% in developing countries; 'other' unintentional injuries, attributing 44% of these injuries to workplace hazards, radiation or industrial accidents; and Malaria, with 42% attribute to modifiable environmental risk factors related to land use, deforestation, water resources management, settlement location, improved drainage etc. (Prüss-Üstün & Corvalán, 2006).

As already mentioned, the analysis of 2002 data revealed that "children suffer a disproportionate share of the environmental burden" (Prüss-Üstün & Corvalán, 2006), with 36% of the overall burden of disease among children under 5 years of age and 37% of all deaths. Out of this an average of 26% of all deaths of children under 5 years of age in developing countries was attributed to diarrhoea, malaria, and respiratory disease. Hence, the analysis once more confirmed a large difference between developing and more developed regions, with 25% of death attributed to environmental factors in developing regions and 17% in developed regions. Furthermore, developing countries were carrying a disproportionately higher burden of communicable diseases and injuries compared to developed countries, while the fraction of NCDs attributable to environmental factors showed no overall difference between developing and developed countries (Prüss-Üstün & Corvalán, 2006).

This picture changed in the analysis of the 2012 data:[12] While the total burden of disease calculated in DALYs decreased to 22% (596 million DALYs, 95% CI: 13–32%) from 24% (354

personal and household hygiene, and leading to community and larger-scale pollution; direct and indirect risks for malnutrition to account for degraded soils, floods, and other human-engendered impacts on the quantity, quality and distribution of food; a component of injuries, and some social non-physical/non-chemical stressors; a small component of environmental risk for every disease group; health impacts on the natural environment, such a dust exposure and natural disaster drowning (Smith, Corvalán & Kjellström, 1999).

[12] While there were some changes in the methods between the 2002 and 2012 studies the authors consider these as being relatively minor in terms of the total burden of disease, nevertheless the changes were important for

million DALYs) in 2002, the fraction of total deaths remained almost the same with 12.6 million deaths (total 22.7% (95% CI: 13–34%) in 2012 compared to 23.3% (13.3 million deaths) in 2002. Up to 26% of the total deaths among under 5 years is estimated to have been preventable, a decrease from 37% in 2002. The 2012 study also shows a shift in the disease burden from communicable diseases to NCDs. This also reflects the trend in total deaths by disease groups which rose for NCDs from 33.5% in 2002 to 37.7% in 2012 (Prüss-Üstün et al., 2016). For the trends from 2002 to 2012 see Table 3.

Table 3. Changes in the burden of disease from 2002 to 2012 assessments[13]

Attributable to environmental risk factors	2002 data	2012 data
Global burden of disease in DALY	24% (95% CI: 21–27%) 354 million	22% (95% CI: 13–32%) 596 million
Global death	23.3% (95% CI: 21–25%) 13.3 million	22.7% (95% CI: 13–34%) 12.6 million death
Fraction of death of noncommunicable disease	17%*	22%*
Fraction of death of infectious, parasitic, neonatal, and nutritional diseases	31%*	20%*
Fraction of death of injuries	37%*	38%*
Global death among children under 5 years	37%*	26% (95% CI: 16–38%)
Global burden of disease among children under 5 years	36% (95% CI: 31–40%)	25% (95% CI: 13–34%)

(Source: based on Prüss-Üstün et al., 2016; Prüss-Üstün & Corvalán, 2006)
Note: Confidence Interval (CI) not available.

The total global population in 2012 was estimated at 7044.3 million, the total global deaths at 55.6 million and the total burden of disease at 2736 DALYs. Out of these it is estimated that a total of 12.6 million (23%) deaths and 596 million DALYs (22%) could have been prevented, if exposure to environmental risk factors were "removed or reduced to an alternative (or counterfactual) exposure distribution – the minimum exposure distribution currently achieved in certain population groups, or that which could be achieved by changes in the environment" (Prüss-Üstün et al., 2016).

Out of the three main disease groups NCDs present the highest burden of disease (276 million DALYs) and the highest share of deaths (8.2 million deaths), followed by infectious, parasitic, maternal, neonatal and nutritional causes with 2.5 million deaths and a disease burden of 202 million DALYs, while the category of intentional and unintentional injuries has the highest population attributable fractions of death (38%) and disease burden (39%) within its category as they are often directly caused by environmental factors. Importantly, SDHs were not included separately in the calculations, even though some of them "are closely linked to and mediated exposure to environmental risk factors" (Prüss-Üstün et al., 2016), see Table 4.

certain diseases like less infectious diseases included as consequences of malnutrition, effects of water and sanitation considered only for low- and middle income countries, or the inclusion of injuries from fire and hot substances (for further details refer to Prüss-Üstün et al., 2016).

[13] See footnote 12 above on methodological differences in the assessments 2006 and 2016.

Table 4. Total and attributable deaths and burden of disease to the environment by disease group, 2012 assessment

Disease group	Death			DALYs		
	Total deaths (million)	Attributable to the environment (million)	Population attributable fraction (%)	Total DALYs (million)	Attributable to the environment (million)	Population attributable fraction (%)
Infectious, parasitic, maternal, neonatal and nutritional causes	12.8	2.5	20%	925	202	22%
NCDs	37.7	8.2	22%	1,506	276	18%
Injuries	5.1	1.9	38%	305	118	39%
Total	**55.6**	**12.6**	**23%**	**2,736**	**596**	**22%**

(Source: based on Prüss-Üstün et al., 2016)

The 12 main disease and injury groups and the main areas for interventions which show further clear links to environmental factors are presented below in Table 5. The table also presents the environmental burden of the disease or injury through the population attributable fraction of DALYs in percentage and magnitude, as well as the total global death attributable to environmental risk factors. For the full list please refer to Annex 1.

Table 5. The 12 highest disease and injury groups and possible areas for intervention, by population attributable fractions, global DALYs and total number of global deaths

Disease or injury by group	Main intervention areas	Population attributable fraction (% of DALYs)	World - Total DALYs (000s)	World - Total Deaths (000s)
NCDs [f]		**18**	**276 224**	**8170.7**
Cancers, global	Household and ambient air pollution, second-hand tobacco smoke, ionizing radiation, UV radiation, chemicals, worker protection.	20 (95% CI:9–43)	44 950	1 665.8
Mental, behavioural and neurological disorders, global	Occupational stress; disasters such as floods, earthquakes and fires (linked to housing, flood management, climate change); forced resettlements in the context of development projects; occupations in the entertainment or alcohol industry; head trauma (for epilepsy); chemicals (for certain neurological diseases); noise (for insomnia); bright lights, poor air quality and odours (for headaches). Physical activity fostered by supportive environments can reduce certain disorders.	12 (95% CI:3–30)	32 703	154.2
Cardiovascular diseases	Household and ambient air pollution, second-hand tobacco smoke, exposure to lead, stressful working conditions, shift work.	31 (95% CI:20–40)	121 268	4900.2
COPD, global [g]	Household air pollution, ambient air pollution, exposure to dusts in the workplace.	35 (95% CI:20–48)	32 280	1193.6
Musculoskeletal diseases, global	Occupational stressors, prolonged sitting at work and poor work postures; need to carry large quantities of water over significant distances for domestic use.	22 (95% CI:12–33)	24 130	32.6

Table 5. contd.

Disease or injury by group	Main intervention areas	Population attributable fraction (% of DALYs)	World - Total DALYs (000s)	World - Total Deaths (000s)
Infectious, parasitic, maternal, neonatal an nutritional causes [r]		**22**	**201 722**	**2503.7**
Infectious and parasitic diseases [e]			**173 068**	**2206.3**
Lower respiratory infections, global [a]	Household and ambient air pollution, second-hand tobacco smoke, housing improvements.	35 (95% CI:27–41)	51 753	566.4
Diarrhoeal diseases	Water, sanitation and hygiene, agricultural practices, climate change.	57 (95% CI:34–72)	56 607	845.8
Malaria, global	Environmental modification and environmental manipulation to reduce vector breeding sites and reduce contact between humans and disease vector, contextually mosquito-proof drinking-water storage, livestock distribution.	42 (95% CI:28–55)	23 074	258.7
Neonatal and nutritional conditions [e]			**28 654**	**297 4**
Neonatal conditions, global	Household air pollution, mothers' exposure to second-hand tobacco smoke, poor water and sanitation in birth settings.	11 (95% CI:2–27)	25 820	270.1
Injuries [r]		**39**	**118 466**	**1950.1**
Unintentional injuries [e]			**105 245**	**1704.0**
Road traffic injuries, global	Design of roads, land-use planning; traffic intensification in development areas with big infrastructure projects.	39 (95% CI:23–64)	31 001	497.1
Drownings, global	Safety of water environments, public awareness, regulations, worker safety, climate change.	73 (95% CI:46–90)	16 948	268.2
Other unintentional injuries, global	Protection from animal bites and contact with venomous plants, safety of mechanical equipment, ionizing radiation and currents.	43 (95% CI:20–74)	23 134	393.1
Intentional injuries [e]			**13 222**	**246.1**

(Source: based on Prüss-Üstün et al., 2016, see Tables ES2, A2.1, A2.3 & A2.4)

Notes: a) Lower respiratory infections in adults were not estimated; e) Population attributable fraction not available; f) 95% CI not available; g) COPD – chronic obstructive pulmonary disease.

As can be seen in the key areas for interventions in Table 5 above, the so-called 'classic' environmental health risk factors still contribute to a high proportion of the burden of disease: the majority of the in total 36 diseases or disease groups are related to either ambient or household air pollution (28%) or to water, sanitation and hygiene practices, including the management of water systems and bodies of water (36%). Additionally, out of the global top six diseases with the highest burden of disease attributable to the environment (303.1 million DALYs; 51% of all environmental 596.4 million DALYs) five are linked to air pollution, making it the biggest modifiable risk factor and revealing a high potential for disease prevention – see Table 6.

Table 6. Global burden of disease by global top 6 diseases attributable to environmental risk factors and fraction of ambient and household air pollution

	Attributable to the environment (2012 data)	**Fraction of the total global burden of disease by risk factor (estimates of 2012 report)***		**Global burden of disease (2015 data)**
Disease	DALYs in millions (%)	Ambient air pollution fraction in %	Household air pollution fraction in %	DALYs in millions (%)
Stroke	58.9 (9.9%)	25%	26%	139.9 (5.2%)
Ischaemic heart disease	58.6 (9.8%)	24%	18%	192.1 (7.2%)
Lower respiratory infections	51.7 (8.7%)	8%	33%	142.4 (5.3%)
Cancers – *out of which:*	44.9 (7.5%)			243.7 (9.1%)
Trachea, bronchus, lung cancers	*13.9 (2.3%)*	*14%*	*17%*	*41.1 (1.5%)*
COPD	32.3 (5.4%)	9%	24%	72.8 (2.7%)

(Sources: Prüss-Üstün et al., 2016; WHO, 2016a)

Note: * Due to methodological differences in the calculation of DALYs between 2002, 2012 and 2015 the DALYs for the fractions of environmental risk factors ambient and household air pollution were not calculated, but the figures can give an indication of the magnitude of the problem.

Water, sanitation and hygiene are clear risk factors for diarrhoeal diseases (see Table 7), accounting globally for the third highest environmental disease burden (56.6 million DALYs globally), as well as for the majority of infectious and parasitic diseases when also taking environmental vector management aspects into account. In regard to diarrhoeal disease the 2012 data again reveal a substantial difference between regions and countries in disease burden and number of deaths attributable to environmental risk factors, with diarrhoeal diseases having globally the second highest disease burden in DALYs among children aged under 5 years (34,8 million DALYS), but ranking at the top among all low and middle income countries (LMIC) and non-member countries of the Organisation for Economic Co-operation and Development (OECD), further called non-OECD member countries, (total of 56.4 million DALYs) but only accounting for 0.2 million DALYs in all high income countries (HICs) and the 35 OECD member countries. For a full list of the WHO Member States by region and income grouping refer to Annex 2.

Table 7. Global burden of disease by global top 6 diseases attributable to environmental risk factors and fraction of water, sanitation and hygiene

	Attributable to the environment (2012 data)	**Fraction of the total global burden of disease by risk factor (estimates of 2012 report)**			**Global burden of disease (2015 data)**
Disease	DALYs in millions (%)	Drinking-water in %	Sanitation in %	Hand-washing in %	DALYs in millions (%)
Diarrhoeal diseases	**56.6 (9.5%)**	**34%**	**19%**	**20%**	**84.9 (3.2%)**

(Sources: Prüss-Üstün et al., 2016; WHO, 2016a)

Moreover, while LMIC and non-OECD countries account for 85.1% of the world population, the percentage of all environmental attributable deaths taking place in these countries is, with 91.7%, considerably higher. This is in contrast to HIC OECD members accounting for 14.9% of the world population but only 8.3% of all global deaths attributable to the environment. The figures also reveal that, with 13.5% of all deaths, children aged under 5 years are more affected by environmental risk than in all HIC OECD countries together – see Table 8:

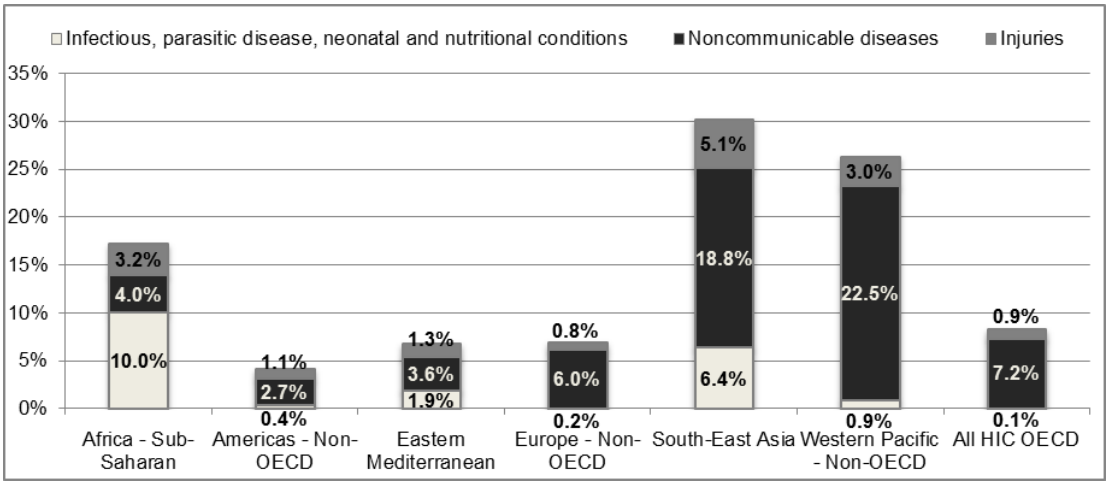
Table 8. Total share of population, death and environmental attributable deaths by country groups

	World	World - Children 0-4 years		LMIC Non-OECD		HIC OECD	
Total population	7 044 272 076	651 316 807	9.2%	5 991 322 415	85.1 %	1 052 949 661	14.9%
All deaths	55 656 266	6 550 241	11.8 %	46 602 192	83.7 %	9 054 075	16.3%
Total environmental death	12 624 495	1 709 860	13.5 %	11 578 436	91.7 %	1 046 059	8.3%

(Source: based on Prüss-Üstün et al., 2016, Table A2.3)

Furthermore, there is a high variation between the LMIC and non-OECD countries and regions with, for example, the highest percentages of infectious, parasitic, neonatal and nutritional conditions in Africa – sub-Sahara (10%) and South-East Asia (6.4%), while the highest percentages of NCDs can be seen in the Western-Pacific (22.5%) and South-East Asia (18.8%). Notably these two regions also accounted for the highest share of the global population of 7044 million people: Western-Pacific non OECD (1,640 million population; 23%) and South-East Asia (1,833 million population; 26%), while all HIC OECD countries accounted for 15% of the global population (1052 million), see Fig. 5.

Fig. 5. Deaths attributable to the environment in % of total attributable deaths (12 624 deaths), by region and disease group



(Source: based on Prüss-Üstün et al., 2016, Table A2.3)

As major development programmes and projects often have an impact on air and water pollution, a meaningful inclusion of health into the relevant environmental assessment process would therefore also help in tackling these major burdens of disease in LMIC countries, as well as in HIC countries.

2.3 Selected frameworks relevant in the area of environment and health assessments

To further analyse how health is affected and what actions can be taken to reduce the burden of disease various analytical and policy frameworks have been developed. Selected frameworks which build the basis for health and environmental assessments, help to assess

the impact of policies, plans, programmes or projects (PPPP) on health, and are therefore also of specific relevance for the discussion of the research findings.

2.3.1 International policy frameworks

The various policy frameworks developed in the areas of health, environmental and development policies, describe the basic principles they are built on, and define the "essential or underlying structure" (Oxford English Dictionary, 2017a) for a policy. They set objectives and assessment criteria, and sometimes they even define a set of measurable indicators (Waheed, Khan & Veitch, 2009).

To tackle the major issues in regard to health different international policy frameworks have been developed in the public health arena since the foundation of WHO in 1948[14]. Importantly, the WHO definition of health as a goal that a society should aim for and that should enable the population in the Member States to accomplish the highest health status possible, has not been changed by WHO over the years, instead WHO has focused more on the societal nature of health and is leading the integrated approach on the SDHs. Thus, the major policy frameworks regarded as important for this research are, at the global level the international conferences on health promotion, initiating and supporting the 'Health for All' (HfA) and 'Health in All Policies' (HiAP) approaches, as well as the global drive towards sustainable development with the latest commitments to achieving the Sustainable Development Goals (SDGs). Within the WHO European Region, the Health 2020 policy framework and the European Environment and Health Process play another important role. A special focus of this chapter will be on the inclusion of environmental assessments like EIA, SEA, and HIA in these frameworks as they are the focus of the research.

2.3.1.1 'Health for All' (HfA) and 'Health in All Policies' (HiAP)

Various resolutions of the World Health Assembly (WHA) and international Declarations support the HfA approach, which was first proclaimed in the Declaration of Alma-Ata on Primary Health Care (1978), and endorsed as 'Global Strategy for health for all by the year 2000' by the 32nd WHA in 1979 (WHO, 1981). The Declaration of Alma-Ata (1978) also emphasizes the importance of the promotion and protection of health as being "essential to sustained economic and social development" (WHO, 1978) as well as the need for intersectoral collaboration of "all related sectors and aspects of national and community development" (ibid.).

The importance for health of factors lying outside the classic medically-oriented health sector has been further reinforced through declarations at various global conferences on health promotion. For example, the first declaration, the Ottawa Charter for Health Promotion (1986), defines the conditions and resources that are needed for health as "peace, shelter, education, food, income, a stable eco-system, sustainable resources, social justice and equity" (WHO, 1986), and the Adelaide Recommendations on Healthy Public Policy (1988) added as basic requirements not only for health but also for social development "nutritious food and

[14] The Constitution of WHO was adopted by the International Health Conference, New York, USA, 19–22 July 1946, and entered into force on 7 April 1948.

clean water; education and decent housing; a useful role in society and an adequate income; conservation of resources and the protection of the ecosystem" (WHO, 1988). These prerequisites have been reaffirmed in the following declarations and statements with the latest declaration of Shanghai adding that "health and well-being are essential to achieving sustainable development" (WHO, 2016b).

The declarations and statements also confirm the importance of intersectoral collaboration and the need to consider health in other sectors' policies as defined in the HiAP approach, being "an approach to public policies across sectors that systematically takes into account the health implications of decisions, seeks synergies, and avoids harmful health impacts in order to improve population health and health equity" (WHO, 2013). Furthermore, already at the Sundsvall conference (1991), as well as in Jakarta (1997) participants called for the enhanced integration of health into EIA for major policies and programmes, and to "include equity-focused health impact assessments as an integral part of policy development" (WHO, 1997). EIA and HIA have been described as mechanisms of ecological and healthy accountability based on the principles of sustainable development (WHO, 1991). A list of the Global Conferences on Health Promotion can be found in Box 2.

Box 2. Declarations and statements of the Global Conferences on Health Promotion

1. Ottawa Charter for Health Promotion. 1986, Ottawa, Canada.
2. Adelaide Recommendations on Healthy Public Policy. 1988, Adelaide, Australia.
3. Sundsvall Statement on Supportive Environments for Health. 1991, Sundsvall, Sweden.
4. Jakarta Declaration on Leading Health Promotion into the 21st Century. 1997, Jakarta, Indonesia.
5. Mexico Ministerial Statement for the Promotion of Health: From Ideas to Action. 2000, Mexico City, Mexico.
6. The Bangkok Charter for Health Promotion in a Globalized World. 2005, Bangkok, Thailand.
7. Nairobi Call to Action. Promoting Health and Development. Closing the Implementation Gap. 2009, Nairobi, Kenya.
8. Helsinki Statement. 2013, Helsinki, Finland.
9. Shanghai Declaration on Promoting Health in the 2030 Agenda for Sustainable Development. 2016, Shanghai, China.

(Source: WHO, 2017, webpage)

Endorsing the report of the WHO Commission on Health and Environment on 'Our planet, our health' (1992) the 45th WHA called in its resolution WHA45.31 on health and environment for a 'Global Strategy for Health and Environment' of WHO to address the most urgent issues arising from global challenges such as demographic issues and rapid growth in population, poverty rate of 40% of the world's population, excessive use of resources, and macroeconomic frameworks that do not take into account economic, environmental and health goals jointly. Global goals of the strategy were – and still are: "achieving a sustainable basis for health for all; providing an environment that promotes health; and making all individuals and organizations aware of their responsibility for health and its environmental basis" (WHO Commission on Health and Environment, 1993). The strategy was endorsed by the 46th WHA through Resolution WHA46.20 and is effective until today.

While these international charters, declarations and statements do not have any legal implications, as they are usually adopted by the conference participants and not by

governments or their representatives[15], they can attain a more binding character when adopted as resolutions of the WHA. For example, through this process WHO Member States were called on to develop strategies for health promotion and to establish "effective mechanisms for a multisectoral, including interministerial, approach in order to address effectively the social, economic, political and environmental determinants of health throughout the life-course" (WHA, 2007). WHA resolutions – as well as declarations, charters or statements – often reiterate and reconfirm statements and decisions already taken earlier. But as ministries of health agree to them they should shape the policies and practices in their country accordingly. Nevertheless they do not have a legally binding status, but importantly, according to St Leger (2007) they "provide many people, organizations and governments with a common and consistent set of beliefs, principles, arguments and actions about why it is essential to promote the health and well-being of everybody. They also affirm and provide direction" (St Leger, 2007).

2.3.1.2 Health 2020 policy framework and strategy of the WHO Regional Office for Europe

With the European policy framework and strategy Health 2020, adopted in 2012[16] (WHO Regional Committee for Europe, 2012), the WHO Regional Office for Europe re-emphasised the need for a HiAP approach not only at all levels of government, 'whole-of-government', but it also encouraged the participation of a wide range of stakeholders and intersectoral action, the 'whole-of-society' approach. The aim of Health 2020 is to support action across ministries and in the different communities to "significantly improve the health and well-being of populations, reduce health inequalities, strengthen public health and ensure people-centred health systems that are universal, equitable, sustainable and of high quality" (WHO Regional Office for Europe, 2013a). Two strategic objectives and four common policy priorities for health are formulated, which are further linked through three broad target areas with the six regional targets of the WHO Regional Office for Europe – see Table 9.

Table 9. Linkages between Health 2020 objectives, policy priorities, broad target areas and regional targets

Two Health 2020 strategic objectives	Four Health 2020 policy priority areas	Three Health 2020 broad target areas	Six regional targets
1. Improving health for all and reducing the health divide	1. Investing in health through a life-course approach and empowering people	2. Healthy people, well-being and determinants	2. Increase life expectancy in Europe 3. Reduce inequities in health in Europe (social determinants target) 4. Enhance well-being of the European population
	2. Tackling Europe's major health challenges of noncommunicable and communicable diseases	1. Burden of disease and risk factors	1. Reduce premature mortality in Europe by 2020

[15] with the exception of the Mexico Ministerial Statement, 2000, which was signed by 87 countries.

[16] Health 2020 was adopted through Resolution EUR/RC62/R4 in September 2012 at the 62nd session of the WHO Regional Committee for Europe by its Member States.

Table 9. contd.

1. contd.	4. Creating resilient communities and supportive environments	2. Healthy people, well-being and determinants	2. Increase life expectancy in Europe 3. Reduce inequities in health in Europe (social determinants target) 4. Enhance well-being of the European population
2. Improving leadership and participatory governance for health	3. Strengthening people-centred health systems, public health capacity and emergency preparedness	3. Processes, governance and health systems	5. Universal coverage and the "right to health" 6. Member States set national targets

(Source: adjusted from WHO Regional Office for Europe, 2013a)

Priority area four on 'creating resilient communities and supportive environments' is of special interest for this research, as it emphasises the importance of the cooperation between the environment and health sectors for the protection of human health from risks of contaminated or hazardous environments as well as for the creation of health-promotion settings. A better collaboration between the sectors relevant for animal, environmental and human health would also enhance public health effectiveness.

HIA is acknowledged as a valuable tool not only to assess the potential impacts of policies on health but also to assess the effect of these policies on equity. HIA is considered as a key tool to support leadership and participatory governance "for better coordination and integration among government activities on health but also reaching out beyond government to others" (WHO Regional Office for Europe, 2013a). Accordingly, HIA of environmental determinants and of cross sectoral policies is defined as a core function of the health sector, as it can play an important role in bringing different sectors together under a well-defined framework for analysing the potential impacts on health of a policy, plan, programme, or project proposal (ibid.).

Following the adoption of Health 2020 as a regional policy framework and strategy in 2012, the following year saw the adoption by the 63rd Regional Committee for Europe of 17 core indicator sets to measure Health 2020 implementation across the WHO European Region (EUR/RC63/R3, 2013). The indicators are grouped around the three broad target areas of Health 2020, with six core indicators for area 1) burden of disease and risk factors and using already existing databases; seven core indicators for area 2) healthy people, well-being and determinants, and three core indicators for area 3) processes, governance and health systems.[17] For the Health 2020 priority area specifically tackling environment and health no

[17] 14 indicators are to be obtained from existing sources such as the European HFA-Database and mortality indicator database (HFA-MDB) of the WHO Regional Office, of the United Nations Educational, Scientific and Cultural Organization (UNESCO), ILOSTAT of the International Labour Organization (ILO), Eurostat database on European Union Statistics on Income and Living Conditions (SILC), the World Bank database, Global Monitoring Framework for Noncommunicable Diseases (Global Health Observatory), the Health Behaviour in School-aged Children (HBSC) survey, the European School Survey Project on Alcohol and Other Drugs; 2 indicators are to be obtained through direct reporting by Member States through the Annual Report of the WHO Regional Director for Europe (on the establishment of process on national target setting); 1 indicator to be newly developed (on life satisfaction) and 1 indicator should come from non-defined but already available sources (indicators of objective well-being).

special indicators have been defined (WHO Regional Office for Europe, 2013c). Therefore, it is difficult to conclude from the midterm progress report on Health 2020 implementation if any progress has been made in the realm of intersectoral collaboration (WHO Regional Office for Europe, 2016).

2.3.1.3 Sustainable development and Sustainable Development Goals (SDGs)

Sustainable development is by now playing an important role in the international discussion of development policies. It has been defined in the so called Brundtland Report 'Our Common Future' of the World Commission on Environment and Development (WCED), 1987, as "*meeting the basic needs of all and extending to all the opportunity to satisfy their aspirations for a better life*" (UN, 1987). A special focus of sustainability is put on long-term approaches and performance with the aim to "increase the quality of life for humans and other ecological entities, enhance economic activities, and reduce the impacts on ecological systems. […] 'sustainable development' is about achieving a balance among three objectives or dimensions — environmental, economic, and social — over time and spatial horizons " (Waheed, Khan & Veitch, 2009). According to Gibson (2013) eight key requirements contribute to sustainability, which are shown in Box 3.

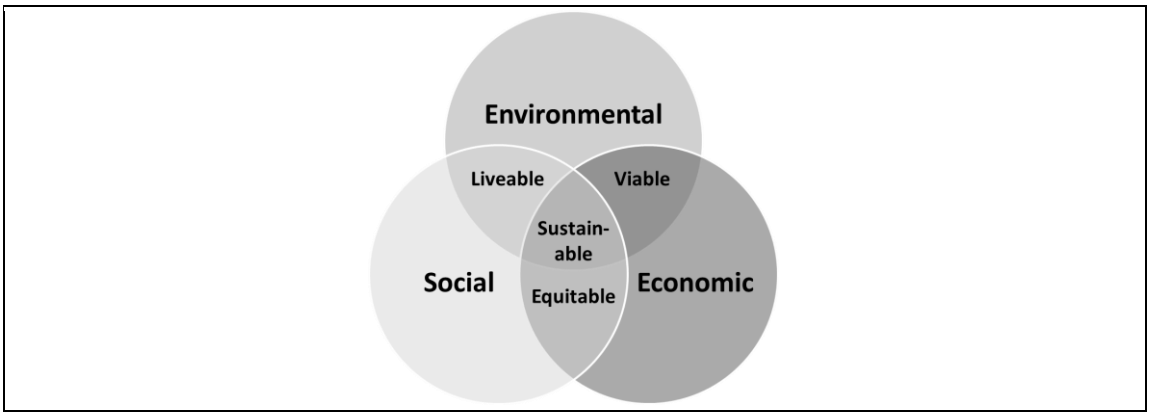
Box 3. Eight key requirements contributing to sustainability

1) **Socio-ecological system integrity**: Build human-ecological relations that establish and maintain the long-term integrity of socio-biophysical systems and protect the irreplaceable life support functions upon which human as well as ecological well-being depends.
2) **Livelihood sufficiency and opportunity**: Ensure that everyone and every community has enough for a decent life and opportunities to seek improvements in ways that do not compromise future generations' possibilities for sufficiency and opportunity.
3) **Intragenerational equity**: Ensure that sufficiency and effective choices for all are pursued in ways that reduce dangerous gaps in sufficiency and opportunity (and health, security, social recognition, political influence, etc.) between the rich and the poor.
4) **Intergenerational equity**: Favour present options and actions that are most likely to preserve or enhance the opportunities and capabilities of future generations to live sustainable.
5) **Resource maintenance and efficiency**: Provide a larger base for ensuring sustainable livelihoods for all while reducing extractive damage, avoiding waste and cutting overall material and energy use per unit of benefit.
6) **Socio-ecological civility and democratic governance**: Build the capacity, motivation and habitual inclination of individuals, communities and other collective decision-making bodies to apply sustainability principles through more open and better informed deliberations, greater attention to fostering reciprocal awareness and collective responsibility, and more integrated use of administrative, market, customary, collective and personal decision-making practices.
7) **Precaution and adaptation**: Respect uncertainty, avoid even poorly defined risks of serious or irreversible damage to the foundations of sustainability, plan to learn, design for surprise and manage for adaptation.
8) **Immediate and long-term integration**: Attempt to meet all requirements for sustainability together as a set of interdependent parts, seeking mutually supportive benefits.

(Source: Gibson, 2013; based on Gibson et al., 2005, chapter 5).

The so-called classic three pillars of sustainability and sustainable development are environmental, economic and social dimensions (Tanguay et al., 2010), shown as a Venn Diagram in Fig. 6 below.

Fig. 6. The classic dimensions of sustainable development



(Source: adapted from Tanguay et al., 2010)

A fourth dimension, institutional, has been added by the United Nations Commission for Sustainable Development (UNCSD) theme indicator framework (Singh et al., 2009, referring to; Labuschagne, Brent & van Erck, 2005), but can also be integrated into the social dimension, which is concerned with aspects of society, for example, culture, values, social relations, health and well-being, security, housing, labor and work practices, human rights. The economic dimension is concerned with economic structures, consumption and production patterns; and the environmental dimension with the natural environment like atmosphere, biodiversity, flora and fauna, land, oceans, seas and coasts, fresh water. To achieve sustainable development these three dimensions need to overlap, resulting in the three quality dimensions of equitable, being the interaction between the economic and social dimension, and often referred to a as inter- and intra-generational equity; livable, corresponding to the interaction of environment and social and taking into account the concept of quality of life; and viable, i.e. that "economic development must abide by the supportive capacity of the ecosystems, and depletion of nonrenewable resources must be avoided" (Tanguay et al., 2010).

The importance of improving and protecting the environment for the population's well-being as well as for economic development in all countries is already recognized in the Stockholm Declaration of the first global UN Conference on the Human Environment (1972), Stockholm, Sweden. The conference called on UN Member States to "adopt an integrated and coordinated approach to their development planning so as to ensure that development is compatible with the need to protect and improve the environment for the benefit of their population" (UN, 1973, Principle 13), which can also be seen as a call for health-inclusive environmental assessments.[18]

The Brundtland Report (1987) not only defined sustainable development, it also stressed the importance of human health as well as equitable opportunities for all in order to achieve sustainable development. Additionally, it called for broader EIA, which should not only be applied to development projects but also to sectoral policies. Acknowledging the lack of

[18] The conference also called for the establishment of a specialized programme for environmental issues, which led to the establishment of the UN Environmental Programme (UNEP).

capacity which often exists in governments to undertake or at least control the quality of EIAs, the report also called for the creation of an "*independent international assessment body to help developing countries, upon request, to evaluate the environmental impact and sustainability of planned development projects*" (UN, 1987).

The Rio Declaration on Environment and Development of the UN Conference on Environment and Development (1992) emphasized in its first principle that the concern for human beings who are "entitled to a healthy and productive life in harmony with nature" is at the centre of sustainable development (UN, 1992a, Principle 1). EIAs, as national tools, are expected to be undertaken if planned proposals are "to have a significant adverse impact on the environment and if the activity is subject to a decision of a competent national authority" (ibid., Principle 17). Furthermore, Agenda 21, adopted at the Conference, stressed the importance of implementation procedures for environmental health impact assessment (EHIA), for example, to meet urban challenges (UN, 1992b, 6.34.c.i), to reduce health risks from environmental pollution and hazards (ibid., 6.40.d), and to assess impacts of industry and energy production (ibid., 6.41.i.i).

The outcome documents of the following conferences did not mention EIA or HIA as playing a prominent role but referred to EIA as a tool that supports sustainable development in countries, for example, the implementation plan of the World Summit on Sustainable Development (WSSD), 2002, also called for the implementation of EIA as a tool to "enhance corporate environmental and social responsibility and accountability" (UN, 2002). Meanwhile, the outcome document of the UN Conference on Sustainable Development, 'The Future We Want', 2012, also called Rio +20, only mentioned the importance of implementing EIA as a tool for the protection of oceans and seas (UN, 2012). An overview of the relevant UN conferences and their declarations related to sustainable development can be found in Annex 4.

In preparation to the Rio +20 Conference a joint report by WHO, the UN Conference on Sustainable Development, the UN Convention on Biological Diversity (UNCBD), the UN Framework Convention on Climate Change (UNFCCC), and the UN Convention to Combat Diversification (UNCCD) further linked health with the Rio Conventions, calling for improved synergies in policy design and support, strengthening research and operational capacity on environmental change and human health, and monitoring and evaluating progress across health, environment and sustainable development (Patz et al., 2011).

While neither EIA nor HIA nor even the term 'health' are mentioned in the UN Millennium Declaration (2000), adopted at the Millennium Summit (2000), the eight UN Millennium Development Goals (MDGs), defined in a road map toward the implementation of the declaration (2001), are heavily concerned with health issues: Out of the eight MDGs three are directly linked to health – MDG 4 Reduce child mortality, MDG 5 Improve maternal health, and MDG 6 Combat HIV/AIDS, Malaria and other diseases – and four relate to major health determinants: MDG 1 Eradicate extreme hunger and poverty, MDG 2 Achieve universal primary education, MDG 3 Promote gender equality and empower women, and MDG 7 Ensure environmental sustainability. For a full list of the MDGs and their targets see Annex 5.

Even though in the 15 years following the Millennium Declaration progress has been observed in many areas, for example, in an increase of access to schools for both girls and boys, and millions of people emerging from extreme poverty, the progress was unevenly

distributed with, for example, African countries often lagging behind. Also, achievements in the core health goals on maternal, newborn and child health as well as reproductive health remained behind schedule (UN, 2015).

The successor of the MDGs are the Sustainable Development Goals (SDGs), adopted in 2015 by the General Assembly of the UN through the 2030 Agenda for Sustainable Development (UN, 2015). While the MDGs were a limited set of time-bound and measurable goals with a focus on improving human development outcomes through health, education and eradication of extreme poverty in the developing world, the SDGs are relevant for all countries. They still keep poverty eradication, nutrition and food security, health and education as priority areas but are now much broader covering "the economic, social and environmental pillars of sustainable development with a strong focus on equity" (Boerma et al., 2015). The SDGs consist of 17 goals with a total of 149 targets, of which one goal, SDG 3, is explicitly on health, see Box 4.

Box 4. The 2030 Sustainable Development Goals

1. **Poverty** - End poverty in all its forms everywhere
2. **Hunger and Food Security** - End hunger, achieve food security and improved nutrition and promote sustainable agriculture
3. **Health** - Ensure healthy lives and promote well-being for all at all ages
4. **Education** - Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
5. **Gender Equality and Women's Empowerment** - Achieve gender equality and empower all women and girls
6. **Water and Sanitation** - Ensure availability and sustainable management of water and sanitation for all
7. **Energy** - Ensure access to affordable, reliable, sustainable and clean energy for all
8. **Economic Growth** - Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
9. **Infrastructure, Industrialization** - Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
10. **Inequality** - Reduce inequality within and among countries
11. **Cities** - Make cities and human settlements inclusive, safe, resilient and sustainable
12. **Sustainable Consumption and Production** - Ensure sustainable consumption and production patterns
13. **Climate Change** - Take urgent action to combat climate change and its impacts
14. **Oceans** - Conserve and sustainably use the oceans, seas and marine resources for sustainable development
15. **Biodiversity, Forests, Deforestation** - Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
16. **Peace and Justice** - Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
17. **Partnerships** - Strengthen the means of implementation and revitalize the global partnership for sustainable development

(Source: UN, 2015)

Relevant targets relating directly or indirectly to health or the determinants of health can be found in all of the 17 SDGs (Boerma et al., 2015, table 1.4). For example Goal 7, Target 1 on ensuring "universal access to affordable, reliable and modern energy services" (UN, 2015), would also support discontinuing indoor burning of coal or biomass for heating or cooking – one of the major risk factors for lung cancers – as well as a shift away from fossil fuels to renewable energy. Nonetheless, neither EIA nor HIA are mentioned in the 2030 Agenda Declaration or in the SDGs and targets: instead, it mentions several times the commitment to avoid adverse or negative impacts of urban activities, hazardous chemicals, climate change,

fossil-fuels subsidies, etc. (UN, 2015). However, it can be assumed that environmental assessments will play an important role when developing new policies or projects in the different SDG areas, as globally in almost all countries legal regulation for environmental assessments exists (Morgan, 2012).

2.3.1.4 The European Ministerial Conferences on Environment and Health and its process

The European Ministerial Conferences on Environment and Health[19] bring together the environment and health sectors of the 53 WHO European Member States to work together on crosscutting issues relating to environment and health. The declarations of the conferences underline the need for better integration of environment and health determinants into policies and programmes in order to improve the health of the population. The conferences and their main commitments are shown in Box 5.

Box 5. Overview of the European Ministerial Conferences on Environment and Health

1. Frankfurt am Main, Germany (1989) adopting the European Charter on Environment and Health;
2. Helsinki, Finland (1994) reviewing a comprehensive assessment of the situation in Europe; promoting the Environmental Health Action Plan for Europe;
3. London, United Kingdom, (1999) declaring the determination to strengthen and expand the coordination and partnership, while working towards improved environment and health within sustainable development; adopting the legally binding Protocol on Water and Health to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes; the Charter on Transport, Environment and Health; and the London Declaration;
4. Budapest, Hungary (2004) ministers committing to implementing the Children's Environment and Health Action Plan for Europe in their respective countries, linking the environment and health agenda to the MDGs and focusing on climate change and chemicals, acknowledging the Protocol on Strategic to the Espoo Convention and committing to taking into account health impacts when conducting SEAs;
5. Parma, Italy (2010) keeping the focus on children and address other environmental health issues of increasing concern, such as climate change, environment and health inequalities and the wider context of social determinants of health. Setting for the first time time-bound targets, the Parma Commitment to Act by setting four Regional Priority Goals;
6. Ostrava, Czech Republic (June 2017), under the conference theme “Better health. Better Environment. Sustainable Choices” participants discussed new responses to the multiple challenges posed by the prevalent high EBoD.

(Source: WHO Regional Office for Europe, 2013d)

The first European Ministerial Conference on Environment and Health, Frankfurt am Main, Germany, and its Environment and Health Charter (1989) are considered international milestones in shaping the agenda of environment and health in Europe (WHO Regional Office for Europe, 2013d). Through the first Charter the governments of 29 European Member States recognize the “dependence of human health on a wide range of crucial environmental factors”

[19] “The European Environment and Health Process (EHP) is a regional intersectoral process and platform for the development and implementation of policies advancing environment, health and well-being in the WHO European Region” (WHO Regional Office for Europe, 2017a) . It is led and monitored by the European Environment and Health Task Force (EHTF) and the EHTF Bureau. The WHO Regional Office for Europe serves as the Secretariat to the entire EHP and may build a joint Secretariat together with UNECE Executive Committee, through the Committee on Environmental Policy. The WHO European Centre for Environment and Health, located in Bonn, Germany, was established after the first Conference and delivers work in technical areas related to the commitments of the declarations and provides technical information to the EHP and technical support to WHO European Member States.

(WHO Regional Office for Europe, 1989) as well as the need to integrate health and environment more into other sectors policies:

3. "All sections of society are responsible for protecting the environment and health as an intersectoral matter involving many disciplines, (…)
4. Every public authority and agency at different levels, in its daily work, should cooperate with other sectors in order to resolve problems of the environment and health." (WHO Regional Office for Europe, 1989)

Different strategic instruments are mentioned to protect health, such as, developing appropriate control measures, applying better prevention methods, strengthening information systems, and integrating health aspects better into EIA (WHO Regional Office for Europe, 1989). The declarations of London (1999a) and Budapest (2004) reconfirm the importance to fully integrate health into EIAs as well as to conduct SEAs of policies, plans, and programmes (see also Box 6). The Parma Declaration on Environment and Health and its Commitment to Act (2010), recognizes impact assessments as important tools to promote the consideration of health effects in planning processes. The latest declaration of the Sixth Ministerial Conference, Ostrava (2017), calls for the strengthening "the knowledge and capacity for health and environmental professionals for HIA through further education and training" (WHO Regional Office for Europe, 2017b, 14e.).

Box 6. Health as integral part of SEA, Budapest Declaration, 2004, Paragraph 13

We recall the UNECE Protocol on SEA to the Convention on EIA in a Transboundary Context adopted and signed at the Fifth Ministerial Conference 'Environment for Europe' held in Kiev from 21 to 23 May 2003, that acknowledges the benefits to the health and well-being of present and future generations that will follow if the need to protect and improve people's health is taken into account as an integral part of strategic environmental assessment. We commit ourselves to taking significant health effects into account in the assessment of strategic proposals under the Protocol.

(Source: WHO Regional Office for Europe, 2004)

2.3.2 Selected relational frameworks – from Pressure-State-Response (PSR) to the modified Driving force-State – Exposure – Effect – Action (DPSEEA) framework

Analytical frameworks and structural models play an important role when analysing possible impacts on health, for example, through describing the factors influencing health in a systematic way, and developing links between these factors and different health outcomes. A framework can be defined as "a basic structure underlying a system, [or] concept" (Oxford English Dictionary, 2017a) and a model as a "simplified or idealized description or conception of a particular system, situation, or process" (Oxford English Dictionary, 2017b).

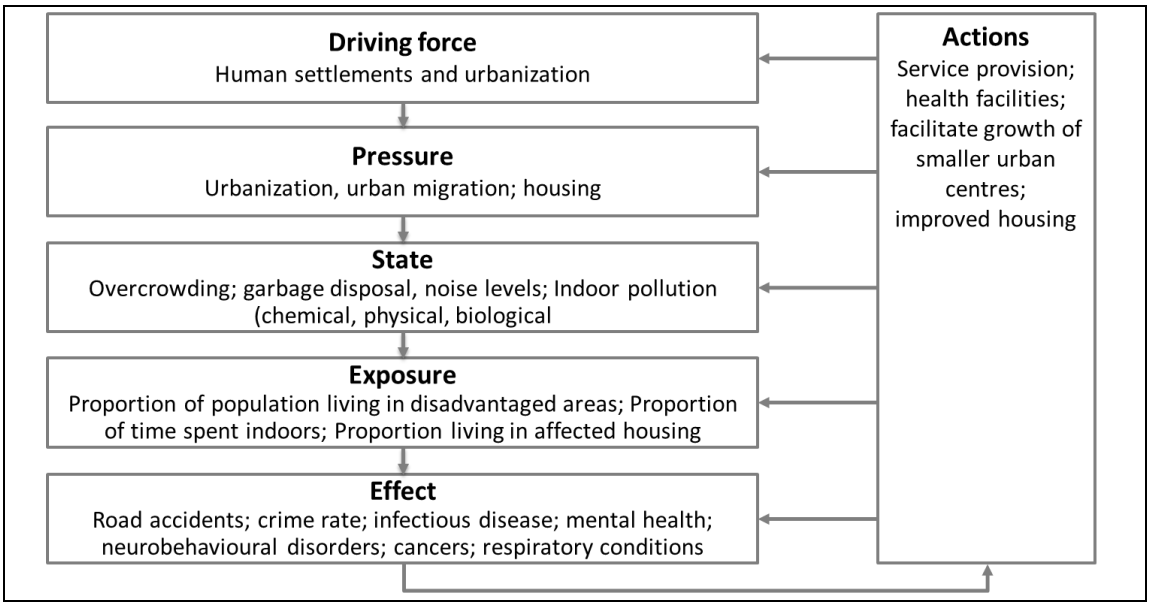
Hence, frameworks and models are needed in the environment and health arena to structure the broad spectrum of aspects influencing health (Fehr, Hornberg & Wichmann, 2016; Fehr & Neus, 2005). Thus, they build the backbone for analysing complex cause-effect correlations and help to systematize possible health impacts of proposals. In this regard, multiple frameworks have been developed in the area of environmental health: some of them in the environmental sector and barely linking directly to health, for example, the Pressure-State-Response (PSR) model of the OECD (1993), others directly in the health sector on the determinants of health, for example, the rainbow model developed by Dahlgren and Whitehead (1991). While broader frameworks, such as the health determinants model by

Dahlgren and Whitehead, describing "the general morphology of the system under consideration" (Knol et al., 2010), are defined by Knol et al. (2010) as structural frameworks, relational frameworks "focus on the important phenomena within certain domains and the logical or functional links by which these are related" (ibid.).

One of the relational frameworks widely used in the environmental health arena is the **D**riving force – **S**tate – **E**xposure – **E**ffect – **A**ction (DPSEEA) framework. A first version without the **E**xposure component was developed by Kjellström and Corvalán (1995) aiming at establishing a first set of environmental health indicators, and in response to the emergence of sustainable development and the adoption of the Agenda 21. The Driving force – State – Effect – Action (DPSEA) framework is based on an older PSR framework of OECD (1993) developed to systematize environmental indicators for environmental performance reviews. The DPSEA framework was further developed within a project on linkage methods for environment and health analysis by Corvalán, Briggs and Kjellström (1996) into the DPSEEA framework, adding the exposure component and linking environmental risk factors better to health outcomes. An example of the application of the DPSEEA framework for human settlements and urbanization is shown in Fig. 7, below.

In the figure, the **driving force** describes the type of development or the socioeconomic activities which in this example is the trend to more urbanization. **Pressure** describes the environmentally harmful products emerging from the socio-economic activities, in this example urbanization as well as housing issues. **State** describes existing environmental levels and the changes that are happening due to the pressure on the environment, for example, in the frequency or magnitude of hazards, levels of pollution. **Exposure** "refers to the intersection between people and the hazards inherent in the environment" (Corvalán, Briggs & Kjellström, 1996).

Fig. 7. DPSEEA framework on human settlements and urbanization



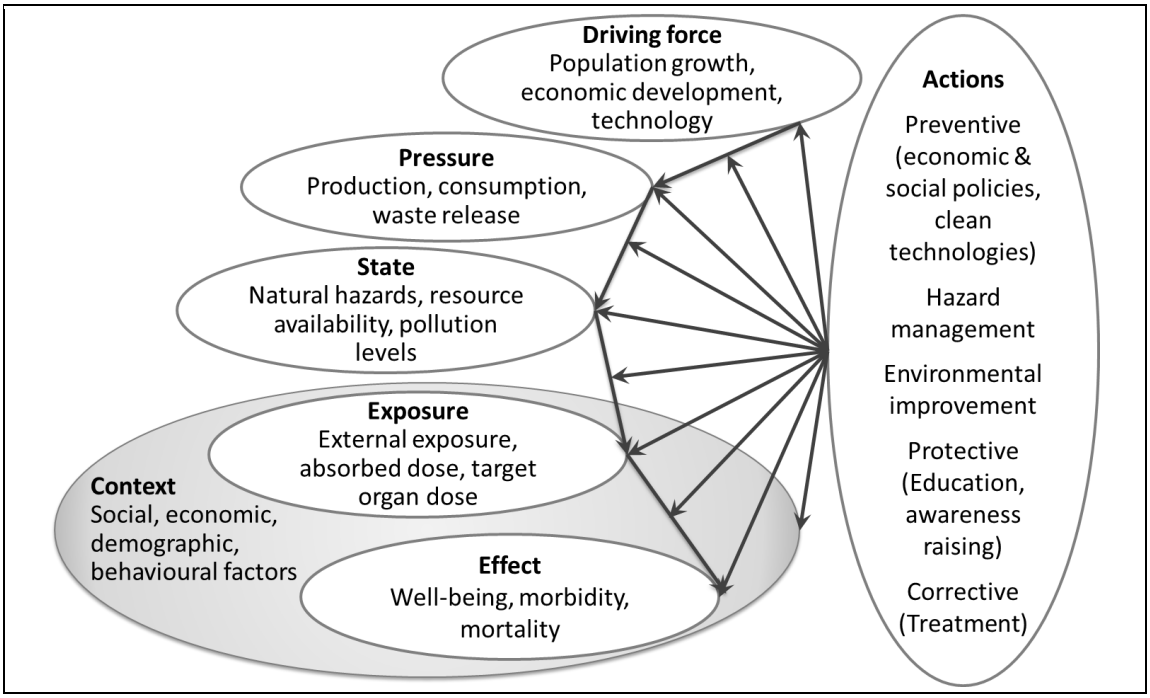
(Source: based on Corvalán, Briggs & Kjellström, 1996)

In the example of urbanization the proportion of population living in disadvantaged areas, the proportion of time spent indoors or living in affected housing can give an indication of the

population exposed to health risks. **Effects** are the health effects that may occur because of the exposure, based on a risk analysis and the given knowledge of dose-response functions. Effects in the example can be morbidity or mortality, for example, from road accidents, infectious diseases, cancers or respiratory conditions. **Actions** then refer to possible activities that can be undertaken – at any of the stages – to avoid, mitigate or reduce the effects and lower the pressure, for example, through improved housing, better service provision, or even enhancing the living and working conditions in rural areas to lower migration to urban centres. "The most effective long-term actions are those which are preventive in approach – aimed at eliminating or reducing the forces which drive the system" (Corvalán, Briggs & Kjellström, 1996).

The DPSEEA framework was further expanded by Morris et al. (2006) by adding the individual context of potential persons or population groups exposed to the environmental states – see Fig. 8:

Fig. 8. The modified DPSEEA framework



(Source: based on Morris et al., 2006; Corvalán, Briggs & Kjellström, 1996; and Waheed, Khan & Veitch, 2009)

2.3.3 Capacity building in environment and health

Among the possible actions, education and awareness raising are explicitly mentioned as protective action in the modified DPSEEA framework. The need for qualified personnel in the environmental health field was reinforced by the development of National Environment and Health Action Plans (NEHAPs) as follow-up to the Second European Ministerial Conference on Environment and Health in Helsinki, Finland, 1994. To support the staffing of environmental health services with competent professionals, the WHO Regional Office for Europe developed guidance on professional profiles (Fitzpatrick & Bonnefoy, 1998) as well as on educational and training curricula for the field of environmental health (Fitzpatrick & Bonnefoy, 1999). The overall objective of the environmental health services was defined as protecting and promoting environmental health, with the primary aim "to ensure improvements in living

conditions in order to promote human health. Several secondary objectives can be identified as contributing to the whole. These include developing and enforcing legislation, promoting public participation and involvement, influencing the development of governmental responsibility at all levels, and supporting practical and academic research" (Fitzpatrick & Bonnefoy, 1998).

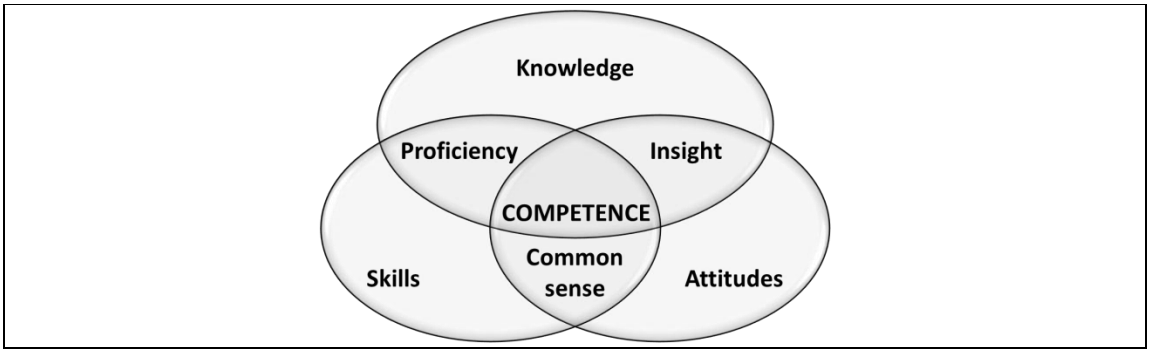
Fitzpatrick and Bonnefoy (1998) describe 17 areas that are at the core of environmental health: two horizontal areas consisting of environmental health policy and environmental health management; eight determinants of the natural and built environment, namely air quality, ionizing and nonionizing radiation, noise control, waste management and soil pollution, water quality, food quality and safety, vector control, and human ecology and settlements; two employment and livelihood health determinants – health of people at work, and accident and injury prevention and control – and five sector specific areas, namely agriculture, energy, land-use planning, tourism and recreational activities, and transport management (Fitzpatrick & Bonnefoy, 1998).

Based on these core areas they identified common and specific activities of environmental health services. Common activities include risk assessment, risk management, risk communication, intersectoral cooperation and consultation, education and training and research. These activities were then defined for each of the 17 areas listed above, building 17 specific activities (Fitzpatrick & Bonnefoy, 1998).

These professional profiles build the basis for the educational and training curricula of four career pathways for environmental health professionals at different educational levels – environmental health technicians/aides, generalists, specialists and managers (Fitzpatrick & Bonnefoy, 1999). The curricula are based on a competence model consisting of three main interwoven domains – see also Fig. 9:

- attitudes, defined as "the predisposition to perceive, feel or behave in a particular manner",
- practical skills, described as "the ability to carry out a specific task", and
- theoretical knowledge, defined as "the collection of facts, values, information etc. to which one has access through study, intuition, or experience" (Fitzpatrick & Bonnefoy, 1999; citing WHO Regional Office for Europe, 1994).

Fig. 9. Competence model based on three main domains



Note: Terms in the overlapping areas are suggestions by Fitzpatrick and Bonnefoy (1999)
(Source: Fitzpatrick & Bonnefoy, 1999)

While the domain of attitudes consists of areas such as "caring attitude, (…) mutual respect for (…) other disciplines, (…) ability to deal with uncertainty (…)" (Fitzpatrick & Bonnefoy,

1999), the domain of skills consists of six categories: investigative, analytical, interpretative, communicative, educative, and organizational skills, covering a broad range of areas and functions (ibid.). The domain of knowledge is based on the areas of common and specific activities. Fitzpatrick and Bonnefoy (1999) describe for each of these areas the specific knowledge required. For example, the risk assessment activities require knowledge in areas such as applied biology, biomonitoring, and especially environmental epidemiology, but also sector specific risk assessment knowledge, for example, on agriculture, energy, land-use planning, or transportation. Risk management activities require knowledge of organizational management, problem-solving and decision-making, socioeconomic management, information management, human resource management, as well as legal and legislative knowledge. Risk communication activities require knowledge on risk perception, information management, communication skills, teaching and training, and risk communication in accident and disaster situations. Furthermore, knowledge is required in – quantitative and qualitative – research, for intersectoral cooperation and consultation, and in education and training (Fitzpatrick and Bonnefoy, 1999).

Besides the four profiles for four career pathways for environmental health professionals at different educational levels, Fitzpatrick and Bonnefoy (1999) also propose curricula for allied generalists and specialists, as well as for managers of other sectors involved in environmental health, to gain additional competences in environmental health.

The outlined curricula support different learning experiences, such as lecture or demonstration, small group discussion, self-directed environment, practice in controlled environment, normal working environment, all aimed at achieving the overall learning objectives of orientation, acquiring knowledge and understanding, consolidating knowledge and understanding, application of knowledge and understanding, practice of skills, and change in attitudes. The links between the learning experience and learning objectives are presented in Table 10:

Table 10. Linkages of learning experiences and learning objectives

Learning objectives	Lecture or demonstration	Small group discussion	Self-directed environment	Practice in controlled environment	Normal working environment
Orientation	X				
Acquire knowledge and understanding	X	X	X		
Consolidate knowledge and understanding		X	X		
Apply knowledge and understanding		X		X	X
Practice skills		X		X	X
Change attitudes		X		X	X

(Source: Fitzpatrick & Bonnefoy, 1999)

All curricula consist of five different module types: 4–6 basic modules providing basic knowledge in the main sciences, 8–11 applied modules providing in-depth knowledge in specific areas, 4–9 integrated modules to develop an understanding of the relationship between the diverse topics, 3–4 holistic modules to develop a holistic approach, and 1–3

optional modules providing further background in specific topics. The hours allotted for the curricula range between 270 hours for managers of other sectors and 2450 hours for environmental health professionals, with 420 hours for environmental health service managers, 540 hours for allied generalists or specialist, 826 hours for general technicians or assistants, and 1344 hours for environmental health technicians/aides (Fitzpatrick & Bonnefoy, 1999). How far the curricula were taken up in any of the Member States is outside the scope of this research.

Environmental health impact assessment and auditing is only introduced by Fitzpatrick and Bonnefoy (1999) among the optional modules for environmental health professionals and allied generalists or specialists, and as a holistic module for environmental health service managers and managers of other sectors. Gazzola (2008) reviewed 64 environmental assessment related Masters programmes in nine EU member countries. The largest number of environmental assessment related Masters programmes was offered by environmental science and engineering departments or faculties (each at 13 universities) followed by planning departments or faculties (at 11 universities) but only by two health departments or faculties. Overall, environmental assessment is included in a variety of disciplines such as "planning, engineering, architecture, geography, health, business and management, mathematics, physics, technology, geology, food and agricultural sciences, natural and environmental sciences" (Gazzola, 2008), but only rarely is environmental assessment "taught as a full postgraduate programme" (ibid.). Furthermore, the research revealed that the understanding of environmental assessment highly depends on the scientific approach prevalent in the programmes: a physical science-based approach leads to the understanding of environmental assessment as a scientific tool to support decision-making through scientifically verifiable input, while a social science-based approach also considers the subjective and qualitative nature of environmental assessments as well as a wide range of sectors and disciplines (Gazzola, 2008). Gazzola (2008) calls for more interlinkages between the two approaches.

An exemplary curriculum of a specific EIA course for higher education in Pakistan was developed by Fischer (2014a). It covers a total of 16 themes starting with an introduction to EIA and decision-making theory (themes 1–2), followed by the specific context in Pakistan such as main environmental problems, legal background, and requirements of international development banks (theme 3–5), specific EIA procedural steps such as screening, assessment of impacts, public participation and consultation, baseline data collection, reporting, follow-up and monitoring (themes 6–11), EIA effectiveness (theme 12), an introduction of SEA and its application in Pakistan (themes 13–14), integrating EIA and SEA further and specific EIA guest lectures (themes 15–16). While themes 1–10 can be taught at both undergraduate and postgraduate levels, themes 11–15 are more suitable for postgraduate level only. Theme 16 – guest lectures on specific EIA themes – should always be included in any programme. Importantly, all themes include lectures and practical elements, but the report does not indicate a time frame for each theme (Fischer, 2014a).

2.4 Overview on different forms of impact assessments and their relation to health

As shown in the previous chapters, there is considerable scope for action outside the health sector to prevent ill health and promote good health. For example, sectors with high potential

for disease prevention are agriculture, housing, transport, and water and sanitation (see for example, Table 7 in chapter 2.2.3, and Annex 5 and Annex 3). In this regard, factors affecting health include policies, plans, programmes and projects that are implemented not just within the health sector, relating to health systems, health financing and health care, but also in other sectors concerned with environmental policies and at the junction of environmental and health policy. In addition, by recognizing the EBoD, the return on investments in the environmental domain through interventions addressing the environmental root causes of disease can be considerable. The EBoD report, discussed in chapter 2.2.3, gives a further overview of the main sectors with primary prevention opportunities. These sectors are all also relevant for environmental assessments; for example, the risk of air pollution from the industrial and commercial sectors can be avoided through industrial emission control as well as improved energy options. Table 11 gives some examples for the sectors mentioned in the report and risks that can be considered in environmental assessments (Prüss-Üstün et al., 2016). For a full list linking the sectors with prevention opportunities please refer to Annex 3.

Table 11. Main sectors with primary prevention opportunities through environmental assessment

Sector	Selected risks and/or intervention area
Agriculture	Occupational exposure to chemicals/regulation, personal equipment.
Industry / commercial	Air pollution: industrial emission control/improved energy options;
	Water pollution/industrial emission control;
	Noise/noise control regulations.
Transport	Air pollution; decreased physical activity: improved urban planning, improved and increased use of public transport; reduction of traffic congestion; replacement of older diesel vehicles, etc.;
	Risk of injury: traffic-calming measures and other traffic control solutions; separation of pedestrians from motorized traffic etc.
Housing / community	Contact with infected excreta/safe disposal of excreta;
	Contact with malaria and other vectors: environmental manipulation and modification of human habitations;
	Low physical activity, obesity: better urban planning, access to sports facilities, school and workplace based programmes;
	Unsafe drinking-water: safe household water treatment;
	Risk of drownings: improved access to and safety of water environments.
Water	Inadequate water, sanitation and hygiene: provision of adequate drinking-water and sanitation facilities;
	Inadequate implementation of water and sanitation management: sanitation and water safety plans, drinking-water guidelines.

(Source: Prüss-Üstün et al., 2016)

In general, impact assessment can be described as a "process of identifying the future consequences of a current or proposed action" (Partidário et al., 2012). Thus, environmental assessment is a systematic and comprehensive process of evaluating the potential environmental impacts of a proposed policy, plan, programme or project and its alternatives. It supports decision-making in order to avoid, minimize, or mitigate adverse effects (adapted from Theakstone, 2006; Sadler and Verheem, 1996, cited in Thérivel, 2004).

Environmental assessments developed as a consequence of increased public awareness about potential hazardous impacts on the environment and human health of already existing and planned development and industrial activities (Morgan, 2012; Welteke & Machtolf, 2005).

With the further development of environmental assessment a distinction was made between the project level and the more strategic levels of a policy, plan, or programme, with the term '**environmental impact assessment' (EIA)** used for specific proposed actions at the project level and the term '**strategic environmental assessment' (SEA)** for specific proposed actions at the policy, plan or programme level. Policies, plans, and programmes are often referred to as strategic actions with a policy "considered as the inspiration and guidance for action, a plan as a set of coordinated and timed objectives for implementing the policy, and a programme as a set of projects in a particular area" (Wood & Dejeddour, 1992). Hence, for this research the term **proposal** when referring to any proposed activity or any major change to an activity at any of the policy, plan, programme or project levels.

Importantly, different actors and interest groups such as stakeholders, competent authorities, action-leading agents or project proponents are directly involved, consulted or otherwise concerned with the outcome of an environmental assessment. A stakeholder can be defined as "any organization, group or individual that has an interest in or may be affected" (Theakstone, 2006) by a proposal, while the competent authority is "usually a government or quasi-government organization (..) responsible for deciding" (Thérivel & Partidário, 1996) on the proposal.[20]

The action-leading agent/developer or project proponent is the organization or private business responsible for developing the proposal. Within an SEA the action leading agent/developer can be the same governmental or quasi-governmental organization as the competent authority, for example, a transport ministry proposing a new highway programme, preparing the SEA within the ministry and finally deciding whether or not to go ahead with the programme (Thérivel & Partidário, 1996). In this case, the country needs to guarantee the objectivity of the competent authority by ensuring at least a functional separation within the authority between the developing unit and the authorizing unit (EU, 2014, Art. 9a).

The conceptualizing of EIA for projects, the development of SEA for higher levels, and the development of HIA to overcome shortcomings in assessing health within EIAs and SEAs, will be described further in the following subchapters, while other forms also playing an important role in the international development of impact assessments (Bond & Pope, 2012) will only be described briefly.

2.4.1 Environmental impact assessment (EIA)

The first legal regulation of EIAs was the National Environmental Policy Act (NEPA) of the United States of America (USA), 1969 (Congress of the U.S.A., 1970). It was a response to the growing concerns in the population as well as in the scientific community on environmental damage which had led to significant health impacts, caused by major development projects and industrial pollution. NEPA established the requirement for federal agencies to develop and publish, for activities with potential significant impact on people, communities or the natural

[20] In regard to the EU EIA and SEA Directives and the UNECE Espoo Convention and its Protocol on SEA the competent authorities are those "which the Member States designate as responsible for performing the duties arising from" (EU, 2014, Art. 1) the Directives or covered by the Convention and Protocol.

environment, an environmental impact statement (EIS) on how these impacts and concerns were taken into account and addressed.

By now, almost 50 years later, some kind of EIA regulation can be found in almost every country of the world, but with quite some variance in EIA practice even between countries with considerable similarities, as well as within countries often applying EIA at national/ federal, regional/state and local level (Bond, 2004; Faith-Ell, Kalle & Lund-Iversen, 2014; McCarthy et al., 2002; Morgan, 2012). EIA has also been recognized internationally in diverse declarations such as in Principle 17 of the Rio Declaration on Environment and Development, Rio de Janeiro (UN, 1992a).

The implementation of EIA in Europe was especially influenced by the introduction of the EIA Directives of the EU, starting with the first 'Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment'. The first EIA Directive was amended three times (1997, 2003 and 2009)[21] before being newly codified by Directive 2011/92/EU, with the latest amendment by Directive 2014/42/EU (EU, 2014, 2012, 2009, 2003, 1997, 1985). With the Directives, EIA became mandatory for EU Member countries for specific projects defined in Annex I of the Directive and optional for projects defined in Annex II depending on the threshold or criteria defined (Annex II.A) or through a case-by-case examination. The procedure described in the EIA Directive includes a scoping stage, defining the information that the developer should provide to the competent authority (Annex II.A); an EIA report to be provided by the developer which needs to include basic information as listed in Annex IV; information and consultation with environmental authorities and the public; decision of the competent authority, taking into consideration the results of consultations; and a public notification of the decision.

The revised Directive 2014/42/EU entered into force on 15 May 2014 and had to be transposed by EU Member States into national legislation by 16 May 2017. Based on a public consultation process, concluded at the 25th anniversary of the EIA Directive (2010), the main amendments introduced are described in Box 7.

Box 7. Main amendments of EIA Directive 2014/43/EU

- Member States now have a mandate to simplify their different environmental assessment procedures.
- Timeframes are introduced for the different stages of environmental assessments: screening decisions should be taken within 90 days (although extensions are possible) and public consultations should last at least 30 days. Members States also need to ensure that final decisions are taken within a "reasonable period of time".
- The screening procedure, determining whether an EIA is required, is simplified. Decisions must be duly motivated in the light of the updated screening criteria.
- EIA reports are to be made more understandable for the public, especially as regards assessments of the current state of the environment and alternatives to the proposal in question.
- The quality and the content of the reports will be improved. Competent authorities will also need to
-

[21] Amended by Directive 97/11/EC bringing it in line with the Espoo Convention on EIA in a Transboundary Contexts; Directive 2003/35/EC bringing it in line with Aarhus Convention; "Directive 2009/31/EC amended Annexes I and II of the EIA Directive, by adding projects related to the transport, capture and storage of carbon dioxide (CO2)" (EU, 2013a).

Box 7. contd.

- prove their objectivity to avoid conflicts of interest.
- The grounds for development consent decisions must be clear and more transparent for the public. Member States may also set timeframes for the validity of any reasoned conclusions or opinions issued as part of the EIA procedure.
- If projects do entail significant adverse effects on the environment, developers will be obliged to do the necessary to avoid, prevent or reduce such effects. These projects will need to be monitored using procedures determined by the Member States. Existing monitoring arrangements may be used to avoid duplication of monitoring and unnecessary costs.

(Source: EC, 2017)

Furthermore, the UNECE Espoo 'Convention on EIA in a Transboundary Context' (1991) obliges its 45 Parties[22] to conduct EIA on defined projects – similar to the EIA Directive – and inform and consult with any neighbouring country if transboundary effects are likely to occur. For more information on the EIA Directives and the Espoo Convention and their relation to health refer to chapter 5.1.3. [23]

In addition, EIA procedures have been adopted by International Finance Institutions (IFI). The World Bank, for example, requires environmental assessments for "projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision-making in their lending policies" (World Bank, 2013).

Despite variations in practice, EIA has been defined by the International Association for Impact Assessment (IAIA) as a "process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made" (Senécal et al., 1999), and a generic model of an EIA process is shown in Box 8:

Box 8. Generic stages of an EIA process

- **screening** – to determine whether or not a proposal should be subject to EIA and, if so, to what level of detail;
- **scoping** – to identify issues and impacts likely to be important and to establish terms of reference for EIA;
- **examination of alternatives** – to establish the preferred or most environmentally sound and benign option for achieving proposal objectives;
- **impact analysis** – to identify and predict the likely environmental, social and other related effects of the proposal;
- *mit***igation and impact management** – to establish the measures that are necessary to avoid, minimize or offset predicted adverse impacts and, where appropriate, to incorporate these into an environmental management plan or system;
- **evaluation of significance** – to determine the relative importance and acceptability of residual impacts (i.e., impacts that cannot be mitigated);
- **preparation of the EIS or report** – to document clearly and impartially impacts of the proposal, the proposed measures for mitigation, the significance of effects, and the concerns of the interested public and the communities affected by the proposal;

[22] A country becomes a Party to a Convention or Protocol upon ratification, acceptance, approval or accession. UNECE has a total of 56 Member States including the countries of Europe, North America (Canada and the United States of America), central Asia (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan) and western Asia (Israel) (Source: https://www.unece.org/oes/nutshell/region.html).

[23] Hence force the terms 'Espoo Convention' and 'EIA Directive' will be used for the latest revised EIA Directive 2014/52/EU; when referring to older EIA Directives the respective numbers will be given.

Box 8. contd.

- **review of the EIS** – to determine whether the report meets its terms of reference, provides a satisfactory assessment of the proposal(s) and contains the information required for decision-making;
- **decision-making** – to approve or reject the proposal and to establish the terms and conditions for its implementation; and
- **follow up** – to ensure that the terms and condition of approval are met; to monitor the impacts of development and the effectiveness of mitigation measures; to strengthen future EIA applications and mitigation measures; and, where required, to undertake environmental audit and process evaluation to optimize environmental management.

(Source: Senécal et al., 1999)

As described, an EIA is mainly concerned with proposed activities at the project level. Concerning the project level, the EIA Directive is using a narrow definition with project meaning "the execution of construction works or of other installations or schemes, [or] other interventions in the natural surroundings and landscape including those involving the extraction of mineral resources" (EU, 2014, Art. 1). The EIA Directive even defines specific projects in its Annex I and Annex II for which an EIA must be undertaken; these are summarized in Box 9.[24]

Box 9. Sectors with projects subject to EIA – depending on the size of the project

- agriculture, silviculture (forestry) and aquaculture (fishery) (e.g., intensive livestock installations, deforestation, intensive fish farming)
- energy industry (e.g., refineries, thermal and nuclear power stations, storage of petroleum, power lines)
- extractive industry (for example, open-cast mining, quarries, underground mining, deep drilling; oil, natural gas extraction installations)
- other industries, e.g.,
  - chemical industry (e.g., pesticides, pharmaceutical)
  - food industry (e.g., packaging and canning, brewing and malting)
  - mineral industry (e.g., coke ovens, cement, asbestos, glass, ceramic products)
  - production and processing of metals (e.g., production of pig iron or steel, manufacture of motor vehicles, shipyards, swaging by explosives)
  - rubber industry (elastomer-based products)
  - textile, leather, wood and paper industry (e.g., paper and board production, dyeing of fibres or textiles)
- infrastructure projects, e.g.,
  - coastal works to combat erosion
  - dams
  - industrial estate development
  - pipelines (e.g., oil, gas, CO2 transport, chemicals)
  - spatial planning (town and country planning, land use)
  - transport (e.g., motorways, express ways, railways, tramways, waterways, airports, harbours)
  - urban development (including shopping centres and car parks)
- telecommunications
- tourism and leisure (e.g., ski runs, marinas, holiday villages, caravan sites, theme parks)
- waste management (e.g., waste disposal, incineration, wastewater treatment)
- water management (e.g., groundwater abstraction, works for transfer of water resources; long distance aqueducts).

(Source: adapted from EU, 2014, Annex I, Annex II; UNECE, 1991, Appendix I)

[24] These lists are similar to the list of activities in Appendix I of the Espoo Convention and are also reflected in Annex I and Annex II of the UNECE Protocol on SEA to the Espoo Convention.

General problems in the application and the effectiveness of the EIA Directive 2011 were identified in the areas of "screening, scoping, consideration of alternatives, monitoring, public participation and quality control" (Morgan, 2012). The assessment of cumulative effects needs particular improvement, for example, in regard to a clear definition of cumulative effects, as well as a lack of well-established approaches and methods for addressing these effects. Other concerns are the quality of the information provided through EIA, which often is determined by institutional arrangements and poor practice because of low commitment of the project proponent. Despite the still existing challenges within in the area of EIA Morgan (2012) concludes that "EIA should be integral to project development and design processes, not left to the final legal step before project implementation. This would reduce the emphasis on compliance-oriented EIA, allowing impact assessors to work more constructively with proponents and stakeholders to develop processes that meet the needs of all parties, and in so doing result in projects that are consistent with the environmental and social aspirations of local communities" (Morgan, 2012).

2.4.2 Strategic environmental assessment (SEA)

The term SEA is commonly used to refer to a process that analyses the impacts of proposed strategic actions, i.e. policies, plans or programmes, on the environment. The main objective of SEA is the integration of environmental and sustainable considerations into strategic planning and decision-making. Hence, it aims specifically at informing and improving the decision-making process to prevent negative impacts of the planned strategic action and foster positive ones (Dalal-Clayton & Sadler, 2005; Thérivel, 2004).

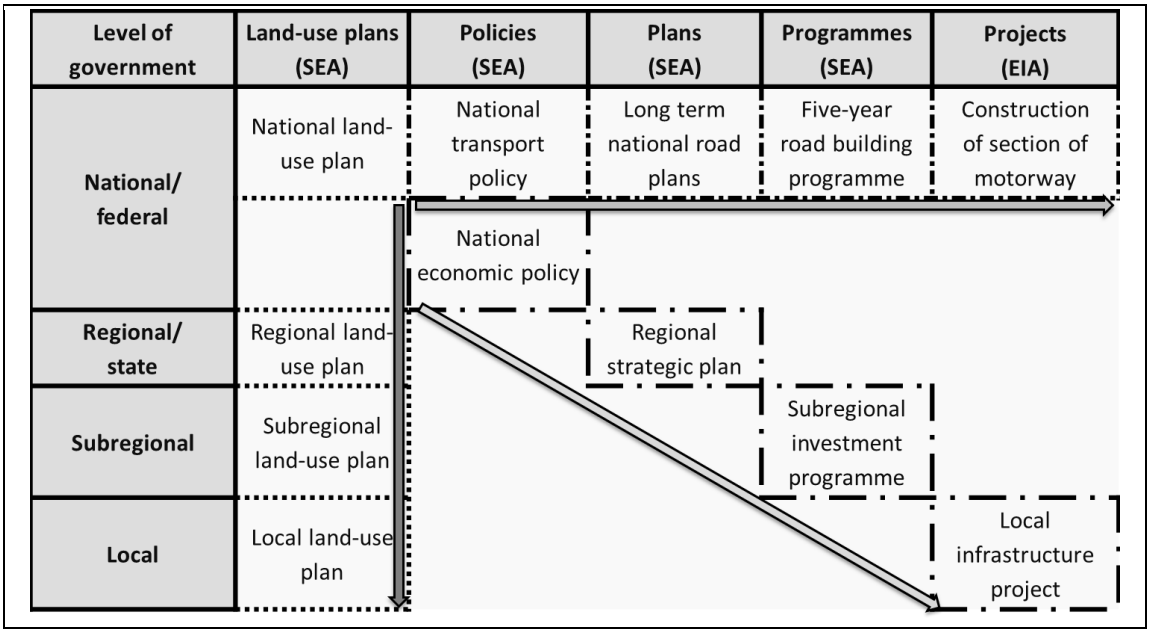
The concept of assessing the environmental impacts of strategic actions dates back to the development of NEPA in 1969, requiring a detailed statement of impacts on the environment of proposed legislation or a major federal action, see also chapter 2.4.1 on EIA. Although in NEPA 'actions' were defined to include all tiers of decision-making – policies, plans, programmes, procedures, regulations or legislative proposals – the main focus of the NEPA-based assessments was on project proposals (Fischer, 2007a; Sadler & Dalal-Clayton, 2012). According to Fundingsland Tetlow and Hanusch (2012), Wood and Djeddour were the first to use the term SEA in 1989 in a report to the EC followed by a paper in 1992 arguing that "EIA may occur too late in the planning process to ensure that all the relevant alternatives and impacts are adequately considered. Alternative approaches, cumulative impacts and synergistic impacts, ancillary impacts, regional or global impacts and non-project impacts all may be better assessed at policy, plan or programme level rather than at the project level" (Wood & Dejeddour, 1992). In this regard, even after 40 years, the implementation of more and more project EIAs has led to disillusionment with a single EIA approach to assist in a smooth decision-making process. According to João (2005) project EIAs could not capture cumulative impacts of neighbouring projects, and furthermore, EIA entered into the decision-making process only when the main decisions "at policy or planning level, that could influence the type and amount of projects that are actually built on the ground, .. [had] already been taken" (João, 2005).

A number of SEA definitions have been developed over the last decades, having in common the systematic process to evaluate environmental effects of policies, plans and programmes

and trying to influence the decision-making process as early as possible. The international trend has led to broader and more complex definitions promoting SEA "as a diagnostic tool to help integrate environmental and social (and even economic) considerations during the formulation of policies and development plans and programmes" (Dalal-Clayton & Sadler, 2005). In this regard, Fischer (2007a) defines SEA as a "systematic, objectives-led, evidence-based, proactive and participative decision-making support process for the formulation of sustainable policies, plans and programmes, leading to improved governance" (Fischer, 2007a). Partidário goes a step further by emphasizing the strategic dimension of SEA, defining SEA "as a strategic framework instrument that helps to create a development context towards sustainability, by integrating environment and sustainability issues in decision-making, assessing strategic development options and issuing guidelines to assist implementation" (Partidário, 2012).

The so called tiering of environmental assessments at different levels of the planning and decision-making is also considered as one of the main drivers for SEA, as many decisions would have been already taken before an EIA would be initiated. Through the linking of the different planning levels – the tiering – and the preparation of environmental assessments at the different levels, the problems of EIA "being only a 'snapshot in time'" (Arts, Tomlinson & Voogd, 2005) could be minimized. Examples on the linkages of the different governmental and administrative levels, and the linkages from the policies over plans and programmes to projects are given in Fig. 10 below.

Fig. 10. Tiering of SEA and EIA: from policies over plans and programmes to projects at different governmental and administrative levels



(Source: adjusted from Thérivel, 2010; based on Wood & Dejeddour, 1992)

The discussion on the concepts of SEA has evolved over the years from a more reactive EIA-based assessment tool into a more proactive decision-making process application. But according to Fundingsland Tetlow and Hanusch (2012), the practical application highly depends on the country-specific SEA provisions and the context in which it is applied. By 2012 the authors estimated that in approximately 60 countries SEA systems were in place, with the

EIA-based application still seeming to dominate in practice. Even though there is no global registry for SEA – and usually not even country-specific registries – they estimate that the sector with the highest number of SEAs is spatial planning; other sectors are transport, water management, extractive industry and energy (Fundingsland Tetlow & Hanusch, 2012).

As mentioned, in 2012 approximately 60 countries had some kind of SEA system in place. This is partly due to European legislation: the SEA Directive 2001/42/EU, which had to be transposed by the 28 Member States of the EU into national law; and the UNECE Protocol on SEA to the Espoo Convention on EIA. What is more, SEA practice has been adopted in the development cooperation context by international finance institutes (IFIs), such as the World Bank; international organizations, such as OECD, the United Nations Development Programme (UNDP), and United Nations Environmental Programme (UNEP); and national development cooperation agencies, such as the Netherlands Commission for Environmental Assessment (NCEA) and the German Agency for International Cooperation (GIZ). This progress dates from the 1960s and 1970s and follows growing understanding of the interrelation between environment, and social and economic development and therefore the need to integrate environmental consideration into sustainable development approaches, as established in the Brundtland Report, (1987), and at the United Nations Conference on Environment and Development (UNCED) Earth Summit, (1992a), with its Rio Declaration and Agenda 21 as described in chapter 2.3.1.3.

2.4.2.1 Selected international legal provisions for SEA

As mentioned above for Europe the SEA Directive 2001/42/EC has had a major impact on the development and preparation of SEA. Since then the SEA Directive has become an international reference standard and its influence goes beyond the region of the European Union (Dalal-Clayton and Sadler, 2005). Together with the UNECE Protocol on SEA, these two international legal provisions for SEA are therefore for this research of special interest.

The 'Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment' (SEA Directive) took effect in 2004 in all EU Member States, after almost 20 years of negotiations with the initial commitment to prepare a Directive in 1987 and a first draft in 1997 (Dalal-Clayton & Sadler, 2005). The SEA Directive was based on the older EIA Directive 85/337/EEC providing the framework for EIAs of certain public and private projects, which were likely to have significant effects on the environment and were defined in Annex I and Annex II of the EIA Directive.

The objective of the SEA Directive is "to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development" (EU, 2001, Art. 1). To ensure this, an environmental assessment has to be carried out of certain plans and programmes, if they are expected to have significant effects on the environment. Compared to the generic definition of policy, plan, or programme in chapter 2.4 above, the definition used in the Directive is narrower, excluding policies, and with plans and programmes being specific plans and programmes or modifications to them "which are subject to preparation and/or adoption by an authority at national, regional or local level or

which are prepared by an authority for adoption, through a legislative procedure by Parliament or Government, and which are required by legislative, regulatory or administrative provisions" (EU, 2001, Art. 1).

In this regard Article 3 refers to plans and projects which are prepared for "agriculture, forestry, fisheries, energy, industry, transport, waste management, water management, telecommunications, tourism, town and country planning or land use and which set the framework for future development consent of projects listed in Annexes I and II" (ibid., Art. 3) to the EIA Directive or require an assessment pursuant to Article 6 or 7 of the Habitat Directive 92/42/EEC of the EU, last amended in 2013 (EU, 2013b). Exempt are plans and programmes that serve national defence or civil emergency purposes, or are financial or budget plans or programmes (EU, 2001, Art. 3). For an overview of the sectors see also Box 9 above.

Even though the UNECE Protocol on SEA to the Espoo Convention (henceforth called the Protocol on SEA) closely follows the provisions of the SEA Directive to ensure "a high level of protection of the environment, including health" (UNECE, 2003, Art. 1), it has a broader scope including also the assessment of policies and legislation while under preparation. Exempt are national defence, civil emergency and budgetary proposals (UNECE, 2003, Art. 4 and Art. 13). Like the SEA Directive, the Protocol on SEA defines that SEA shall be carried out for certain plans and programmes which are summarized in Box 9 above. Despite the transboundary context of the Protocol on SEA, only one article specifically applies to transboundary consultations (Art. 10).

The Protocol on SEA was adopted on 23 May 2003 in Kiev, Ukraine, and was signed by 36 countries plus the European Union, and in 2006 additionally by Montenegro. On 11 July 2010 it finally entered into force, 90 days after the deposit of the 16th instrument of approval, acceptance, accession, succession, or ratification by a signatory country at the United Nations (UN) (Art. 24). By April 2017, 30 signatory countries plus Malta and the EU had become so-called Parties of the Protocol on SEA. For an update on the Parties please refer to the United Nations Treaty Collection (UN, 2017).

Main elements of the Protocol on SEA are screening (Art. 5), scoping (Art. 6), environmental reporting (Art. 7), decision (Art. 11) and monitoring (Art. 12). Article 8 on public participation also builds on articles in the UNECE Aarhus Convention (1998) regarding early, timely and effective opportunities for public participation, the rights of access to information, and public participation in decision-making.

Importantly, the Protocol on SEA constantly underlines the consideration of environmental effects, including health effects, by explicitly mentioning "environment, including health". Health is mentioned within the obligatory information that needs to be provided by the environmental report. Additionally, the Protocol on SEA even requires consultation with environmental and health authorities through a specific Article, Art. 9 (UNECE, 2003). The Protocol on SEA and its implementation is therefore of great interest for this research.

2.4.2.2 The SEA process

The SEA process can be on the one hand EIA-based, often driven by legal obligation, or on the other hand, with an emphasis on the strategic value of SEA, which is then more linked to planning and policy-making concepts (Partidário, 2012). Which approach is used depends not

only on the legal context of the strategic action but also on the level of the decision-making process or the decision tier: “In this context, it has been established that the higher the level of the strategic action, the less applicable project EIA based methods and techniques might be” (Fischer, 2014b). To choose suitable methods and techniques for the SEA Fischer describes the following aspects that need to be considered: time scale, types of data, level of certainty, type of impacts, type of consultation and participation, and alternatives (Fischer, 2014b).

The more project-based approach is prescribed within the SEA Directive and the Protocol on SEA with the core parts of the environmental assessment being “the environmental report, the carrying out of consultations, the taking into account of the environmental report and the results of the consultations in decision-making and the provision of information on the decision” (EU, 2001, Art. 2(b)). Hence, this more project-based SEA process can be described in six main stages: screening, scoping, assessment and reporting, participation, decision-making and monitoring and evaluation. As the main features are similar to the EIA process, the details of the SEA process will be described later when comparing EIA, SEA and HIA (see Annex 6).

The more strategic planning and decision-making approach is, for example, described and further developed by Partidário (2012) in the SEA guidance of the Portuguese Environmental Protection Agency: “SEA entry point should be as early as possible in the decision process, ideally with visioning and establishment of strategic objectives, before strategic options are identified, and long before proposals are put forward” (Partidário, 2012). SEA can therefore be triggered not only when legal obligations call for it but also, for example, in regional plans when:

- the territorial area for action is known but not the proposals/sectorial intentions;
- there are known proposals/sectorial intentions but no territorial area for action is identified;
- the territorial area for action and the proposals/sectorial intentions are known, however there maybe strategic dimensions that can influence decision; or
- sectorial policy is known but it does not have a territorial materialization (ibid.).

In the more strategic approach, a close link of the SEA to the policy-making and planning process is of high importance. Furthermore, according to Partidário, the “SEA should not be about the direct assessment of environmental effects of proposals (on water, air, soil, etc.) as in projects assessment, but instead it should be about the assessment of development conditions (institutional, policy, economic, social issues, etc.) towards the creation of better environmental and sustainability decision contexts and outcomes” (ibid.).

Criteria for a good-quality SEA process aimed at informing planners, decision-makers and the affected public on the impacts and sustainability of a proposal or strategic decision have been defined by the IAIA and are shown in Box 10:

Box 10. SEA Performance Criteria

A good-quality SEA-process…	
Is integrated	• Ensures an appropriate environmental assessment of all strategic decisions relevant for the achievement of sustainable development. • Addresses the interrelationships of biophysical, social and economic aspects. • Is tiered to policies in relevant sectors and (transboundary) regions and, where appropriate, to project EIA and decision-making.
Is sustainability-led	• Facilitates identification of development options and alternative proposals that are more sustainable.
Is focused	• Provides sufficient, reliable and usable information for development planning and decision-making. • Concentrates on key issues of sustainable development. • Is customized to the characteristics of the decision-making process. • Is cost- and time-effective.
Is accountable	• Is the responsibility of the leading agencies for the strategic decision to be taken. • Is carried out with professionalism, rigor, fairness, impartiality and balance. • Is subject to independent checks and verification. • Documents and justifies how sustainability issues were taken into account in decision-making.
Is participative	• Informs and involves interested and affected public and government bodies throughout the decision-making process. • Explicitly addresses their inputs and concerns in documentation and decision-making. • Has clear, easily understood information requirements and ensures sufficient access to all relevant information.
Is iterative	• Ensures availability of the assessment results early enough to influence the decision-making process and inspire future planning. • Provides sufficient information on the actual impacts of implementing a strategic decision, to judge whether this decision should be amended and to provide a basis for future decisions.

(Source: Verheem & IAIA SEA Section, 2002)

2.4.3 Health considerations in environmental assessments – a first summary of the status quo

An initial literature review on the consideration of health within environmental assessments revealed that, for example, spatial planning and transport SEAs do consider important biophysical health determinants such as air, soil or water pollution but they only rarely consider the wider concept of health determinants. If further health determinants are considered it highly depends on the issues covered by the assessment and to some extent on the type and tier of the proposal as well as on the sector (Bhatia & Wernham, 2008; Douglas, 2009; Faith-Ell, Kalle & Lund-Iversen, 2014; Fischer, 2014b; Fischer, Martuzzi & Nowacki, 2009; Kørnøv, 2009; Nowacki, Martuzzi & Fischer, 2010).

Furthermore, health experts seldom participate in EIA or SEA, apparently because the health sector itself still needs to recognize the full potential of instruments like EIA and SEA to promote health. To make the case of health in environmental assessments, not only do health experts need to be equipped with more tools, information and databases, but environmental experts need to be aware of the benefits of further integration, and of the broader determinants of health which are included in only a few international guidelines (Faith-Ell, Kalle & Lund-Iversen, 2014; Fischer, 2014b; Nowacki, Martuzzi & Fischer, 2010; Posas, 2011).

Health inclusive environmental assessments can help identify opportunities and, ultimately, act to prevent disease and to avert unnecessary health costs. As described above, the protection of human health is one of the main objectives of the EIA and SEA Directives, the Espoo Convention on EIA and its Protocol on SEA. Therefore, effects of a proposal on human health and populations have to be considered in the environmental assessment process. For the SEA process different key entry points for health have been identified by Nowacki, Martuzzi and Fischer (2010) which can also be applied to a generic environmental assessment process. They are described in Table 12 below.

Table 12. Generic project-based environmental assessment stages and key health entry points

Environmental assessment stage	Key health entry points
Screening: to decide if an EIA/SEA is needed, for example, based on a legal requirement; to determine whether the proposal will have any significant environmental effects; and/or to help define aims and objectives of the proposal.	Health considerations should be included as part of the screening process, for example, through active involvement of health impact assessment experts, inclusion of health criteria in screening tools, etc.
Scoping: to determine the terms of reference, including the geographic, temporal and thematic extent, the level of detail of the assessment and necessary information to be included, first identification of environmental problems, alternatives, methods and techniques for the assessment: to define potential stakeholders and 'affected parties'; to establish the consultation and participation procedure, management arrangements.	Health must be adequately covered in the terms of reference, including in relation to the role and competencies of experts that will conduct the health related assessment activities.
Assessment and reporting: conducting the analysis to establish significant environmental impacts, ensuring that the results are state-of-the-art and as reliable as possible, using different methods and techniques. All to be documented in an environmental report including alternatives and recommendations.	Need to ensure quality and comprehensiveness of health-related assessment, including stakeholder engagement activities, disclosure of information, assessment methodologies used, credibility of baseline, appropriateness of recommendations, etc.
Consultation and participation: testing the completeness, validity and reliability of the relevant information; identifying and mitigating conflicts; taking into account the needs of the concerned public; facilitating a better understanding between different players; enhancing the acceptance of the policy, plan and programme and enhancing transparency.	Need to ensure that health sector actors and advocates are actively engaged in the policy, plan and programme process.
Decision-making: weighing the findings against each other, justifying how a decision was reached and what information was used.	Need to ensure that health sector actors and advocates are actively engaged in decision-making activities.
Monitoring and evaluation: follow-up of the EIA/SEA regarding the observation and measurement of predefined environmental indicators and effects (performance) but also of the EIA/SEA process itself (conformance).	Health indicators are used for monitoring as well as measuring the overall impact and performance of the EIA/SEA. For example, many environmental issues could potentially result in health problems, many of which have clear attributable risks, for example, poor air quality/respiratory disorder. Health indicators could provide an opportunity to link EIA/SEA performance to wider development objectives, for example, Sustainable Development Goals (SDGs), related environmental and health indicators (those clearly attributed to environmental risk factors such as water and sanitation and climate change).

(Source: adapted from Nowacki, Martuzzi & Fischer, 2010)

In general, there is great potential to further integrate health into environmental assessments, as environmental assessment legislation exists in the majority of countries (Morgan, 2012; Fundingsland Tetlow & Hanusch, 2012). But depending on the type of proposal, the tier and the context, it can be either fully integrated or done through a separate HIA process (Fehr et al., 2014). In any case, as Harris, Viliani and Spickett, (2015) conclude, political will and leadership are needed, for example, through implementing legal frameworks that explicitly require the inclusion of health as a guiding principle or overall objective in the assessment process. Additionally, further implementation "requires people on the ground with skills, experience as well as resources and support from within their organisations. Skills include technical skills such as risk assessment but also the ability to navigate and exchange ideas across disciplines. Without resources or organizational support, it is impossible to make even legislative requirements a reality. Finally, community and other stakeholders require proactive engagement to link in with EIA public consultation processes" (Harris, Viliani & Spickett, 2015).

2.4.4 Health impact assessment (HIA)

The aim of HIA is to support decision-makers by trying to predict the consequences of an action on the health of the population. As with environmental assessment, the roots of HIA can be traced back to the recognition and enhanced understanding of environmental impacts on health, the introduction of regulatory EIA and SEA procedures, and the lack of a meaningful integration of health into said procedures (Harris-Roxas et al., 2012; Morgan, 2012).

Other origins are seen in the wider determinants of health approach, which can be traced back, for example, to the Lalonde Report (1974), the Declaration of Alma Ata (WHO, 1978), and the Ottawa Charter (WHO, 1986) – see also chapter 2.3.1.1, all leading, among others, to the HiAP agenda (Ståhl et al., 2006), and promoting HIA as a tool for the implementation of healthy public policies (Harris-Roxas et al., 2012; O'Mullane, 2013a). Furthermore, the First African Interministerial Conference on Health and Environment, Libreville, Gabon, 28-29 August 2008, supported HIA as an instrument providing an "important decision-making tool, through which the primary prevention of diseases can be achieved by development planning and design" (WHO Regional Office for Africa, UNEP & Republique Gabonaise, 2009), as does the Health 2020 policy framework of the WHO Regional Office for Europe (WHO Regional Committee for Europe, 2012). For further information on HiAP please refer to chapter 2.3.1.1 and on Health 2020 to chapter 2.3.1.2.

The third area of public health activities heavily influencing HIA is seen in the discussion on health equity and the importance of tackling health inequalities. This discussion dates back to the Black Report (United Kingdom Department of Health and Social Security, 1982), the works of Whitehead (1991), Wilkinson and Marmot (1998, 2003) and the reports of the WHO Commission on Social Determinants of Health (CSDH) (2008). The Rio Political Declaration on SDH (WHO, 2011) identifies HIA as a tool for inter-sectoral dialogue, through promoting policies, programmes, practices and legislative measures to address health inequalities and "to adapt or reform those harmful to health and health equity" (ibid., 13(viii)) (Harris-Roxas & Harris, 2011; Harris-Roxas et al., 2012; O'Mullane & Guliš, 2014; O'Mullane, 2013a).

One of the first definitions on HIA is from 1983 within the framework of environmental health impact assessment (EHIA). The aim of HIA is “to predict the direct effects of a development upon human health, in terms of increased morbidity and mortality" (WHO Regional Committee for Europe & Environmental Resources Ltd, 1983). But at that time the authors concluded that it was not possible to do an independent HIA and instead EHIAs should be further developed, as

1. to derive precise figures on changes in mortality or morbidity would be almost impossible due to a specific project as too many other factors also play a role; and
2. given the high uncertainty linked to such figures, they were likely to be very controversial and hence political sensitivity would prevent their publication (WHO Regional Committee for Europe & Environmental Resources Ltd, 1983).

Nevertheless, the development of HIA as an independent tool continued with one of the first guidelines on HIA been developed by Birley (1989) in relation to environmental assessment of major water resource development projects, forecasting the vector-borne disease implications of the development (Birley, 1991). Based on this, a guideline on HIA in development projects was developed for the Asian Development Bank in 1992, defining four categories of possible health hazards to be considered in an HIA of development projects:

1. communicable disease (for example, malaria, diarrhoea, respiratory infection),
2. non-communicable disease (for example, poisoning, pollution, dust),
3. malnutrition (for example, reduced subsistence foods), and
4. injury (for example, traffic accidents, occupational injury) (Birley & Peralta, 1992).

This guideline was further developed into another guidance document on HIA in development projects (Birley, 1995), and in 1996 Scott-Samuel argued that HIA had become “an idea whose time had come” (Scott-Samuel, 1996) not only for assessing environmental impacts but also to assess policies to support healthy public policies.

A further milestone in the development of HIA was the Gothenburg Consensus Paper (WHO Regional Office for Europe, 1999b) aimed at creating a common understanding of HIA. As a result, HIA was defined as “a combination of procedures, methods and tools by which a policy, program or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population” (WHO Regional Office for Europe, 1999b).

This definition was further adapted in 2006 by the health section of the IAIA adding to the Gothenburg definition the systematic judgment of potentially unintended effects, and options for the management of effects. Hence, HIA can be defined as “a combination of procedures, methods and tools that systematically judges the potential, and sometimes unintended, effects of a policy, plan, programme or project on the health of a population and the distribution of those effects within the population. HIA identifies appropriate actions to manage those effects” (Quigley et al., 2006; adapted from WHO Regional Office for Europe, 1999b).

Since then various text books, for example, Kemm, Parry and Palmer (2004), Wismar et al. (2007), Birley (2011), Kemm (2013a), O’Mullane (2013b), and Guliš (2014), have been published, as well as numerous HIA guidelines. Nowacki, Mekel and Fehr (2010) reviewed 20 HIA guidelines of a generic nature, accessible in English or German, and more have been

published since[25], for example, by Bhatia (2011), Human Impact Partners (2011) or the Oregon Health Authority (2015).[26]

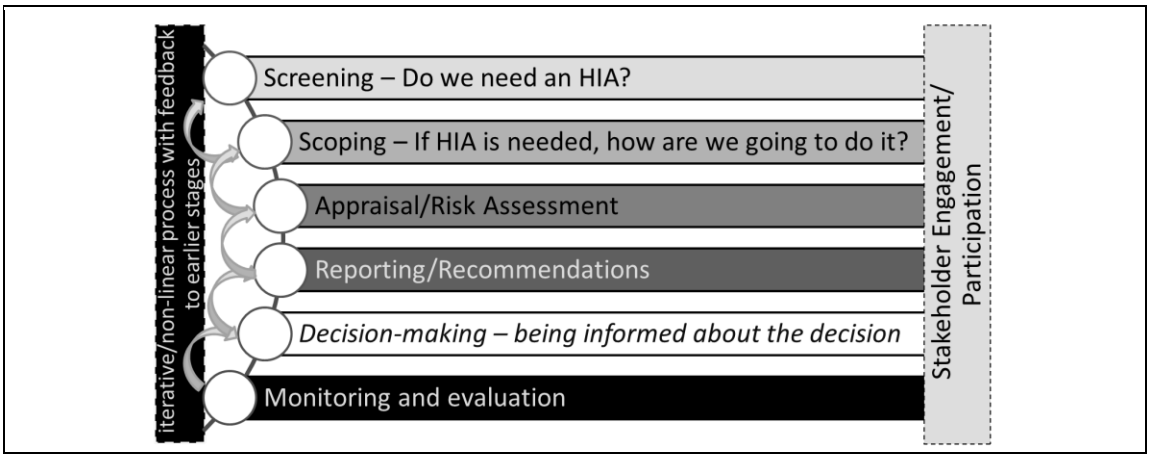
In addition, several industry associations have developed guidelines for separate HIAs of their projects, for example, the International Council on Mining and Minerals (ICMM) (Vohra, Birley & Ball, 2010), and the International Association of Oil and Gas Producers (OGP) and International Petroleum Industry Environmental Conservation Association (IPIECA) (Krieger & Balge, 2005). Not only does this recognize the importance of addressing health in major projects involving these industries, but it also helps industry in achieving a social license to operate.

As can be seen in the above definition of HIA (Quigley et al., 2006), there is no specific distinction as to a which tier and governmental level HIA can be undertaken. And importantly, HIA should not only look into the possible risks or negative impacts of a proposal but also into the possible positive impacts and opportunities for health development. Hence, the underlying values of HIA, already defined in the Gothenburg Consensus (1999) are

- **democracy**, emphasizing the importance of stakeholder participation in the process;
- **equity**, emphasizing the importance of impact distribution among different population groups;
- **sustainable development**, to consider short- and long-term, direct and indirect, positive and negative impacts; and
- **ethical use of evidence**, using qualitative and quantitative approaches of different scientific disciplines if necessary, and basing the conclusions on the best evidence available (WHO Regional Office for Europe, 1999b).

Similar to the EIA project-based approach, the HIA process is designed around stages, as shown in Fig. 11.

Fig. 11. Generic HIA process



(Source: adjusted from Nowacki & Vohra, 2014, slide 17)

[25] Especially in the United States of America (USA), as two philanthropic organizations – Robert Wood Johnsons Foundation and Pew Charitable Trusts – have been providing substantial funding for HIA development since 2009 (Ross & Rao, 2013).

[26] Comprehensive overviews on the historical landmarks in HIA can be found in Krieger et al., 2010, Harris-Roxas and Harris (2011) and Harris-Roxas et al., 2012.

Although in the various guidelines the stages may differ, they can be summarized in a generic model. For further details of the stages please refer to Annex 6 comparing the EIA, SEA and HIA process.

Importantly, stakeholder and community involvement is described in many models as a specific stage, but as it should take place very early on and if possible and/or applicable throughout the whole process, it is not shown as a separate stage in the figure. Furthermore, the whole process needs to be seen as an "iterative and non-linear process where later steps can feed back into earlier ones and vice versa" (Vohra, Birley & Ball, 2010). Additionally, the reporting stage should include a feedback stage to a first draft of the report at least by the involved stakeholders: if not another public consultation is undertaken. The report should not only describe the result of the assessments, methods used, and presumptions made, but should also address possible aspects of uncertainty in the assessment as well as the possible mitigation and/or enhancement measures. For the development of the recommendation, the precautionary principle should be taken into account. This principle states "that in the case of serious or irreversible threats to the health of humans or the ecosystem, acknowledged scientific uncertainty should not be used as a reason to postpone preventive measures" (Martuzzi & Tickner, 2004). Furthermore, the final report should be made publicly available, as required for EIA and SEA by the UNECE Aarhus 'Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters' (UNECE, 1998).

Fig. 11 also includes the decision-making stage, which, as the HIA is only informing the decision-making process, is not a true HIA stage, but is important for the later outcome evaluation of the HIA and further monitoring of the proposal, for example, through a health management plan. Furthermore, the final decision should be made public and include justification as to which recommendations could not be taken up and why not. This would also align the HIA with the Aarhus Convention and the obligations of EIA and SEA.

The HIA process can be further distinguished into three different kinds of HIAs, depending on the proposal, the funding, the time given for it, and the depth of the appraisal stage (Kemm, 2013b; Mindell, Joffe & Ison, 2004):

- **Desktop appraisal** – usually carried out by a person in a few hours, giving an overview of possible health effects of the project mainly on the basis of already existing data and possibly through consultation with selected experts.
- **Rapid appraisal** – based on a systematic literature review of already existing information evidence for the evaluation of the health effects is systematically collected and used: the appraisal can be supported by a workshop with the affected parties, and a quantification of the assumed health effects.
- **Comprehensive appraisal** – in addition to comprehensive systematic literature research, the assessment might be based on an investigation of the affected population, as well as a secondary analysis of existing data, the participation of stakeholders according to systematic selection criteria, quantification of data and the conduct of sensitivity analysis. An evaluation of the HIA process or a result evaluation is also planned.

In contrast to environmental assessments, HIA seems to be now mainly institutionalized on a voluntary basis, i.e. at a national or subnational level, countries may have in place some kind of

policy or political statements that support HIA but do not legally require it. This is the case in many European countries such as Austria, and the Netherlands. At the international level institutions like WHO, regional development banks such as the Asian Development Bank, and industry associations, such as ICMM, recommend the implementation of HIA. However, some countries have developed legal regulations for HIA, which might be either implemented through environmental assessment legislation, as in Lithuania, or through separate public health legislation, as in Slovakia or Thailand. Furthermore, in some countries such as Australia, Canada, New Zealand, Spain, and the United Kingdom, legislation might only exist at lower-than-national levels (O'Mullane & Guliš, 2014; Winkler et al., 2013).

In this regard Harris-Roxas and Harris (2011) further differentiate between four main forms of HIA: mandated, decision-support, advocacy and community-led. A short description, the main purpose and the origins of these HIA forms is presented in Table 13.

Table 13. Forms of HIA – description, purpose and origins

	Mandated	Decision-support	Advocacy	Community-led
Description	Occurs in the context of an EIA, integrated impact assessment (IIA) or environmental, social and health impact assessment (ESHIA) …	Conducted voluntarily by, or with the agreement of, organisations responsible for a proposal ...	Conducted by organisations or groups who are neither proponents nor decision-makers …	Conducted by potentially affected communities on issues or proposals that are of concern
Purpose	• meeting a regulatory or statutory requirement • minimising negative health impacts	• improving decision-making and implementation • minimising negative health impacts • maximising positive health impacts	• ensuring under-recognised health concerns are addressed in design, decision-making and implementation • minimising negative health impacts • maximising positive health impacts	• ensuring the community's health-related concerns are identified and addressed • enabling greater participation of communities in decisions that affect them • minimising negative health impacts • maximising positive health impacts
Origins	Environmental health	Environmental health, social view of health, health equity	Social view of health, health equity	Social view of health, health equity

(Source: adjusted from Harris-Roxas & Harris, 2011)

In order to address and promote health equity, a separate strand of HIAs has developed mainly in Australia and the United Kingdom (Douglas & Scott-Samuel, 2001; Harris-Roxas et al., 2014, 2011; Mahoney & Potter, 2004): the so-called 'equity focused HIA' (Simpson et al., 2005), 'health inequalities impact assessment' (Mackenbach et al., 2004) or 'health equity impact assessments' (HEIA) (Povall et al., 2014). HEIA, for example, specifically takes on an equity lens in all stages, as it is perceived that although many HIAs assess differential impacts, these impacts are not further considered in the results and recommendations. Furthermore, the 'normal' HIA often lacks an "assessment of the 'causes of the causes' of health inequalities/inequities" (Povall et al., 2014).

The emphasis of the importance of the consideration of the SDHs in all HIAs has been criticized by Krieger et al. (2010), as, for example, private sector projects in the developing world could not address all these issues as they are usually outside their sphere of influence. It would therefore rather hinder development opportunities, especially when governmental institutions are weak, instead of supporting realistic development opportunities. Thus, according to Krieger et al. (2010) a more balanced approach and operationalization of HIA would be needed to focus on "the health assessment and the subsequent ability of the government or corporation to avoid, eliminate, or mitigate negative effects, and enhance positive project benefits and opportunities, without simultaneously marginalizing the project economically" (Krieger et al., 2010). Meanwhile, Vohra et al. (2010) countered that the key to further development of HIA is not operationalization, but rather "transparency, accountability, and having a wide scope are also crucial to achieving the promise of 'tangible results' from large projects" (Vohra et al., 2010). Additionally, there is even a whole impact assessment strand, social impact assessments (SIA), which has developed and which especially addresses the broader social change aspect, although under a different lens. For further details on SIA, please refer to chapter 2.4.6.1.

Harris-Roxas et al. (2012) list the following weaknesses and challenges that HIAs – still – face:

- assessing equity and distributional impacts is still a challenge due to the complexity of scoping differential impacts, and resource-poor settings makes even the analysis of baseline data more difficult;
- appropriate resource allocation to HIA in regard to budget, personnel as well as timelines;
- capacities to conduct but also to commission and review HIAs; and
- lack of evidence on the effectiveness of HIA, for example, in regard to influencing the decision and final implementation of a proposal and hence its benefits.

In regard to influencing the decision, Haig et al. (2015) concluded in their research on HIA effectiveness in Australia and New Zealand that the stepwise while flexible process of HIA together with its evidence base are essential features if the HIA is to have an impact on the decision-making process. Also, the 'proactive positioning' through proactive engagement in the decision-making process is of high relevance and needs to be seen in conjunction with the right timing as well as the flexibility of the HIA to meaningfully contribute to issues that are still open for decision. But the ability and opportunity of proactive positioning highly depends on the contextual factors like organizational support and culture, as well as on existing processes and relationships. There seems to be the need to further recognize that HIA, as well as a decision-making process are iterative processes that influence each other at different times and through the multiple 'smaller' decisions that need to be taken in this process (Haigh et al., 2015).

For Harris, Sainsbury and Kemp (2014) HIA is a process that can especially support the often non-linear policy-making cycle, if used tactically and technically; referring on the one hand to the need of "technically proficient assessment and predictions of the population health and equity impacts of substantive policy issues" (Harris, Sainsbury & Kemp, 2014); on the other hand to a tactical focus on the values, interests, rules and mandates of the actors in the policy-making process, as well as positioning health as "a relevant public health issue" (Harris, Sainsbury & Kemp, 2014), all of which requires institutional support and intersectoral

collaboration. Then HIA can support the policy formulation process as it provides "space for practical reasoning to navigate facts, values and processes underlying the substantive and procedural dimensions of policy" (Harris, Sainsbury & Kemp, 2014).

The major threat to HIA identified by Harris-Roxas et al. (2012) is within the health sector the still existing dominance of the provision of medical services and core public health functions like infection control, while only rarely interacting with other sectors and seldom getting involved in the planning process of other sectors. In light of the diversity of HIA application – at different governmental levels, in different sectors, for public as well as private proposals and with different foci, as for example, in the HEIA approach, the authors also see a "pressing need to revisit, at an international level, the governing values and standards that apply to HIA's use in order to ensure they are relevant to the current diverse range of HIA practice" (Harris-Roxas et al., 2012).

2.4.4.1 Environmental, social and health impact assessment (ESHIA)

Major development projects of the extractive industry often implement an integrated EIA, SIA and HIA process called ESHIA (see e.g., Birley, 2003; Greenment, 2017; McHugh et al., 2006; World Bank, 2015). According to Birley (2011), these would often imply separate processes and reports with cross-references to each other as, for example, illustrated by him in an example of the Sakhalin Energy project (Birley, 2003). Even though the three assessments should take place in parallel, ideally regularly updating each other, the HIA most likely needs more time, as many of the data gathered by the EIA and the SIA can be used in the HIA. In a fully integrated assessment this would also lead to more cross-references from the HIA to the EIA and SIA than vice versa and it should lead to "integrated recommendations for safeguarding and enhancing the health of stakeholders, environmental quality, and social well-being" (Birley, 2003). Besides these reporting challenges the management of a full integration also poses budgetary and possibly methodological challenges, as, within the HIA there might be a focus on the medical health model but limited engagement with the health community, as the participatory process most likely takes place within the SIA (Birley, 2003, 2011).

2.4.4.2 Differentiation HIA and health risk assessment (HRA)

In public health the term HRA is used "to characterize the nature and magnitude of health risks to humans and ecological receptors from chemical contaminants and other stressors that may be present in the environment" (U.S. EPA, 2017). HRA has been defined as a "process intended to calculate or estimate the risk for a given target system following exposure to a particular agent, taking into account the inherent characteristics of an agent of concern as well as the characteristics of the specific target system" (Theakstone, 2006).

Based on a problem formulation, the HRA process follows four components: 1) hazard identification, 2) hazard characterization or dose-response assessment, 3) exposure assessment, and 4) risk characterization (IPCS, 2004). Aims and content of the steps, including the starting point – the problem formulation – are described further in Table 14.

Table 14. Paradigm for risk assessment, including problem formulation

Step	Description	Content
Problem formulation	Establishes the scope and objective of the assessment.	• defining the question • prior knowledge • desired outcomes.
Hazard identification	Identifies the type and nature of adverse health effects.	• human studies • animal-based toxicology studies • in vitro toxicology studies • structure-activity studies.
Hazard characterization	Qualitative or quantitative description of inherent properties of an agent having the potential to cause adverse health effects.	• selection of critical data set • modes/mechanisms of action • kinetic variability • dynamic variability • dose–response for critical effect.
Exposure assessment	Evaluation of concentration or amount of a particular agent that reaches a target population.	• magnitude • frequency • duration • route • extent.
Risk characterization	Advice for decision-making.	• probability of occurrence • severity • given population • attendant uncertainties.

(Source: WHO, IPCS & IOMC, 2010).

Hence, HRA is much narrower in its scope, but the results that the HRA delivers are an inherent part of HIA appraisal stage and build the evidence base for the HIA.

In the context of larger development projects, HRA is often used as a tool within the occupational health and safety or hazard management plan of the project proponent. In such a case it is then mainly "concerned with occupational health and safety of the future workforce associated with a proposal and, to some extent, with issues like explosions that could affect the peripheral community" (Birley, 2011), and does not necessarily follow the classic HRA steps described above. While the HIA in this regard is more concerned with the impacts on the community in general – existing as well as future members – outside of the project boundaries or 'outside the fence', HRA in this context is within the project boundaries or 'inside the fence'. Even though the issues of occupational health and safety and hazard management could also be covered by an HIA, this does not make any sense if they are already covered by the project proponent's management plans. Instead the HIA can then refer to these plans (Birley, 2011; Kemm, 2013b).

2.4.4.3 Differentiation HIA and health needs assessment (HNA)

A **community HNA** can be defined as a process "that describes the state of health of local people; enables the identification of the major risk factors and causes of ill health; and enables the identification of the actions needed to address these" (Rowe, McClelland & Billingham, 2001). While a community HNA has several issues in common with HIA, for example, the baseline data collection and profiling of the community/population, the focus of the HNA is clearly on existing conditions and to develop recommendations for future social and health

investment programmes which then might be further linked to, or even assessed by, HIA (Birley, 2011).

The community HNA needs to be distinguished from **HNA of health systems**, which is used, for example, to assess the readiness of a country's health system to deal with an emergency situation. It is based on the six key functions of the WHO health system framework: 1) leadership and governance, 2) health workforce, 3) medical products, vaccines and technology, 4) health information, 5) health financing, and 6) service delivery (Rockenschaub, 2012).

2.4.4.4 Differentiation HIA and health technology assessment (HTA)

While HIA is concerned with the impacts of policies, plans, programmes and projects which often lie outside the health sector, an HTA is "concerned with the medical, organizational, economic and societal consequences of implementing health technologies or interventions within the health system" (Velasco-Garrido & Busse, 2005). Technologies are defined as procedures and interventions, including pharmaceuticals and surgery, in the field of health care, and the HTA is "a systematic, broad-ranging evaluation of the implications of using technologies within a particular health-care system. It aims to provide structured, evidence-based input to policymaking in order to inform the formulation of safe and effective health policies that are patient-focused and seek to achieve best value" (Kristensen, 2008).

Within the field of HTA economic evaluation plays an important role, especially in the final decision, if a technology is to be financed by the public health system (Briggs, 2008; Nowacki, 2007). Here there might be important linkages to HIA: economic evaluation of health impacts is only rarely done in HIA; the methods and techniques developed and used in HTAs might also be suitable for HIA; and the results of HTA could be used, for example, in HIAs on health policies (Nowacki, 2007).

2.4.5 Comparison of the main points of the three impact assessment forms EIA-SEA-HIA

A brief comparison of the illustrated impact assessments shows that the three impact assessment approaches, EIA, SEA and HIA, share the same objectives and are all based on the same basic principles as summarized for EIA (see Box 11). They all aim to support the decision-making process through systematic and evidence-based processes to avoid or at least mitigate negative impacts of proposals on the environment and health of the population, and they support sustainable development. HIA, by definition, has its main focus on health impacts, and also emphasizes the need to enhance positive impacts with a special focus on equity issues.

Box 11. Basic principles of EIA

- **Purposive** – the process should inform decision making and result in appropriate levels of environmental protection and community well-being.
- **Rigorous** – the process should apply "best practicable" science, employing methodologies and techniques appropriate to address the problems being investigated.
- **Practical** – the process should result in information and outputs which assist with problem solving and are acceptable to and able to be implemented by proponents.
- **Relevant** – the process should provide sufficient, reliable and usable information for development planning and decision making.
- **Cost-effective** – the process should achieve the objectives of EIA within the limits of available information, time, resources and methodology.

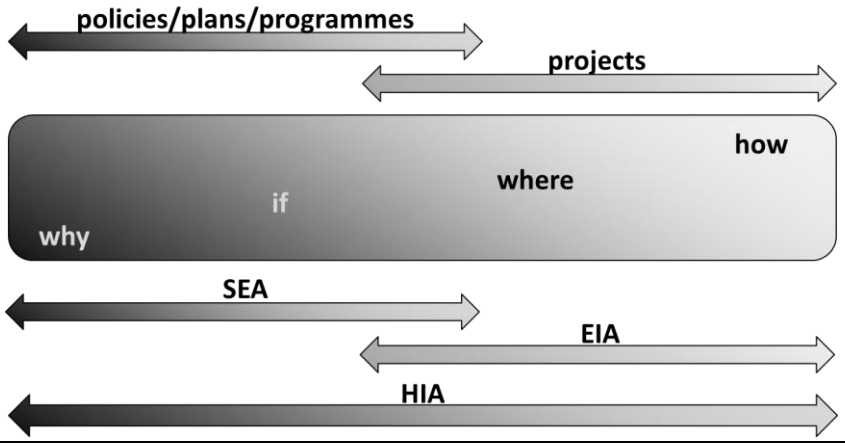
Box 11. contd.

- **Efficient** – the process should impose the minimum cost burdens in terms of time and finance on proponents and participants consistent with meeting accepted requirements and objectives of EIA.
- **Focused** – the process should concentrate on significant environmental effects and key issues; i.e., the matters that need to be taken into account in making decisions.
- **Adaptive** – the process should be adjusted to the realities, issues and circumstances of the proposals under review without compromising the integrity of the process, and be iterative, incorporating lessons learned throughout the proposal's life cycle.
- **Participative** – the process should provide appropriate opportunities to inform and involve the interested and affected publics, and their inputs and concerns should be addressed explicitly in the documentation and decision making.
- **Interdisciplinary** – the process should ensure that the appropriate techniques and experts in the relevant bio-physical and socio-economic disciplines are employed, including use of traditional knowledge as relevant.
- **Credible** – the process should be carried out with professionalism, rigor, fairness, objectivity, impartiality and balance, and be subject to independent checks and verification.
- **Integrated** – the process should address the interrelationships of social, economic and biophysical aspects.
- **Transparent** – the process should have clear, easily understood requirements for EIA content; ensure public access to information; identify the factors that are to be taken into account in decision making; and acknowledge limitations and difficulties.
- **Systematic** – the process should result in full consideration of all relevant information on the affected environment, of proposed alternatives and their impacts, and of the measures necessary to monitor or investigate residual effects.

(Source: Senécal et al., 1999)

While EIA is mainly concerned with projects, SEA is concerned with policies, plans and programmes, and HIA covers the whole spectrum, see Fig. 12.

Fig. 12. Comparing type and aim of EIA, SEA and HIA



(Source: adjusted from Partidário, 2013, (c) the World Bank Group)

While the three approaches share the same process, with some variation in SEA, if a more strategic approach is undertaken (see Annex 6), there are also conceptual differences between EIA, SEA and HIA, as shown in Table 15.

Table 15. The main differences between EIA, SEA and HIA

Aspect	EIA	SEA	HIA
Decision-making level	plan, programme, projects	policies, plans, programmes	policies, plans, programmes, projects
Nature of action	immediate, operational	strategic, visionary, conceptual	immediate, operational
Outcomes	detailed	general and often broad brush	from general to detailed depending on the tier/level
Relation to decision	evaluator, technical/ scientific approach	facilitator, mediator	facilitator, mediator, evaluator, scientific approach
Alternatives	specific location, design, construction, operation	area-wide, political, regulative, technological, fiscal, economic or social or physical strategies	not specifically mentioned
Scale of impact	microscopic, localized	macroscopic, cumulative, unclear	macroscopic, cumulative, uncertainties due to multiple exposures and divers pathways
Scope of impacts	physical or ecological issues mainly, to a lesser extent also social and economic	sustainability issues, economic and social issues may be more tangible than physical or ecological issues	broader definition of health related, special emphasize on distributional aspects
Timescale	medium to short term	long to medium term	mainly long to medium term, in case of accidents also short term
Key data sources	field work, sample analysis, statistical data	state of the environment reports, sustainable development strategies, local agenda 21, statistical data, policies, plans and programmes in related areas	health baseline data and health statistics, state of the environment, expected changes in pollution levels, data on health and other public available services, socio-economic data, field work, sample analysis
Data	mainly quantifiable	descriptive, often not clearly quantifiable	quantitative and qualitative in regard to health values
Rigour of analysis	more rigour, less uncertainty	less rigour, more uncertainty	depending on the level and proposal less or more rigour, less or more uncertainty
Assessment of benchmarks	legal restrictions and best practices	sustainability benchmarks (criteria and objectives)	best practices
Public perception	more reactive (NIMBY – not in my backyard)	vague, distant	active engagement but also more reactive, depending on the perceived own health risk
Post-evaluation	objective evidence, construction and operation	other strategic action or project planning	monitoring of proposal implementation; evaluation of correct prediction difficult as health outcomes may only show after longer time scales, for example, cancers

(Source: based on and adapted from Birley, 2011; Partidário & Fischer, 2006 - see also Fischer, 2007a)

2.4.6 Other forms of impact assessments

Two other forms of impact assessments will be described very briefly as they are intrinsically linked with the wider concept of health determinants and the concept of sustainable development: SIA and sustainability assessments.

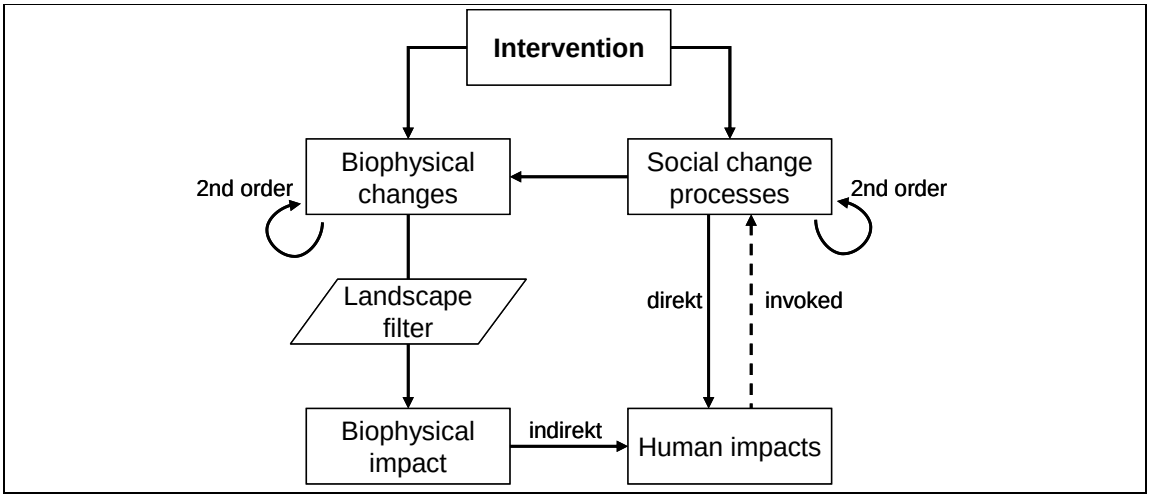
2.4.6.1 Social impact assessment (SIA) and health

The formalization of SIA can be traced back to the NEPA (1969). In NEPA the compulsory EIA included socioeconomic components as early as the 1970s, although these mainly consisted of demographic information from the project-affected regions. The reason for this, according to Burdge (2003), was a lack of understanding among EIA-performing technicians, engineers or landscape architects of what social effects are. For Burdge social impacts can be considered as all changes for individuals or the community as a whole that occur as a result of planned projects. "SIA variables point to measurable change in human population, communities, and social relationships resulting from planned (a proposed action) and unplanned interventions" (Burdge, 2003).

In this regard, Vanclay (2003) defines SIA as "the process of analysing (predicting, evaluation and reflecting) and managing the intended and unintended consequences on the human environment of planned interventions (policies, programs, plans, projects) and any social change processes invoked by those interventions so as to bring about a more sustainable and equitable biophysical and human environment" (Vanclay, 2003).

Slootweg, Vanclay and van Schooten (2001) differentiate two processes of change; the ‚social change processes' and the ‚biophysical changes', which they describe in their framework for integrating EIA and SEA, presented in Fig. 13:

Fig. 13. Framework to integrate environmental and social impact assessments



(Source: Slootweg, Vanclay & van Schooten, 2001; see also van Schooten, Vanclay & Slootweg, 2003)

A planned project can cause on the one hand biophysical changes such as changes in water quality, and on the other hand social changes, for example, through the influx of new workers to the community. Both changes can, in turn, lead to further change processes – processes of the second order. Furthermore, on the one hand biophysical changes can lead to biophysical impacts which may also depend on a so-called landscape filter, for example, different noise levels from aircrafts depending on the location of the residential area and the runways. These

in turn can indirectly lead to human impacts. Social change processes, on the other hand, have a direct influence on human impacts, and may also lead to biophysical changes, for example, the influx of workers leads to increased prices for houses or lands for new residential areas. Finally, social impacts can lead to new social change processes, for example, out-migration of residents due to the noise levels of a new runway, increased rents etc. (Slootweg, Vanclay & van Schooten, 2001).

Importantly, unlike in HIA, human impacts in SIA are not the impacts on health, but rather "they refer to quantifiable variables such as economic or demographic issues, as well as to changes in people's norms, values, beliefs and perceptions about the society in which they live, the gendered differentiation of impacts and all other facets of life" (Slootweg, Vanclay & van Schooten, 2001). The main social change processes that need to be considered in an SEA are summarized in Box 12, while the seven main categories on which impacts can be observed are described in Box 13.

Box 12. Main social change processes to be considered in SIA

- **Demographic processes**: process related to natural birth and death rate; in-migration, out-migration, resettlement, displacement/dispossession, rural to urban migration, urban to rural migration;
- **Economic processes**: waged labour, conversion and diversification of economic activities, impoverishment, inflation, currency exchange fluctuation (devaluation), economic globalization (conversion to global market-oriented production);
- **Geographic processes**: conversion and diversification of land use, urban sprawl, urbanization, gentrification, enhanced transport and rural accessibility, physical splintering;
- **Institutional and legal processes**: institutional globalization and centralization, decentralization, privatization;
- **Emancipatory and empowerment processes**: democratization, marginalization and exclusion, capacity building; and
- **Sociocultural processes**: social globalization, segregation, social disintegration, deviant social behaviour.

(Source: van Schooten, Vanclay & Slootweg, 2003) Reproduced with permission of The Licensor through PLSclear.

Box 13. Main impact categories in an SIA

- **Health and social well-being**, for example, death of self or a family member, nutrition, actual physical health and fertility, perceived health, mental health;
- **Quality of the living environment (liveability)**, for example, leisure and recreation opportunities and facilities, availability of housing facilities, physical quality of housing (actual and perceived);
- **Economic impacts and material well-being**, for example, workload, standard of living, income, economic dependency, burden of national debt;
- **Cultural impacts**, for example, change in cultural values, cultural integrity, loss of local language or dialect, natural and cultural heritage;
- **Family and community impacts**, for example, social networks, alterations in family structure, social tension and violence;
- **Institutional, legal, political and equity impacts**, for example, functioning of government agencies, participation in decision making; and
- **Gender relations**, for example, women's physical integrity, personal autonomy of women, gender division of production-oriented labour, gender-based control over, and access to, resources.

(Source: van Schooten, Vanclay & Slootweg, 2003) Reproduced with permission of The Licensor through PLSclear.

Not only is health and well-being one of the main categories for SIA, but according to den Broeder and Vanclay (2014) health is considered to be central to SIA, as 'social' is defined very broadly and health is for a large part socially determined. Hence, SIA and HIA can be seen as concepts with different main orientations and based on different theoretical discourses but which can be applied together to consider in total the impacts on human health and social change. This joint assessment is also reflected in diverse international as well as sectoral and

corporate SIA guidelines or standards, reviewed by den Broeder and Vanclay (2014): all of the nine reviewed guidelines mentioned the need to address health. Although, a further review of three exemplary SIA case studies also revealed that there is still room for improvement: “The broader determinants of health were visible in all reports, but were not necessarily recognized as such. The pathways from social impacts to health, and the links between health and social impacts were not explicitly part of the analysis. In none of the cases was the impact of health on social factors part of the analysis” (den Broeder & Vanclay, 2014).

An additional integral part of SIA to the information on social and cultural factors of the community is the integration of local knowledge and existing values in a community through a participatory process (IOCGP 2003). In this regard, the SIA process is similar to the already described processes in EIA, SEA and HIA and will not be further described as this is outside the scope of this research.

While SIA is by now widely used in the regulatory approval process of major development projects and embedded in EIAs, Esteves, Franks and Vanclay (2012) recognize a shift in the drivers and the focus of SIA: SIA is increasingly recognized by international organisations and companies as a management tool which supports the identification of a project’s potential social impacts. Hence, SIA is seen as “part of an ongoing management process to respond to impacts [which] is linked to the field of community relations (..) and recognizes the importance of social issues as drivers of business risk” (Esteves, Franks & Vanclay, 2012). Further shifts, described by den Broeder and Vanclay (2014), are within governments in considering SIA for the development of Social Impact Management Plans, as well as communities themselves actively requesting SIA to support them in negotiations with project proponents. In the latter SIA becomes a process to ensure ‘free, prior and informed consent’ (den Broeder & Vanclay, 2014).

Despite these shifts and further advancements of methods and tools, SIA is mainly commissioned by environmental experts or project managers who often have a limited understanding of the core concepts of social impacts and participatory approaches. But according to Esteves, Franks and Vanclay (2012) it is “crucial to understand how these concepts influence the way social relationships are created, change and respond to change” (Esteves, Franks & Vanclay, 2012) to develop a better understanding of the project impacts. Hence, Esteves, Franks and Vanclay (2012) conclude that there is a need to “develop practical guidelines and to educate proponents, regulators and impact assessment colleagues from other professions on these core concepts so that they become embedded in the terms of reference for SIA” (ibid.).

2.4.6.2 Sustainability assessments and health

Sustainable development was defined in chapter 2.3.1.3 as “meeting the basic needs of all and extending to all the opportunity to satisfy their aspirations for a better life”(UN, 1987). While the impact assessment approaches described above all support sustainable development in one way or another, ‘sustainable assessment’ as a separate form of impact assessment has evolved since the 1990s and has seen since the 2000s increasing development and implementation (Bond, Morrison-Saunders & Pope, 2012).

The generic approach of sustainability assessment has been defined "as any process that directs decision-making towards sustainability" (Bond, Morrison-Saunders & Pope, 2012; derived from Hacking & Guthrie, 2008). In this regard sustainability assessment can be applied in many different forms supporting the decision-making process, from individual everyday life decisions to more complex decisions on projects, plans, programmes or policies (Morrison-Saunders et al., 2014b). Thus, EIA, SEA, HIA and SIA could all be seen as a kind of sustainability assessment, with SEA, HIA, and SIA meeting the – as perceived by some– inadequacies of EIA practice (Bond, Morrison-Saunders & Pope, 2012). But sustainability assessment can differ from SEA, which from its setup would be most adequate to address all three dimensions of sustainability – environmental, social and economic – as it is applicable to all administrative decision-making tiers and can be conducted at the policy, plan, programme and project level (Bond, Morrison-Saunders & Pope, 2012).

In this regard, health and well-being within sustainable assessment would be included in the social dimension. According to Bond and Pope (2014) health might not be mentioned per se, but usually in any sustainability assessment health determinants are assessed and therefore health is implicitly integrated in the assessment. This should be especially true for the so-called baseline-driven integrated assessment approach, aiming to minimise negative impacts across all three pillars of sustainability (Bond & Pope, 2014; Pope et al., 2017).

Even though sustainability is one of the underlying concepts of environmental assessments, according to Bond, Morrison-Saunders and Pope (2012), the focus of EIAs on mitigation regularly fails to address the interaction between the effects of the three pillars, and therefore EIAs are not sufficient for sustainable development. Hence, the authors argue that merely taking into account the three pillars for sustainability assessment is not sufficient; instead a system approach is needed. "The ineffectiveness of current models of mitigation, which emphasize avoidance and minimization of impacts, warrants a rethink of the existing hierarchy of mitigation, such that 'enhance' is placed firmly onto the top" (Bond, Morrison-Saunders & Pope, 2012). In this regard Gibson (2013) defines the core objective and fundamental standard of sustainability assessment as "to ensure that every one of our potentially significant undertakings is designed to deliver positive contributions to sustainability – multiple, mutually reinforcing, fairly distributed and lasting positive contributions to sustainability – while avoiding persistent damages" (Gibson, 2013). Based on his negative assessment of current global trends as "suicidal as well as damaging to many other living things" (Gibson, 2013) and in urgent need of being reversed, Gibson defines six imperatives of sustainability assessment, which are presented in Box 14.

Box 14. The six imperatives of sustainability assessment

(1) Reverse unsustainable trends, by insisting that every policy, plan, programme and project contributes to a desirable and durable future.
(2) Integrate all factors affecting sustainability, as this will in most of the impact assessments not be done at all.
(3) Seek mutually reinforcing gains by showing the interdependence of ecology, economy and society, to stop the 'vicious cycles' of ecological degradation and resource depletion, undermining livelihood, increasing desperation and conflict, further undermining cooperation, foresight and stewardship, leading to further degradation and depletion, etc.
(4) Minimise trade-offs, as "it is not about balancing ecology, economy and society as competing priorities".

Box 14. contd.

(5) Respect the particulars of contexts in which the sustainability assessment takes place: "specify the effective criteria for evaluations and decision-making in light of the key issues and aspirations, capacities and concern of the people and places involved".
(6) Ensure the process is open and broadly engaging, as it is always "a matter of public choices among options and objectives for a desirable and lasting future" and as the challenges are usually beyond the capacities of governments, the participative capacities of citizen and civil society organisation needs to be strengthened and integrated.

(Source: Gibson, 2013)

As the criteria that need to be considered in a sustainability assessment are broad in nature and need to be adjusted to the context with its specific jurisdiction as well as to the level of the proposal to be assessed, there is no one process that can be prescribed. For instance, if these criteria were all considered in the impact assessments presented above, such as EIA, SEA and HIA, each could also become a sustainability assessment. As Bond, Morrison-Saunders and Pope (2012) state: "What constitutes sustainability in the context of an individual sustainability assessment needs to be determined on a case-by-case basis as the context differs and, for example, the definition of sustainability is contested and subject to value judgements" (Bond, Morrison-Saunders & Pope, 2012)

In this regard, Morisson-Saunders et al. (2014a) call for further integration of the different strands of impact assessment, as increasing specialization and further work in silos may lose sight of the big picture – sustainable development. "The proliferation of specialist practices has made it increasingly difficult to assimilate and integrate the evidence in a single decision-making process in a way that is meaningful to decision-makers and which speaks of sustainable development" (Morrison-Saunders et al., 2014a). Instead the different dimensions of sustainability should be addressed in such a way that acknowledges their interlinkages. Even though the authors acknowledge that 'silo-based expertise' is needed in an integrated assessment, but key would be a meaningful scoping exercise to determine which 'silo based expertise' needs to be involved in the given context.

3 Research questions

As illustrated in chapter 2, numerous political statements and declarations illustrate the need and political will to include health considerations into the decision-making process for policies, plans, programmes and projects. Environmental assessments have a long standing history concerning environmental protection. They were developed as a response to growing concerns relating to environmental damages caused by major development projects and industrial pollution which had led to significant health impacts. Hence, the generic objectives of environmental assessments usually include the protection of human health. They can thus be considered as systematic processes that offer the possibilities for enhanced integration of health into the policy- and decision-making process, especially as they are by now legally binding processes in many countries around the world (Fehr et al., 2014; Morgan, 2012).

An enhanced integration of health into environmental assessments like EIA and SEA contributes widely to the goals of public health, to improve the health of a population through health promotion and prevention of diseases, and to achieve "the biologic, physical, and mental well-being of all members of society" (Chen, 2015). Additionally, further integration of a broad range of health determinants into environmental assessments has the potential to support a whole-of-government and whole-of-society approach, as promoted in the Health 2020 policy framework of the WHO Regional Office for Europe, and to support the achievement of the Agenda 2030 on Sustainable Development agreed on by the UN General Assembly in 2015 (Kickbusch & Behrendt, 2013; UN, 2015; WHO Regional Office for Europe, 2013a).

The inclusion of health into SEA, as the impact assessment process designed for higher tiers, is in this regard especially relevant, and the Protocol on SEA (UNECE, 2003), as a legally binding document for already 30 Member States[27] in the European Region, calls for the assessment of environment and health impacts, and the inclusion of health authorities in the SEA process.

Hence, the overall objective of the research is to identify the main methods, tools, institutional and procedural factors that facilitate the integration of environmental health aspects into environmental assessments such as SEA. Such aspects are not only determined by the natural (biological, chemical, physical) and built environment, but also by social and behavioural factors.

As described in chapter 2.4.2, SEA aims to enter into the decision-making process at an early stage before the decision on the strategy, policy, programme or plan has been taken. Hence, it provides a very good opportunity to also consider health issues at an early stage, and thus avoid negative impacts and strengthen positive impacts on the health of the population concerned. However, first research (Fehr et al., 2014; Fischer, 2014b, 2010; Kørnøv, 2009; Nowacki, Martuzzi & Fischer, 2010) on the inclusion of health in SEA demonstrates that a broad range of environmental health aspects, determined by the natural (biological, chemical,

[27] In addition the EU is a Party to the Protocol on SEA as well as to the Espoo Convention.

physical), built, social and behavioural factors, are still ignored in SEA, and that only few SEAs include health experts in the process; see chapter 2.4.2 and chapter 2.4.3 for further details.

As described in chapter 2, the research is based on a set of assumptions concerning health determinants and environmental assessments:

- For primary prevention of ill health and promotion of good health, a wide range of environmental health issues is relevant, including the natural (biological, chemical, physical), built, social and behavioural factors.
- By explicitly including a wide range of health determinants, environmental assessments offer the opportunity to markedly contribute to primary prevention and health promotion.
- Prospective impact assessments like HIA, EIA and SEA can be considered as tools that offer the potential for enhanced integration of health into the policy- and decision-making process and hence, contribute to sustainable development.
- Capacity building activities on HIA, EIA and SEA for both health and environmental experts can contribute to increased integration of health into policy- and decision-making processes and thus to primary prevention and health promotion.
- However, the full potential of environmental assessments has not yet been achieved.

To achieve the overall objective of the research five questions will be analyzed:

1. Which environmental health aspects, determined by natural (biological, chemical, physical), built, social and behavioural factors, are mainly considered in environmental assessments and specifically in SEAs?
2. How are these environmental health aspects considered in environmental assessments in Member States of the WHO European Region?
3. Do publicly available guidelines on SEA include guidance on the assessment of the broad spectrum of environmental health aspects?
4. What are the main barriers and facilitators for the integration of health in environmental assessments?
5. Which kind of capacity building activities would be needed to further support the integration of health in environmental assessments?

4 Methodological approach and methods applied

In line with Creswell and Plano Clark (2011) this research uses a mixed method approach, exploring different aspects of furthering the integration of health into SEA. The research comprises five parts, linked to specific research questions:

1. a generic iterative literature review (described in chapter 2.1) of environment and public health concepts and frameworks, of the most relevant impact assessment types and their relation to health, of key developments in the integration of health determinants into environmental assessments and into legally binding international regulations for EIA and SEA (linked to research questions 1, 2, and 4);
2. a literature and internet review of the inclusion of health in SEA guidelines (linked to research questions 1, 2, and 3);
3. a document analysis of SEA guidelines obtained through the literature and internet research (linked to research questions 1, 2, and 3);
4. a case study evaluation of the Capacity Building in Environment and Health (CBEH) international training week, with a special focus on the in-depth workshops on health in EIA and health in SEA (linked to research questions 4 and 5); and
5. the development and execution of a quantitative online questionnaire on the implementation of HIA and health in environmental assessments in countries in the WHO European Region (linked to research questions 1,2, 4 and 5).

4.1 Iterative literature research on the integration of health in environmental assessments

As already described in chapter 2.1 a generic iterative literature review, or so-called scoping review (Peters et al., 2015), was conducted to gain further understanding of the topic through describing key historic developments and the current status of environment and health as well as giving an overview of the main impact assessment forms relevant for assessing health impacts. Hence, it builds the background for the research as presented in chapter 2.

The literature review also served to obtain an overview of key developments in the integration of health determinants in EIA and SEA. The consideration of health in existing international EIA and SEA regulations was also reviewed. Thus the review addressed questions 1 and 2, on which environmental health aspects are mainly considered in environmental assessments, and how, and question 4 on the main barriers and facilitators for the integration of health in environmental assessments. The review included not only scientific papers discussing health in environmental assessments but also grey literature in form of workshop or project reports as well as legal documents. Results of this scoping review are described in chapter 5.1 – see also Annex 7.

4.2 Literature and internet review of SEA guidelines and health

The literature and internet review of SEA guidelines built the basis for the following document analysis to address research questions 1 and 2, and in particular question 3, on the inclusion of environmental health aspects in publicly available SEA guidelines.

To gather information on the inclusion of health in SEA guidelines a first internet review was conducted in 2010. To obtain guideline documents or other forms of grey literature such as webpages published until 2010 the Google search engine was used and different search strings were used, such as:

- ”strategic environmental assessment” AND health OR “health impact”; and
- “strategic environmental assessment” AND guidance OR guideline OR guide.

Due to the high number of hits, the search was narrowed down by using additional search criteria and combinations:

- file type: pdf OR doc
- language: English OR French OR German OR Italian OR Spanish OR Portuguese
- region: Austria OR France OR Germany OR Italy OR Netherland OR Portugal OR Spain OR Switzerland OR United Kingdom OR United States of America

The selection of the languages and regions was determined by languages understood by the author or through key references referring to those countries which have a long-standing history in SEA (Dalal-Clayton & Sadler, 2005; Fischer, 2007b; Thérivel, 2010). Search terms were also translated into the different languages.

Since the combination of the different search terms still revealed either only a low number, missing out on already known guidelines, or a too high a number of hits (between 104 and 908 000), the internet research strategy was further adjusted: based on the SEA key references (Dalal-Clayton & Sadler, 2005; Fischer, 2007b; Thérivel, 2010), expanded through an iterative literature research process using references in obtained literature, English versions of the internet pages of international and national key actors in SEA were searched for SEA guidelines. These key actors are listed below. For a complete list of organizations, institutions and authorities, their webpage and guidelines published, see Annex 8.

Multilateral organizations

- European Commission (EC)/European Union (EU)
- European Environment Agency (EEA)
- European Observatory on Health Systems and Policies
- Organization for Economic Co-operation and Development (OECD)
- United Nations Development Programme (UNDP)
- United Nations Economic Commission for Europe (UNECE)
- United Nations Environment Programme (UNEP)
- United Nations University (UNU)
- The World Bank Group, including the African, Asian and European Development Banks and the International Finance Cooperation (IFC)
- World Health Organization (WHO)

Development co-operation organizations

- Canadian International Development Agency (CIDA), Canada
- Danish International Development Cooperation (DANIDA), Denmark
- Department for International Development (DFID), United Kingdom
- German International Development Cooperation (giz), Germany
- Netherlands Development Organisation (SNV), Netherlands
- Swedish International Development Cooperation Agency (SIDA), Sweden

- United States Agency for International Development (USAID), United States of America

International associations and programmes

- International Association for Impact Assessment (IAIA)
- National Strategies for Sustainable Development Network (NSSD)
- Health and Environment Linkages Initiative (HELI) of WHO and UNEP

National environmental and health ministries and governmental agencies of:

- Australia
- Austria
- Canada
- China
- Denmark
- Finland
- France
- Germany
- Hong Kong
- Ireland
- Italy
- Netherlands
- New Zealand
- Norway
- Portugal
- Slovakia
- Spain
- Switzerland
- United Kingdom (England, Northern Ireland, Scotland, Wales)
- USA

In 2015/2016 the internet review of these webpages was updated to obtain guidelines published from 2010 to 2016.

4.3 Document analysis of SEA guidelines on the inclusion of health

The document analysis addresses research questions 1, 2, and 3, on the inclusion of environmental health aspects in publicly available SEA guidelines.

Following the extensive internet review, a document analysis was conducted. “Document analysis is a systematic procedure for reviewing or evaluating documents” (Bowen, 2013). The document analysis of SEA guidelines was chosen to further obtain relevant insights into the inclusion of health in environmental assessment. In this regard, the documents provided supplementary research data and supported findings in the other parts of the research (Bowen, 2013).

The obtained guidelines – online internet pages, published and downloadable files – were analysed applying the content analysis tool presented in detail in Annex 10. The tool consists of eight sections:

(A) information on the issuing organization or authority,
(B) general information on the guideline,
(C) general concept of SEA (definition, procedural steps, principles),
(D) general aspects of health in SEA:

- "Health scale” (option or relevance mentioned, (some) indication given how to, comprehensive discussion, not mentioned)
- Who shall provide the health expertise?
- When shall health experts / issues be included into the SEA?
- Is HIA mentioned or used?
- What health data shall be used?
- Is there a mix of quantitative and qualitative methods?

(E) health determinants mentioned,
(F) areas/sectors mentioned,
(G) SEA case studies or practical examples given, and
(H) practical tools for SEA mentioned.

To gather an overview of the inclusion of health and health-related issues in SEA guidelines, the data obtained were entered into Microsoft Excel®. For the analysis mainly pivot tables were used to calculate frequency distributions. Results of the guideline analysis are described in chapter 5.2.

4.4 Evaluation of the case study: The CBEH international training week

The case study has been chosen to increase insight into capacity building for health in environmental assessments, thus addressing question 5 and also question 4.

From January 2009 to July 2012 the WHO Regional Office for Europe ran the CBEH project, co-funded by the EC, Directorate General for Health and Consumers (DG Sanco).[28] This project was chosen as a case study as it was especially developed to support the participating countries in their work on environment and health and included in an international training week a specific part on integrating health in environmental assessments like EIA and SEA. For further information on the background of the CBEH project please refer to chapter 6 and for the programme to Annex 11.

An evaluation has been defined by the Joint Committee on Standards for Educational Evaluation (JCSEE) as “the systematic investigation of the worth or merit of an object” (JCSEE & Sanders, 1994). In this regard, the main objective of the evaluation was to determine the utility and feasibility of the international training week to gain directions for improving possible future training events. To achieve this objective the author of this publication developed and conducted a ‘mini evaluation’ and analysed the data collected. The main results were published within the CBEH project package in 2013 (WHO Regional Office for Europe, 2013e).

Participants were asked to fill in one-page evaluation forms daily. On the final day a more comprehensive form for the overall evaluation of the training week was distributed (see Annex 12):

Both evaluation forms contained the following parts:

- generic questions on the main sector of work (environment, health or other) and on the years of working experience in the field;
- a five point Likert scale on agreement (from strongly disagree to strongly agree) with statements about the key lecture of the day (Module 2) and the parallel session on health and impact assessments of Module 3 or the training of trainer sessions (Module 4); and
- two open questions on the three most useful things learned during the day and on the three least useful topics covered during the day.

Additionally, the overall evaluation form contained the following items:

[28] Now DG SANTE – Directorate General for Health and Food Safety

- a five-point Likert scale on agreement (from strongly disagree to strongly agree) with statements on the relevance of the different training week components for the vocational/professional needs of the participant;
- open questions regarding the three topic areas felt to be the least useful, the three topic areas that should be further emphasized, and the three most useful things learned;
- a five-point Likert scale on agreement (from strongly disagree to strongly agree) with statements regarding general satisfaction with the training course and on further needs; and
- a five-point Likert scale on agreement (from strongly disagree to strongly agree) on statements regarding the organizational arrangements.

For the data collection, questionnaires were distributed and the data of the returned forms was entered into Microsoft Excel® sheets for further analysis. For the analysis mainly pivot tables were used to calculate frequency distributions and proportions of the total participants of the international training week. Answers to the open questions that shared similarities were clustered into main and subcategories that logically and intuitively fit together. For these, frequency distributions of the participants responding to the open questions were calculated. Results of the evaluation of the training week are described in chapter 6.

4.5 The online questionnaire on HIA implementation and health in environmental assessments

In 2015, the WHO European Centre for Environment and Health, Bonn, Germany, developed an online questionnaire on HIA implementation and the further integration of health in environmental assessments. The questionnaire was developed, conducted and the results were analysed under the lead of the author of this publication, in her function as Technical Officer and PhD candidate at the Faculty of Health Science, University Bielefeld, Germany, and in close collaboration with the HIA Section of the European Public Health Association (EUPHA).

It is important to note that the online questionnaire and the data analysis were in the first instance developed for a WHO report on the status quo across the WHO European Region. While the report is mainly an overview of HIA implementation and health in environmental assessments in its Member States, the data analysis mainly considers the individual answers of the respondents, including the answers of respondents who had only participated in part I of the online questionnaire.

The online questionnaire includes specific questions on the implementation of health within EIA and SEA, thus relating to questions 1 and 2 on how these environmental health aspects are implemented in SEA in the Member States within the WHO European Region, as well as on question 4, on the main barriers and facilitators, and question 5 on capacity building needs.

4.5.1 Main points of interest of the online questionnaire

As described in chapter 2.4.4 HIA has been defined as a procedure that aims at supporting decision-makers in better considering the impacts on health of proposals at all levels. But up to now there is neither a consolidated review of HIA practice and institutionalization across WHO European Member States nor does a review exist which further looks into the practice of assessing health impacts within environmental assessments like EIAs and SEAs in these

countries. While a variety of scientific publications, journal articles and books, as well as grey literature on HIA exists, these are either concerned with further developing HIA methodology or give specific examples of different types of HIAs. A literature review by WHO (Xu & Nowacki) identified a total of 53 journal articles or book chapters which also gave some indications on HIA institutionalization across 20 countries of the WHO European Region. The review showed that in most of the countries HIA is institutionalized at a voluntary level but with some kind of health assessment within environmental assessments varying in the range of health determinants assessed and often conducted as a stand-alone assessment.

Hence, the main objective of the online questionnaire was to gain an overview of implementation of HIA and to gather information on the assessment of health impacts within environmental assessments like EIA and SEA within the WHO European Region. Especially the part on health assessments in environmental assessments is for this research of great interest and the description of the research results later on will focus on this part. The main points of interest to explore through the online questionnaire have been:

a) the ways in which HIA is institutionalized in the Member States within the WHO European Region;
b) the existing or still needed support for HIA;
c) the health determinants and related factors for well-being that are mainly assessed in HIAs;
d) the areas or sectors in which HIAs are mainly undertaken;
e) the implementation of health assessments in environmental assessments;
f) the involvement of HIA experts in environmental assessments; and
g) the existing or still needed support for health assessments within environmental assessments.

It was the first time that such a comprehensive questionnaire was developed and the further insights into the inclusion of health and health experts in environmental assessments in the WHO European Region makes it relevant for answering the two first two research questions on the categories of environmental health aspects mainly considered in environmental assessments and how environmental health aspects are integrated in environmental assessments in Member States within the WHO European Region.

4.5.2 Selection of respondents

Because of the diverse picture of HIA implementation across the countries in the Region, it was at the beginning decided not to interview health authorities or public health institutions in the countries but instead HIA experts; persons who have or have displayed special skills or knowledge derived from training in HIA or practical experience in conducting or evaluating HIAs over the last 15 years (Bogner, Littig & Menz, 2014; Merriam-Webster, 2017). As there is no international registry of such HIA experts the selection of potential HIA experts was based on the following potential groups of persons:

- authors of chapters of books published on HIA, as they on the one hand discuss HIA methodology and on the other hand provide a variety of practice examples of HIA application in different countries (Birley, 2011; Guliš et al., 2014; Kemm, Parry & Palmer, 2004; Kemm, 2013a; O'Mullane, 2013b; Wismar et al., 2007);

- authors of scientific journal articles on HIA implementation with a special focus on country experiences;
- authors of HIA reports or HIA guidelines;
- consortia members of HIA related projects, for example, HIA in New Member States and Pre-Accession Countries (HIA-NMAC), Risk Assessment from Policy to Impact Dimension (RAPID), CBEH, Dynamic Model for HIA (DYNAMO-HIA);
- members of international associations with a relation to HIA; or
- participants of HIA training workshops.

As the main legal provisions for environmental assessments, the EU Directives on EIA and on SEA, have to be implemented in all the Member countries of the EU, it was further decided to have a first focus on the 28 Member countries of the EU plus its candidate countries, potential candidates, and the countries closer linked to the EU through the European Economic Area (EEA) or Customs Union Agreements. For a full list of the country groups please refer to Annex 13.

To cover these 43 countries it was then decided that out of the above mentioned different HIA expert groups, the authors of chapters in the standard books on HIA should be contacted first. To achieve a full coverage of the 43 countries this first list was then complemented with HIA experts who had further published articles in scientific journals or presented papers at international conferences on HIA implementation. Finally, experts who had been participating in international projects on HIA and who were known to the questionnaire developers as having worked on HIA implementation were included into the HIA experts list. Through this listing, a total of 127 experts could be identified covering a total of 33 countries out of the 43 countries aimed at.[29]

In addition to the above described HIA experts group, it was decided to further complete the picture of the European Region of WHO and send the questionnaire also to WHO European Environment and Health Focal Points of the 53 WHO European Member States. These focal points were officially invited by the Secretariat of the European Environment and Health Process (EHP) to participate in the questionnaire on behalf of their country. As it was expected that the focal points would most probably contact someone who could be familiar with the HIA situation in their country they were informed about the HIA experts already contacted in their country. In total 77 focal points from 52 Member States were contacted.[30] Importantly, the questionnaire was only developed in English language, due to time and resource constraints.

[29] For the following countries it was not possible to identify HIA experts: Andorra, Bosnia and Herzegovina, Croatia, Cyprus, Holy See and Vatican City State, Luxembourg, Monaco, Montenegro, San Marino, and The former Yugoslav Republic of Macedonia.

[30] One European Member State of WHO had not nominated an official Focal Point for Environment and Health and some countries had nominated up to three Focal Points coming from different Ministries – environment or health – or different departments within these Ministries.

4.5.3 Background literature review and development of the questionnaire

Due to the dimension of the study area – at first 43 and later all 53 Member States in the WHO European Region – and the number of HIA experts identified, 127, plus later on the 77 Environment and Health Focal Points, a systematic and standardized questionnaire was developed.

To develop the questions for the questionnaire along the main research questions, basic literature focusing on country experiences with HIA implementation and on assessing health impacts within environmental assessments was reviewed in addition to the above mentioned standard publications on HIA (Dora, 2011; Fehr et al., 2014; Lee, Röbbel & Dora, 2013; Nowacki, Martuzzi & Fischer, 2010).

For the purpose of determining the areas and sectors in which HIAs are mainly undertaken and in which mainly the health impacts within environmental assessments are analysed, the different legal provision for environmental assessments –Protocol on SEA, Espoo Convention, EIA Directive 2014/52/EU, and SEA Directive 2001/42/EC – were compared. Based on this comparison, the different areas and sectors in which EIAs and SEAs should be conducted were grouped in ten categories described in Box 15 below.

Box 15. Areas/sectors with EIA/SEA application

1. **Agriculture, forestry and fishery:** for example, intensive livestock installations, deforestation, intensive fish farming;
2. **Energy industry:** for example, refineries; thermal, nuclear power stations; storage of petroleum; power lines;
3. **Extractive industry:** for example, open-cast mining, quarries; underground mining; deep drilling; oil, natural gas extraction installations;
4. **Other industry:** for example, *chemical industry* - pesticides, pharmaceutical; *food industry* - packaging and canning, brewing and malting; *mineral industry* - coke ovens, cement, asbestos, glass, ceramic products; *production and processing of metals* - production of pig iron or steel, manufacture of motor vehicles, shipyards, swaging by explosives; *rubber industry* - elastomer-based products; *textile, leather, wood and paper industry* - paper and board production, dyeing of fibres or textiles;
5. **Infrastructure projects:** for example, coastal works to combat erosion, dams; industrial estate development; pipelines - oil, gas, CO2 transport, chemicals; spatial planning – town and country or land use planning; transport - for example, motorways, express ways, railways, tramways, waterways, airports, harbours; urban development including shopping centres and car parks;
6. **Telecommunications:** for example, masts and base stations installations;
7. **Tourism and leisure:** for example, ski runs, marinas, holiday villages, caravan sites, theme parks;
8. **Waste management:** for example, disposal, incineration, waste water treatment;
9. **Water management:** for example, groundwater abstraction, works for transfer of water resources; long distance aqueducts;
10. **Policies:** for example, education sector reforms, employment/business development strategies, finance sector/taxation policies, health sector reforms, poverty reduction strategies, public sector reforms/decentralization, trade policies.

(Source: Nowacki, Martín-Olmedo & Martuzzi, based on; EU, 2014, 2001, UNECE, 2003, 1991)

Similarly, a comparison of the classifications and definitions on health determinants and factors influencing health and well-being in different publications was undertaken (Barton & Grant, 2006; Bhatia, 2011; CSDH, 2008; Human Impact Partners, 2011; Public Health Advisory Committee, 2005; WHO Regional Office for Europe, 2013b,a, 2005). Based on comparison, a

generic classification of ten categories of health determinants and factors influencing health was developed. These categories are described in Box 16.

Box 16. Categories of health determinants and related factors influencing health and well-being

A) General social, economic and political factors (macro level): for example, discrimination/racism; economic, social, environmental and health trends; freedom of speech and press; general inequalities; local and national priorities, policies, programmes and projects; political participation; poverty; social exclusion);

B) Environmental factors: for example, indoor and outdoor air quality; biodiversity; natural spaces and habitats; climate change; disease vectors; floods, wildfire, and landslide hazards; food resources and safety; light pollution; noise pollution; smell/odours; soil contamination; transportation hazards; vibrations; waste disposal; water resources and safety;

C) Built environment and housing: for example, sites of cultural significance – sacred or historic; open and green space, parks/landscape; places; streets and routes; housing supply, affordability, and accessibility; housing size and level of crowding; housing safety; neighbourhood infrastructure and liveability; residential segregation;

D) Health services: for example, access to, quality of and cost primary community and secondary health care – especially for vulnerable groups; access to hospitals; emergency response;

E) Other public services and local economy: for example, child care services – access and quality; educational – access and quality; police – security and emergency response; public transportation – access and quality; social services – access and quality; waste management systems;

F**) Private services – local economy factors:** for example, financial institutions; retail food resources; shopping – access and quality;

G) Employment and livelihood factors: for example, un-/employment and job security; income and employment benefits; workplace occupational hazards; workplace rewards and control;

H) Family and community structure: for example, crime and violence; community centres; cultural and spiritual participation; family structure and relationships; health inequalities: for example, in different neighbourhoods; health of minorities and vulnerable groups/ impacts on different social groups; social support (neighbourliness, social networks and isolation); voluntary group participation;

I) Behavioural risk factors: for example, alcohol consumption; diet; leisure and recreational activity; physical activity/inactivity; smoking; substance abuse;

J) Biological factors: for example, age; gender; existing health conditions and disabilities in the community.

(Source: adjusted from Barton & Grant, 2006; Bhatia, 2011; Human Impact Partners, 2011; WHO Regional Office for Europe, 2013b; Public Health Advisory Committee, 2005; CSDH, 2008; WHO Regional Office for Europe, 2013a, 2005)

4.5.4 Pre-test, revision and go-live version

The first version of the questionnaire contained 25 questions – 13 questions on HIA implementation and 12 questions on health in environmental assessments. After some internal feedback from colleagues of the different institutions involved, the questionnaire was revised and divided into two parts: A first so-called obligatory part containing questions essential for answering the main research questions, and a second so-called voluntary part. This second part contained further detailed questions relevant for the research but which were felt that they might be too complex and respondents might drop out when confronted with them.

This version was then designed as a word document form and went into a pre-test with seven HIA experts from different countries (Denmark, Germany, Lithuania, Slovenia, Spain and

the United Kingdom) coming out of the group of 127 HIA experts identified previously. By then the questionnaire contained a total of 24 questions on HIA institutionalization and health in environmental assessments: nine questions on HIA implementation and six questions on health assessment within environmental assessments in part 1; six more detailed questions on HIA implementation and three more detailed questions on health assessment within environmental assessments in the voluntary part 2. In addition, there was a general part with four questions about the respondents' professional experience with HIA and a general field for further comments at the end of the questionnaire.

Based on the comments received from the pre-testing experts the questionnaire was further reviewed and refined. Basically, the main comments were around clarification of questions asked. None of the pre-tester objected to the division of the questionnaire into a main part and a voluntary part with more complex matrix questions.

Due to problems which arose with the word document form for some respondents it was then also decided to develop the questionnaire as an online questionnaire. It was expected that this would facilitate also the participation in the questionnaire, avoid problems with other forms of offline questionnaires, which could lead to respondents dropping the questionnaire. For designing and conducting the online questionnaire SurveyMonkey® was used. In the end, part 1 of the final questionnaire contained 21 questions: three questions about the respondents' professional experience with HIA, ten questions on HIA implementation and eight questions on health assessment within environmental assessments. The voluntary part 2 contained another nine questions for a deeper insight into the subject: four more detailed questions on the respondents' professional experience with HIA, two further detailed questions on HIA implementation, and three further detailed questions on health assessment within environmental assessments. In addition the questionnaire contained one general field for further comments and one field with contact options for recommended experts who could be further contacted to participate in the questionnaire. For the final questionnaire please refer to Annex 14.

4.5.5 Invitations to respondents

The first invitation to participate in the questionnaire was sent out to the 127 identified HIA experts on 04 August 2015 and on 10 August 2015 to the 77 WHO Environment and Health Focal Points. In addition, another 21 HIA experts were invited to participate in the questionnaire: Either respondents of the questionnaire had recommended contacting these experts or they had been nominated by the EH Focal Points to participate on their behalf.

Furthermore, it was decided to invite the seven pre-tester of the questionnaire as on the one hand the questionnaire had changed significantly to its pre-test version. On the other hand the aim of the questionnaire was to gather information on the HIA implementation status and health in environmental assessments across Europe. It was therefore considered not to be relevant if the respondents had already seen some of the questions beforehand.

Altogether 225 individual invitations to participate in the online questionnaire were sent out by email. Out of these, nine email addresses were not valid anymore and alternative email addresses for those experts could not be found. Hence, a total of 216 HIA experts, WHO

European Environment and Health Focal Points and further nominees of the Member States had been invited to participate.

Over a time of more than three and a half months, the questionnaire was opened and several reminders were send out to invitees who had not yet participated, or had started the questionnaire but not finalized and submitted it. The online questionnaire was finally closed on 23 November 2015.

4.5.6 Data handling and data analysis

As described above the final questionnaire contained 21 questions and subquestions divided into two introductory parts on the respondents' experience in HIA, followed by Part 1a on HIA implementation, Part 1b on health in environmental assessments, and for further information the voluntary Part 2a on further details on HIA implementation, and Part 2b on further details on health in environmental assessments. For the final questionnaire see Annex 14.

The questionnaire contained a mix of different open and close ended questions:

- open end demographic questions, for example, on the country, subnational region, federal state, province or municipality to which the answers referred, on contact details, or on the educational background;
- closed dichotomous questions, for example, on contacting allowed (yes/no);
- open and close end multiple choice questions with a pre-set of optional items, including the option "others", and an open text field to specify the selection of the "Others" item or to comment on the question;
- numeric open end questions relating to the experience in HIA, for example, starting year with HIA, or number of HIAs conducted;
- constant sum questions indicating the percentage per category with the entries having to add up to 100%, for example, on the percentage being involved in HIAs at different levels: policy/strategy, plan, programme or project;
- scaled questions, for example, Likert scales on frequencies (routinely, sometimes rarely, or never), or agreement (1 – not at all, 2, 3, 4, or 5 – very much); and
- two filtering questions regarding willingness to continue with the more detailed voluntary parts 2a and 2b.

Due to the complexity of many of the questions, it was decided to only make the first question on the country and the filtering questions on the willingness to further continue with the questionnaire obligatory, knowing that there is a risk that questions could be easily skipped by participants. In addition almost all questions contained the optional item "Don't know", as it was considered that some of the questions might be difficult to answer.

For the data collection SurveyMonkey® was used. Once the questionnaire was closed the data was downloaded as full text values in a Microsoft Excel® files format. New labels and variable names had to be given as the ones from the downloaded files were not operational for this an export to SPSS of all data was additionally conducted and variable names could be transferred to the database in Excel®. The database contained a total of 465 variables for the total of 31 defined questions. Two more variables were added to further analyse the countries, regions and municipalities of the respondents and another variable was added for the open question on the educational background.

As the focus of the research was on the respondents experience with HIA and health in environmental assessments and of the situation in the different Member States in the European Region, the data analysis used only descriptive statistics. Therefore, the data analysis was conducted in Microsoft Excel® using pivot tables and divers formulas to calculate frequency distributions and proportions of respondents and countries. Calculations were based on the number of total respondents or number of total countries, with the exception of the questions which could directly relate the personal experience in HIA with the number of HIAs conducted by the respondent. Therefore, these questions were weighted by the number of HIAs conducted per respondent, for example, question 3c on the proposal types of HIA the respondents have mostly worked on throughout their career (see Fig. 33, Chapter 7.2).

The three open questions on HIA facilitators, and facilitators and barriers for further integration of health in environmental assessments were analysed in accordance with the text-sorting technique by Beywl and Schepp-Winter (2000): The answers were first broken down into units or word of similar meaning. Thereafter, these individual units were assigned to homogeneous main categories including divers' subcategories.

For the data analysis only the data of those respondents are considered that have at least completed the majority of Part 1a and Part 1b of the questionnaire and who relate their answers to the European Region. In contrast, for the WHO data analysis only questionnaires were considered that had officially submitted their questionnaire, those were considered as completed questionnaires. Results of the online questionnaire analysis are presented in chapter 7.

5 Results I: Health aspects considered in environmental assessments and SEA guidelines – results of the literature and internet reviews, and the guideline document analysis

The generic literature and internet reviews and the document analysis were carried out to give answers to the research questions 1 – what kind of environmental health aspects are mainly considered in environmental assessments, with a special focus on SEA; 2 – how these environmental health aspects are considered in environmental assessments; and 3 – if publicly available guidelines on SEA include guidance on the assessment of a broad spectrum of environmental health aspects.

5.1 Main health aspects considered in environmental assessments – results of the literature review

A first internet and literature review for chapter 2 on the theoretical background and public health relevance showed that the need to protect human health was one of the main arguments for the introduction of EIA procedures and that health aspects have always played a role in environmental assessments, even though the main aspects considered are the classic biophysical determinants, arising from biological, chemical and physical factors, and seldom include the broader aspects of health such as social and psychosocial factors.

Based on the literature obtained the main trends in the general development of health considerations in environmental assessments will be summarized in the subchapter below, followed by an analysis of the inclusion of health in existing international regulatory frameworks for environmental assessments within the WHO European Region. In total, 27 peer reviewed journal articles or book chapter, 30 reports written for or by the EC, IFC, UN, UNECE, WHO or units of universities, and 10 legal documents from the EU and UNECE were included in this review. For a detailed list see Annex 7.

5.1.1 Health in EIA – outlining historic developments from health in EIA to environmental HIA (EHIA) and integrated EHIA (IEHIA)

To understand how health is dealt with in environmental assessments in general, major historic developments and some specific forms of environmental HIA will be briefly outlined. Especially in the early years of EIA, the focus on health was rather narrow – mainly looking into classic environmental determinants such as air, soil, and water with potentially high pollution risks. In the USA, with NEPA requiring effects on public health and safety to be evaluated, in practice EIAs never “developed a systematic and comprehensive approach to health” (Bhatia & Wernham, 2008) with input of health experts rarely requested and no mechanisms for interaction. According to Morgan (2011), health and social issues were often downplayed if not ignored. Reasons being that EIA was mainly commissioned by project engineers, and scoping had not been established. Only in the 1980s did scoping become more accepted, with neglected impacts on health becoming more and more apparent, as scoping allows for the identification of issues in a “systematic and informed manner, including (ideally) stakeholder and community input” (Morgan, 2011).

In the 1990s further application of scoping also led to a broader scope of factors being considered, including social, cultural and health factors, but health assessment still concentrated on the core environmental risk factors as health concerns were usually regulated through other statutory processes. Nonetheless, the call for inclusion of the broader scope of health determinants became increasingly common, for example, within the framework of sustainable development (UN, 1992a). For further information on sustainable development please refer to chapter 2.3.1.3.

As already described in chapter 2.4.4, HIA started to develop as an independent tool to give more attention to the health impacts of development projects. One of the first guidelines on HIA was developed by Birley (1991), with a focus on forecasting the vector-borne disease implications of a development (Birley, 1991). This focus was broadened in a succeeding guideline for the Asian Development Bank, in which communicable disease, NCDs, malnutrition as well as injuries related to traffic accidents and occupational injuries, should be assessed (Birley & Peralta, 1992). Even though, the importance of getting health considerations better integrated into EIAs of large development projects was widely acknowledged, the practices lagged behind.

According to Banken (1999) the "accumulating knowledge of the overall importance of the social determinants of health makes it increasingly imperative to integrate these aspects into the public health process of environmental assessment" (Banken, 1999). In this regard, on the one hand frameworks were developed that included not only the classic environmental determinants but also the social determinants of health as, for example, in Australia (Ewans et al., 1994) and Canada (Frankish et al., 1996). These assessment forms were based heavily on the concepts and experiences of SIA – for further information on SIA please refer to chapter 2.4.6.1. This also led to the further development of HIA as a separate process (Morgan, 2011) – for further information on HIA please refer to chapter 2.4.4.

But even in countries where an integrated framework had been established, many challenges remained (McCaig, 2005), and despite further developments in the conceptualization of EIA as well as HIA and health assessment within EIA, the practice still remained limited (Faith-Ell, Kalle & Lund-Iversen, 2014). For instance, a content analysis of 42 environmental impact statements (EIS) under NEPA and a contextual analysis which included site visits and interviews by Steinemann (2000) resulted in only 38% (n=16) of the EIS mentioning health impacts, even though all EIS assessed biophysical impacts. Out of these 16, in nine the relation to health impacts mainly consisted of a single statement such as 'no adverse health impacts are expected' or 'limit values will not be exceeded' and no further analysis was recorded. The remaining seven incorporated a section on human health, but it only focused on exposures to toxic and radioactive chemicals and the related cancer risks. Based on a further analysis Steinemann (2000) suggested the following action points for better integration of health in EIA:

- "Develop and screen alternatives based on potential health impacts (…)
- Address sources of health impacts, rather than just the symptoms (…)
- Consider mortality and morbidity health impacts other than just cancer (…)
- Incorporate qualitative information into health risk assessment (…)
- Emphasize adaptive management and monitoring (…)

- Apply a precautionary approach to health risks (…)
- Promote collaboration between environmental and public health professionals" (Steinemann, 2000).

Similarly, Kwiatkowski and Ooi (2003) declared: "EIA must involve more than identifying, assessing and mitigating the negative environmental impacts. It must also identify and mitigate perceived concerns and enhance, where possible, the positive aspects of a project" (Kwiatkowski & Ooi, 2003). And, based on an analysis of 22 major project environmental assessments in New South Wales, Australia, Harris et al. (2009) call for capacity development "amongst EIA professionals, led by the health sector, to progress health related knowledge and tools" (Harris et al., 2009).

Main reasons for the limited integration of health into EIA are further summarized in a report on human health and EIA from the EU-funded research project (IMP)3 (IMProving the IMPlementation of Environmental IMPact Assessment) (Hilding-Rydevik et al., 2007), and an excerpt is shown in Box 17 below. Similar reasons were identified by Ahmad (2004), Bhatia and Wernham (2008), Davies and Sadler (1997a), Morgan (2011), and Steinemann (2000), among others.

Box 17. Key reasons for inadequate integration of human health aspects into EIA

1. Analytical complexity makes the prediction of health impacts extremely difficult: health impacts are often indirect or cumulative, i.e. secondary consequences of other environmental effects. This generates inherent uncertainties about interpreting the accuracy and precision estimated and quantified health impacts.
2. There is a lack of standardised, readily available and agreed-upon methods.
3. Access to reliable and current health data is inadequate.
4. There is a lack of systematic evaluations of applications of HIA.
5. Within the current EIA framework, there are no legal requirements or guidelines for assessing health impacts.
6. Traditional separation of environmental and health issues: EIA is often conducted with little input from the health sector; organisational boundaries have hindered cross-sectoral cooperation for the public good; public health authorities do not participate in EIA processes, especially in the initial scoping phase, and when they do participate, health authorities do not have the influence they would like.
7. Health experts have been involved in only a few EIAs.
8. There is usually little reference to health in the identification or scoping phase.
9. There is a fear that the EIA documents will become even longer, more complicated and more expensive.
10. In many cases only those health issues, for which there is a legal limit, are considered. Consequently, health is interpreted using a narrow definition and other relevant health aspects are excluded.
11. Population groups affected by the proposal have no or limited opportunities to participate in the assessment process.
12. The health impacts of the project are to a large extent compared to current national standards, guidance and limit values rather than to the zero option of no such development taking place.
13. EIA authors assume that levels below national standards and threshold levels did not have any effects on human health and hence they did not have to quantify the changes in exposure and their potential health effects.

(Source: Hilding-Rydevik et al., 2007)

Hence, Hilding-Rydevik et al. (2007) conclude that there is still a need to further promote the assessment of human health in planning- and decision-making of EIAs of development projects, a need for enhanced awareness raising which also needs to include the so-called pull-factors, i.e. the positive factors and/or benefits for the project developer when integrating further health aspects into the EIA. Additionally, there is still a need for further research on the linkages between the overall impacts of the project and its impacts on the environment and on

human health. Based on this, the authors developed six policy options for the EC to address these issues using a 'Strength-Weakness-Opportunities-Threats' (SWOT) analysis framework. These options are presented in Box 18.

Box 18. Policy options for the EC to further promote the assessment of human health in EIA

1. do nothing;
2. preparation of a new guidance package on incorporating health into EIA;
3. supporting measures plus the preparation of a new guidance package;
4. minor amendments to the EIA Directive plus supporting measures plus the preparation of a new guidance package;
5. major amendments to the EIA Directive plus supporting measures plus the preparation of a new guidance package; and
6. new HIA Directive.

(Source: adjusted from Hilding-Rydevik et al., 2007)

In 2014, the revised EIA Directive 2014/52/EU was published giving health a more prominent role than in earlier versions. This could be considered as option 4 in regard to tackling health issues within EIA, even though supporting measures and the preparation of a new guidance package for health has still not been developed. Nevertheless, EU Member countries will have to incorporate the revised EIA Directive in their national legislation by May 2017. How far this will support a better integration of health in EIA still remains to be seen.

In light of the revised EIA Directive, Cave et al. (2017a) observe a clear need for updated EIA guidance that defines the relevant factors of population and human health for a proportionate EIA.[31] Public health input at the scoping stage is seen as a key opportunity for better consideration of health in EIA. Hence, the authors call for an urgent discussion "to reach consensus between those concerned with the coverage of population and human health in EIA, notably public health teams, EIA practitioners and planning officers" (Cave et al., 2017a). For further information on the legal regulations and the inclusion of health please refer to chapter 5.1.3 below.

To achieve "an integrated health and environment analysis [that] would enable a powerful policy lever for population health and health equity" (Bhatia & Wernham, 2008) Bhatia and Wernham (2008) recommended further action points:

- engagement of public health agencies and academic institutions with local EIA and lead agencies, to become familiar with EIA processes and participate in them;
- engagement by public health agencies with impacted/affected communities, to become familiar with their concerns;
- capacity and workforce needs, for example core capacities in HIA, could be integrated into training of public health schools and continuing education courses;
- funding HIA, for example, through direct payment by developers, funding from lead agencies, regulatory agency grant programmes, or private grants;
- formalized guidance for health analysis, supported, for example, by the institutionalization of SIA and environmental justice as routine considerations in EIA;

[31] According to Cave et al. (2017) an EIA can be considered proportionate if it is not only legally compliant, but also includes significant health impacts, identified in consultation with health experts.

- evaluation criteria and monitoring: “issues important for HIA/EIA evaluation include analytic validity, issue relevance, public involvement, and impacts on decisions as well as decision makers and decision-making practices. HIA/EIA integration also offers the opportunity to institute adaptive management or mitigation measures that require ongoing monitoring of both health outcomes and environmental factors known to affect health” (Bhatia & Wernham, 2008); and
- collaboration with other HIA and EIA proponents through open collaboration and discussion.

A comparison of EIA practice and the integration of health into EIA in Estonia, Norway and Sweden by Faith-Ell, Kalle & Lund-Iversen (2014) revealed that, despite similarities between the countries, such as similar methods and tools used for the assessment of health impacts, there are differences in the conceptualization of the EIA systems and in the institutional setup for the health assessment. Commonly, aspects of the natural environment (biological, chemical, and physical), and to a lesser degree also cultural, social and economic aspects, are assessed within EIAs. While in a small country like Estonia a separate HIA process would be difficult to implement due to limited institutional capacities, in Sweden health aspects are further integrated in EIA and moreover, HIA methodology is developed in parallel, whereas in Norway there seems no strategy for further health assessment in place. For all three countries the authors conclude that “an improvement of databases, surveys, methodologies and professional as well as institutional capacities would improve the situation. All in all, public health specialists should have more influence in impact assessments and, where possible, in the decision-making process” (Faith-Ell, Kalle & Lund-Iversen, 2014). Furthermore, the authors call for “more meaningful statistics and studies with both temporal and areal distribution patterns of health-related issues through various social groups” (ibid.), which would involve both environment and health experts jointly in research as well as in capacity building activities.

Using a realist research design to gain first insights into the institutional conditions for health inclusion in EIA, Harris and Haigh (2015) conclude that in EIA the concept of health as well as health as a technical issue varies widely and needs to be better defined “to be included meaningfully for proponents and regulators and approvers” (Harris & Haigh, 2015). Furthermore, the inclusion of health in EIA largely depends on institutional conditions such as values, existing collaboration across agencies, as well as legal frameworks. While clearly the medical aspect dominates in EIA and the broader determinants of health are not yet seen as useful in EIA, there is a need for more advocacy (Harris & Haigh, 2015).

In this regard, Harris, Viliani and Spickett (2015) further declare that “communities should be increasingly concerned and active about the health consequences of increased industry activity, and EIA systems are the regulatory point where these concerns must be taken on board by industry. Giving greater consideration to the health impacts of a development project within the current EIA processes will provide the best opportunity to consider health impacts within the current approvals processes and regulatory systems” (Harris, Viliani & Spickett, 2015).

5.1.1.1 Environmental Health Impact Assessment (EHIA)

Not only environmental experts but also health experts focused in the early years of EIA development on environmental determinants. For example, the emphasis of WHO was on assessing health hazards associated with specific industrially produced and/or agriculturally used substances (Morgan, 2011). In this regard, one of the first WHO seminars on EHIA, held in Argostoli, Greece, in 1978, was concerned with the impacts of chemicals on human health. It was recognized that even though EIA should consider the environmental and socioeconomic impacts, the health component was only seldom explicitly assessed. Seminar participants put this down to the "time-lag between the generation of the impact upon people and the emergence of the health problem and also because of difficulties in quantifying the impacts" (WHO Regional Office for Europe, 1979) and the acceptability of the possible health risks by the public. The separation of health authorities from the departments dealing with the EIA was seen as another barrier. Therefore, the recommendations of the seminar also included a call to improve the capacity of the environmental personnel dealing with the EIA, especially in regard to the health component, and to improve the capacity of health experts to actively participate in the EIA process (ibid.).

The focus on risk assessment approaches to health hazards within EIA was further reinforced in the 1980s, for example, through diverse guidance documents developed for WHO in different sectors. For example, the guidelines on EHIA of irrigated agricultural development projects were developed because of the shortcomings of EIA in assessing the health impacts of such projects. According to the authors, an EHIA "aims to predict and assess the impacts of a development on environmental parameters which have a strong significance for health ... By predicting future changes in environmental health factors, it is possible to indicate the potential changes in health which may be caused by a development. These indications may then be used by local health experts, in conjunction with other considerations, to assess future changes in morbidity and mortality" (WHO Regional Committee for Europe & Environmental Resources Ltd, 1983). The guidelines and recommendation on EHIA of urban development projects (WHO Regional Office for Europe, 1985) assessed the following source of environmental health factors:

- pollution (air, water, soil, noise, toxic substances at work),
- accidents and hazards (transport, at work, at home, major hazards),
- disease transmission (overcrowding, lifestyle changes), and
- social/psychosocial factors (stress related factors like inadequate housing, increased need for frequent travelling, poor building design, lack of recreation opportunities).

Even when social/psychosocial factors were included the main focus of the EHIA was still on pollution, accidents and hazards (WHO Regional Office for Europe, 1985) – see also chapter 2.4.4 on the development of HIA.

Another WHO workshop on the health and safety component of EIA in 1986 focused on pollution and risk assessment procedures. According to Banken (1998) this choice was for the pragmatic reason that the risk assessment methodology was readily available. In fact, the authors also emphasize that not only disease-related health effects should be included in the EIA "but also all impacts which might change the well-being of neighbouring populations whether it be for the better or the worse. These might include psychological effects of

proximity of certain types of development and improvement in health as a result of increased employment and wealth in a community" (WHO Regional Office for Europe, 1987)

Furthermore, the declaration, objectives and recommendations for further actions of the workshop participants called for the early consideration of health at the planning stage not only on large scale development projects but also on policies and plans. Moreover, the scoping phase should always involve consultation with health professionals, and information on health impacts should become available to the public. To achieve this, training initiatives with different formats and timescales should be undertaken at undergraduate, postgraduate and continuing education levels of higher education institutes, targeting especially medical personnel and health officials, but also senior members of government and industry, and representatives of mass media (WHO Regional Office for Europe, 1987).

5.1.1.2 Integrated environmental health impact assessments (IEHIA)

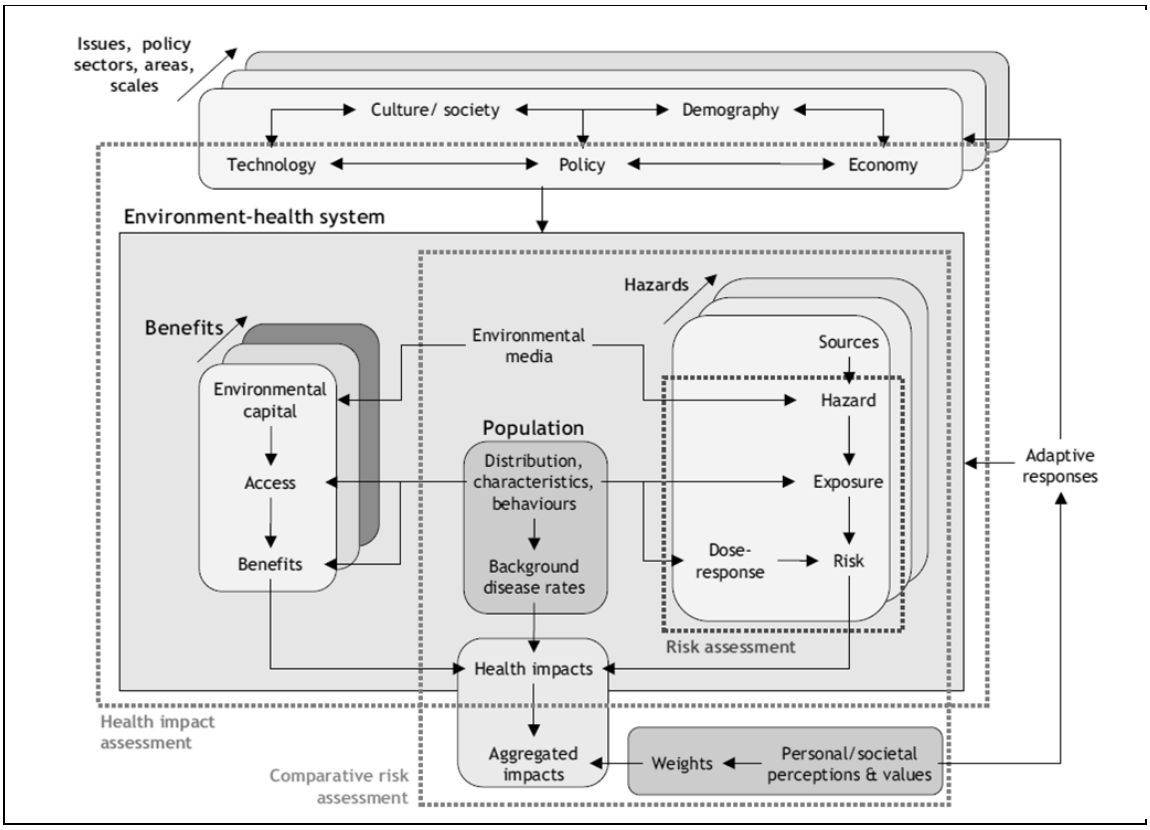
IEHIA is an approach aiming at supporting policy- and decision-making on the complex issues of environment and health. IEHIA has evolved in recent years, based on the EU-funded projects INTARESE – Integrated Assessment of Health Risks from Environmental Stressors in Europe – and HEIMTSA – Health and Environment Integrated Methodology and Toolbox for Scenario Assessment – (Lebret, Hurley & Briggs, 2008), both of which aimed at reviewing and extending methods, and making tools available for assessing environmental impacts on public health. The IEHIA framework upon which both projects were based, was defined by Briggs (2008) "as a means of assessing health-related problems deriving from the environment, and health-related impacts of policies and other interventions that affect the environment, in ways that take account of the complexities, interdependencies and uncertainties of the real world" (Briggs, 2008). As such the framework combined the classical risk assessment approach within the frame of comparative risk assessments (CRA)[32], developed for the burden of disease studies, and within the broader framework of HIA, to further look into various emerging issues, policy sectors, areas as well as different geographic scales and time scales – see Fig. 14 below.

In this regard IEHIA is described by Lebret (2016) as a methodology of the third phase in the management of health risks of environmental stressors, with phase one "going back to the Hygienist Movement in the 18th century, [and] environmental risk management effort .. directed to reduction and removal of the easily observable pollutants" (Lebret, 2016) – see also chapter 2.2.1; phase two emerging in the second half of the 20th century focusing "on management of measurable pollutants" (Lebret, 2016) and the development of the HRA approach and procedure – see also chapter 2.4.4.2; and the third phase starting in the late 1980s and the emerging discussion on risk perception, which not only focuses "on the direct hazards of specific environmental stressors, but is also focused on more diffuse, indirect and long-term problems, often acting at the international or global scale. Risk perceptions and concerns, equity aspects, risk-benefit considerations, sustainability, uncertainty and precaution have become part of the risk appraisal and risk discourse" (Lebret, 2016). This is

[32] CRA was in this regard defined by Murray et al. (2003) as "*a systematic evaluation of the changes in population health which would result from modifying the population distribution of exposure to a risk factor or a group of risk factors*" (Murray et al., 2003) – see also chapter 2.2.3

defined also as the 'risk governance' approach, which "differentiates between different types of risk problems with varying degrees of complexity, uncertainty and ambiguity (and combinations thereof), and proposes differentiated risk management strategies, instruments and stakeholder participation, commensurate to the complexity, uncertainty and ambiguity of the risk problem" (Lebret, 2016).

Fig. 14. The IEHIA framework



(Source: Briggs, 2008)

The four phases of an IEHIA are described in Box 19.

Box 19. The four phases of an IEHIA

1. **Issue framing** – through specification of the policy question, which would also include participation of scientists, policy-/decision-makers, and other stakeholders; and conceptualizing of the issues at hand for example by using relational frameworks like DPSEEA.
2. **Design** – converting the conceptual model into a detailed assessment protocol for example through specification of different policy scenarios, a screening step to "determine whether, and how, the assessment should proceed".
3. **Execution** – analysis of different scenarios and comparison of results; weighting and aggregations.
4. **Appraisal** – documentation, reporting, interpretation, evaluation and priority setting.

(Source: Briggs, 2008)

Due to the general complexity of societal problems that need to be addressed to support policy-making, a system based approach like IEHIA itself is a complex process, and only few examples have yet been published (for example, Briggs, Mason & Borman, 2016). IEHIA not only needs specialized expertise and "in-depth understanding of biological, chemical, and physical process in the causal chain from source to effect" (Lebret, 2016), but also experts with the ability to apply knowledge across different disciplines and situations. Hence, it is not only the technical elements of an IEHIA which present a challenge, but equally the assessment

process and the "required inter- and transdisciplinary cooperation to perform IEHIA" (ibid.). These challenges may be hard to overcome as, according to Lebret (2016), "there is a serious lack of interaction between different fields of science pertinent to IEHIA. Academic curricula and training provide little opportunity to engage in real interdisciplinary work" (ibid.).

5.1.2 Health considerations within SEA

As already described in chapter 2.4.3, a first review on health within SEA demonstrated that mainly the classic environmental health aspects in the environment are considered. Based on their 'review of HIA concepts, methods and practice, Breeze and Lock (2001) argued that even though health can be described as the underlying concern of any environmental assessment, in most assessments it is not made explicit nor are relevant health criteria and health expertise integrated into environmental assessment practice. To overcome this, they identified six key issues that would support the adequate coverage of health impacts within the, at that time, new development of the Protocol on SEA:

1. generating common understanding on health and its broader determinants within the different stakeholders involved in SEA;
2. increasing awareness of HIA and what it can do among the decision-makers as well as among the wider public;
3. managing expectations by clearly describing not only the potential but also the limitations of the HIA;
4. learning from experience at national and international level to develop the HIA concept further and support its relevance across different sectors and governmental authorities;
5. capacity building and involvement at all levels of a country – national, regional and local – supporting and harvesting from multidisciplinary and multi-sector collaboration; and
6. increasing the evidence base through monitoring the results of the HIA as well as the actual impact of the policies, plans or programmes that were subject to the SEA to not only "expand the understanding of interrelationships between determinants of health and the actual impact on health of different policy areas" (Breeze & Lock, 2001) but also to support rapid in-depth assessments for future SEAs.

Furthermore they describe nine principles for assessing health impacts within SEAs which are presented in Box 20.

Box 20. Principles for assessing health impacts as part of SEA

A SEA should:
1. include, routinely, an initial screening to determine the broad relevance to people's health of the policies, plans or programmes under consideration;
2. take into account any health concerns expressed by relevant health authorities and of the public;
3. consider the range of health determinants, and how they are likely to be modified, in positive and/or negative ways, as a result of the policies, plans or programmes that were subject to the SEA;
4. consider the positive as well as the negative effects of proposed policies and programmes;
5. consider how the expected health effects might be distributed across different groups within the population who are affected;
6. contain recommendations with respect to actions that could be undertaken to enhance the potential positive health effects identified and to mitigate or remove the negative ones;
7. seek to involve the public through consultation and participation;
8. give due account to issues raised by the public and/or organisations representing members of the public who may be affected; and
9. consider the need for cost-effective monitoring of any anticipated impact(s) on people's health.

(Source: Breeze & Lock, 2001)

In a review of eight case studies of SEAs from Austria, the Czech Republic, Germany, the Netherlands and the United Kingdom (England and Wales) Fischer, Martuzzi and Nowacki (2009) analysed the integration and participation of health experts as well as which health determinants were considered in these SEAs. The review revealed that the main focus in the SEA was on biophysical aspects, with the SEAs of spatial plans in England and Wales having the broadest approach: they described socio-economic determinants and, partially, behavioural aspects, in the baseline assessment. As both SEAs used separate HIAs this explains the broader consideration of health. But these data were not used in the final assessment. Furthermore, these separate HIAs were only prepared on the already chosen alternative of the SEA and therefore can be considered more as mitigation measures than decision-supporting (Fischer, Martuzzi & Nowacki, 2009). Health stakeholders had the possibility to participate in all eight SEAs, but this opportunity was not fully utilized and health comments where often received from bodies outside the health sector. Furthermore, the judgements on health impacts were mainly provided by the authorities or consultants preparing the SEA. Fischer, Martuzzi and Nowacki (2009) see two reasons for this: "(a) cultural differences between planners, SEA and health experts; resulting in different professional languages being spoken, leading to problems of communication and collaboration; and (b) resource constraints and competing institutional tasks, with limited time to contribute to SEA" (Fischer, Martuzzi & Nowacki, 2009).

A documentary review by Kørnøv (2009) of 100 Danish environmental reports – 25 municipal plans and 75 local plans – came to similar results: While only seven out of the 100 reports did not look into any health aspect, the municipal plans considered more health aspects than the local plans. SEA reports mostly assessed health aspects related to "noise, drinking, water, air pollution, recreation/outdoor life and traffic safety" (Kørnøv, 2009). Out of the 100 reports, only four reports explain the outcome and significance to human health, for example, through "comparing impacts with threshold limit values and the site specific sensitivity" (ibid.). None of the reports looked into distributional effects of the possible impacts.

For her analysis of the 'Draft Guidance on Health in SEA' of the United Kingdom, Posas (2011) analysed 70 peer-reviewed journal articles on HIA from the EU and the United Kingdom between 2003 and 2008 to extract recommendations for HIA and used the six key issues developed by Breeze and Lock (2001) for an adequate consideration of health in SEA. Posas (2011) concludes that the drafted guidance addressed the recommendations extracted from the peer-reviewed journal articles and the key issues for health in SEA identified by Breeze and Lock (2001). Only in regard to capacity building, public participation and improving the evidence base could the guidance be further strengthened. How far the drafted guidance was then taken up and integrated into SEAs in the United Kingdom was not part of this literature review.

A documentary review of 62 consecutive SEAs in Scotland by Douglas, Carver and Katikreddi (2011) revealed similar results: while many health-related aspects were identified in the environmental reports, the main focus was on environmental aspects and only 15 looked into general health conditions, 15 mentioned physical activity and 12 addressed car ownership or transport issues. Only nine SEAs considered differential impacts, such as "access for people of different disabilities" (Douglas, Carver & Katikireddi, 2011) as objectives for the SEA and one even looked into the impacts on different population groups in a health impact screening. But

in none of the cases was it clear on which health evidence the assessment was done. The health consultation authority commented on many of the SEAs but mainly in relation to environmental aspects. To tackle these problems, the authors identify the following needs and recommend some actions:

- SEA performing authorities and/or consultancies need further support in addressing the wider determinants of health to "ensure the quality and consistency of these assessments" (Douglas, Carver & Katikireddi, 2011).
- Public health authorities need to be integrated better into the SEA which "could help to identify appropriate health evidence and encourage greater consistency in the health issues considered" (Douglas, Carver & Katikireddi, 2011).
- A screening checklist that includes differential aspects should be used and health stakeholders need to be involved. This would also be needed in the scoping stage "to identify relevant health issues and to ensure that differential impacts are considered" (Douglas, Carver & Katikireddi, 2011).
- Health-related evidence and data need to be further disseminated but in a form that is useful for the SEA. This could be compiled for the different sectors and types of SEAs.

A review of local development plan processes in East of England, United Kingdom, by Burns and Bond (2008) revealed that even though there is a clear understanding that planning can affect human health, there is a lack of expertise on how to further integrate health aspects into the profession. Hence, they call for knowledge and capacity development on health in the planning community, enhanced dialogue with health practitioners, and an improved evidence base of health outcomes (Burns & Bond, 2008). These results were further confirmed by Bond, Cave and Ballantyne (2013) through a series of telephone surveys and focus group interviews on the consideration of health within spatial planning in England, United Kingdom. They found that while spatial planning experts were not well equipped to consider health, health experts were only rarely engaged in spatial planning processes, due to limited understanding of the process and hence no interest in influencing it. Thus, they concluded that as long as a functional separation between the health and the planning sectors continues there are only limited chances that the consideration of health in spatial planning will improve (Bond, Cave & Ballantyne, 2013).

Similarly, based on a literature review of 52 appraisals of spatial plans at local level, Carmichael et al. (2012) identified four main barriers and facilitators for the integration of health in spatial planning. These consisted of:

1. knowledge: "different knowledge and conceptual understanding of health by different actors/stakeholders" (Carmichael et al., 2012);
2. partnerships: "types of governance arrangements[…] in place and the political context" (ibid.) as well as community stakeholder engagement through better participatory models;
3. management and resources: "the way institutions work, the responsibilities they have and their capacity and resources" (ibid.); and
4. the appraisal process: "the timeliness, comprehensiveness and inclusiveness of the appraisal process" (ibid.) as well as "the quality and range of evidence base used" (ibid.).

Linzalone et al. (2014) analyzed Italian EIA and SEA in regard to the inclusion of health in the environmental reports, researching the national mandatory EIA database starting from 1989,

and the SEA database starting from 2008. Out of 10 720 requirements in the period 1989–2013, only 122 referred to 'public health', and in the environmental impact statement (EIS) of 91 EIAs in the period 2008–2013, health is rarely considered. Within the 18 national and 30 regional SEAs conducted in the period 2008–2013 health "is addressed as a goal of sustainability and health is part of a general context exploration" (Linzalone et al., 2014) but not further assessed. The shortcomings of health in SEA identified by the authors can be found in Box 21.

Box 21. Shortcomings of health inclusion in Italian SEAs in the period 2008-2013

- absence/lack of characterization of the environmental factors that directly and/or indirectly affect the health of exposed people;
- absence/lack of identification and characterization of the potential risks associated with the actions contained in the plan/program;
- absence/poor evaluation of the effects on health deriving from the implementation of plan/program; and
- lack of consideration for prevention and reduction of effects on health.

(Source: Linzalone et al., 2014)

Based on diverse case studies and applications of SEA in selected countries, Nowacki, Martuzzi and Fischer (2010) identified three types of facilitating factors for health in SEA: a) institutional, b) methodological, and c) procedural. These are shown in Box 22.

Box 22. Facilitating factors for health inclusive SEAs

Institutional factors:

- institutional links between plan, programme or policy proponents and health authorities;
- institutional support by a dedicated body or commission;
- involvement of health professionals at an early stage of the assessment process; and
- meaningful involvement of stakeholders.

Methodological factors:

- a clear distinction between those aspects that are significant for health and should always be considered in SEA, those that are more sector specific, and those that give additional useful information for example, on equity issues;
- availability and integration of data from the relevant departments, authorities and/or sectors involved for detailed analysis, for example, local health data, local data on socioeconomic status; and
- definition of meaningful indicators and existence of integrated monitoring systems.

Procedural factors:

- use of SEA as an instrument for integration, aiming to achieve consistency of aims, objectives and proposed action of different decision tiers and sectors;
- coordination with other assessment tools if used;
- application of assessment when no decision on preferred aspects has been made (pro-active approach);
- consideration of social and behavioural factors as well as physical and environmental factors at an early stage to define the critical factors to be considered for the specific SEA;
- consideration of data from different departments, authorities and/or sectors for an integrated assessment and reporting; and
- availability of dedicated resources, such as specific guidance.

(Source: Nowacki, Martuzzi & Fischer, 2010, adapted and amended from Fischer, 2010)

In his review on health in SEA, Fischer (2014b) distinguishes between process-related and contextual facilitating factors, with the former relating to the suitability of the assessment procedure, methods and techniques, and the latter relating to the "issue to be addressed and the roles of those involved in assessment" (Fischer, 2014b), their concerns and expectations. Biophysical health determinants are routinely considered in SEAs, but usually there is no further consideration of distributional effects in affected populations. While sometimes even

social and behavioural determinants are considered, this highly depends on the context and the policy, plan or programme assessed, and regularly policy- and plan-makers lack an understanding of the broader aspects of health and the interlinkages with the proposal under discussion. Additionally, health experts only rarely become involved in SEA or only at a late stage, as they are often not statutory consultees, and due to a lack of knowledge of the SEA process may feel uncomfortable with their involvement (Fischer, 2014b).

5.1.3 Health considerations within selected international EIA and SEA regulations and performance standards

Within the WHO European Region the legislation of the EU plays an important role, not only for its 28 member states, but also for countries closely linked economically to the EU. EU legislation also plays an important role for the European financial institutions and their lending policies as well as for the different national development corporations. Besides EU legislation, international treaties and conventions play an important role, one of the main UN actors for the environment in the WHO European Region being UNECE.

5.1.3.1 Health within the EIA Directive and the Espoo Convention on EIA

While the need to protect human health is also one of the main arguments for the introduction of EIA regulations, impacts on health and the population only play a more important role in the last revised EIA Directive 2014/52/EU. For example, the purpose of the NEPA of 1969 was “to declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man” (Congress of the U.S.A., 1970, Sec. 2). Also in the preamble of the first version of the EIA Directive, Council Directive 85/337/EEC of 1985, the protection of human health and ensuring quality of life justifies the need to assess the impacts of projects: “the effects of a project on the environment must be assessed in order to take account of concerns to protect human health, to contribute by means of a better environment to the quality of life, to ensure maintenance of the diversity of species and to maintain the reproductive capacity of the ecosystem as a basic resource for life” (EU, 2003). But the preamble remains the only place mentioning human health; it is only in Annex III on the information to be provided by the developer of a project that a description of significant effects of the project on the population is requested. Other factors that need to be described are “fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the inter-relationship between the above factors” (EU, 2003, Annex III). While these can all be seen as health determinants, a further assessment on how impacts of these factors could affect health is not requested. The revised EIA Directive 2011/92/EU refers in its preamble to the need to protect health as a prerequisite of the environmental legislation of the European Union. Further, it adds in a new Annex III listing the characteristics of potential significant impacts that need to be considered, not only regarding the extent of the impact on the geographical area but also the size of the affected population (EU, 2012). For further information see also chapter 2.4.1.

With the latest amended EIA Directive (2014/52/EU) human health and population have a more prominent role: not only is the protection of the environment and human health the

main objective of the Directive, but also screening procedures and an EIA of the whole project need to be undertaken to ensure a high level of protection (EU, 2014). Hence, a new article, Article 3, defines the factors for which the direct and indirect significant impacts need to be identified, described and assessed with "(a) population and human health" (ibid., Art. 3) in first place; followed by "(b) biodiversity …; (c) land, soil, water, air and climate; (d) material assets, cultural heritage and the landscape; and (e) the interaction between the factors referred to in points (a) to (d)" (ibid., Art. 3). Furthermore, among the selection criteria of Annex III to determine whether a projected listed in Annex II should be subject to an EIA, not only are the risks of major accidents and/or disasters now included but also the risks to human health, for example, through air pollution or water contamination (ibid., Annex III 1 (g)). Annex IV further specifies that the EIA report needs to describe the factors which are likely to be significantly affected by the project, mentioning first population and human health, followed by biodiversity, land, soil, water, air, climate, material assets, cultural heritage, and landscape. Furthermore a description of the significant effects and the risks to human health is requested (ibid., Annex IV, 4-5).

The EIA Directive 2014/42/EU had to be transposed into national legislation by the 28 Member countries of the EU by 16 May 2017. The Directive is not only important for these 28 countries; it is also important for the candidate countries and the EU associate countries. Furthermore, it is legally binding for the Development Banks of the EU and their respective lending policies. Hence, the importance of EU Directives goes far beyond the 28 EU member countries.

Within the Espoo Convention health is only mentioned in the definition of impact, with impact being "any effect caused by a proposed activity on the environment including human health and safety" (UNECE, 1991, Art. 1 (vii)) and in its Appendix III confirming that concerned Parties have to consider if the proposed projects are "in locations where the characteristics of proposed development would be likely to have significant effects on the population" (ibid., Appendix III, 1.(b)).

Even though the protection of human health is one of the main objectives of these two international legally binding regulations – EIA Directive and Espoo Convention – neither of them requires the inclusion of public health experts, defines the procedure for assessing the effects on humans, or defines what exactly is meant by a 'significant' effect. Although, the latest EIA Directive 2014/42/EU at least demands that 1) the competent authority – to be defined by the member states – needs to have the qualifications to fulfil its obligation in defining the criteria to be assessed, examining the EIA and ensuring its high quality before taking a decision, and 2) the developer needs to ensure that the EIA is undertaken by competent experts. But again there is no further definition on what 'competent' means nor are any minimum criteria given.

5.1.3.2 Health within the SEA Directive and the Protocol on SEA to the Espoo Convention

Although the protection of health is established as a primary concern in the SEA Directive (EU, 2001), the relevant aspects of environmental health are still hardly mentioned. Only Annex I and Annex II of the SEA Directive mention human health. Annex I defines the information that the environmental report must provide on the likely significant effects on the

environment: biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors (Annex I(f)). Annex II calls for a listing of likely significant effects, of "the probability, duration, frequency and reversibility of the effects" as well as of "the risks to human health or the environment (for example, due to accidents)" (Annex II.2).

While health does not play a major role within the SEA Directive the picture is different with the Protocol on SEA. As already mentioned in chapter 2.4.3, the Protocol on SEA constantly underlines the consideration of health effects, by explicitly mentioning "environment, including health" throughout the document. Health is not only mentioned within the obligatory information that needs to be provided by the environmental report but also a separate Article, Art. 9, requires consultation with environmental and health authorities (UNECE, 2003).

A resource manual has been developed to assist the implementation of the Protocol on SEA, and was published as a Draft Version in 2007 (UNECE, 2007a). At that time it included as a separate annex a chapter on health, describing why health matters and possible practical considerations for health in SEA (2007b). This chapter was developed by UNECE, the Regional Environmental Center for Central and Eastern Europe (REC) and WHO. The final version of the resource manual, published after adoption by the Parties in 2012, then integrated the health chapter as Annex 1.1 (UNECE, 2012).

The implementation of the Protocol on SEA must be reported by the Parties every three years. For this review a comprehensive questionnaire has been developed and adopted by the Parties. While the first review did not contain any questions on health and consultation with health authorities – even though there is a specific Article on it – in 2015 a revised version of the questionnaire integrated some questions on health. Hence, the review on the implementation of the Protocol on SEA will give for the first time in 2017 some official indications on the status of health within SEA in the countries of the Parties. The review covers the period 2013–2015 and is based on 27 national reports received by 30 April 2016. Parties were invited to adopt the review at their next meeting in June 2017 in Minsk, Belarus. The finalized published draft shows that there is still a need to ensure that SEA "documentation systematically contains information on health, including transboundary effects" (UNECE, 2017a), as requested in article 7, paragraph 2, and Annex IV.

Environmental and health authorities to be included in SEA are defined in the national laws of 22 countries, and in 11 countries on a case-by-case basis.[33] The latter was explained through the different levels at which an SEA can be undertaken and therefore different governmental levels which were required to participate. Consultation with environmental and health authorities seems to be mainly based on information and requesting comments, only in a few countries would meetings take place between the authorities (ibid.).

[33] Total of 27 countries responded to the question, multiple answers were possible. In general 25 of the Parties completed the implementation questionnaire; Italy and Malta participated, although they were not yet Parties at the time of the questionnaires deadline, also Belarus and Bosnia and Herzegovina provided responses even though they are not Parties.

5.1.3.3 Health in performance standards of International Finance Institutions (IFI)

It is not only the above mentioned legal requirements for EIA which play an important role, but also increasingly IFIs and other private sector associations are leading further implementation of health in EIAs. For example, the 'Equator Principles' (Equator Principles Financial Institutions, 2013), signed by over 80 international finance and investment banks, refer to the International Finance Corporation (IFC) 'Performance Standards on Environmental and Social Sustainability' (2012), and the IFC and World Bank Group 'Environmental, Health and Safety Guidelines' (EHS) (2007), which both state that EIAs have to consider health impacts. The EHS are "technical reference documents with general and industry-specific examples of Good International Industry Practice" (IFC, 2017). They contain the performance levels and measures that must be taken into consideration for projects financed through the IFC, and they also should play an important role for projects financed by the signatory parties to the Equator Principles.

5.2 Health considerations in SEA guidelines – results of the online research and document analysis

The results of the 2010 internet research using the online search tool Google ranged from 104 hits ("strategic environmental assessment" + File type pdf) to 908 000 hits ("strategic environmental assessment"). Hits on SEA and health ranged from 129 ("Strategic Environmental Assessment" + "Health impact" + Guide + File type doc) to 377 000 ("Strategic Environmental Assessment" + Health); on SEA and guidelines from 32 000 hits ("Strategic Environmental Assessment" + Guide + Language: English + File type: pdf) to 385 000 hits ("Strategic Environmental Assessment" + Guideline + Language: English). Thus, the research strategy was changed as described above in chapter 4.2 to search on specific webpages of key actors in SEA.

5.2.1 General information on the guidelines

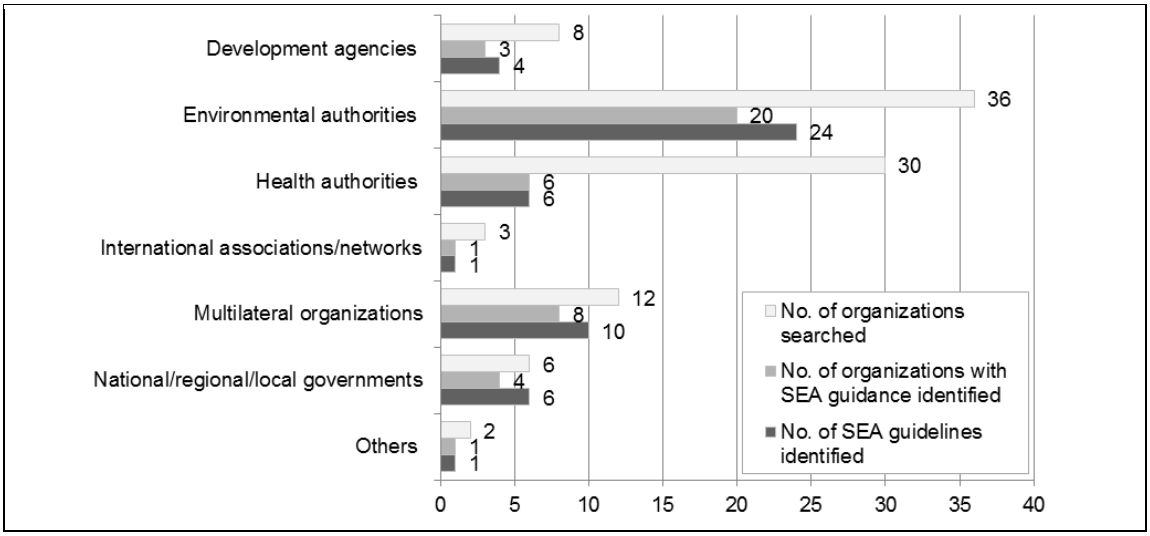
The 2010 research resulted in 12 online guidance webpages and 40 downloadable documents; these 40 documents were published between 1999 and 2010 and range between 1-page fact sheets to 371-page documents. In 2016/17 43 new or updated SEA guidelines from 2010 onwards were obtained but only a short analysis on the inclusion of health in these guidelines was conducted. Hence, the further description of the results will mainly concentrate on the 40 downloadable documents identified in the 2010 research. The 12 webpages were not included in the document analysis as the content could have been changed or updated anytime by the provider.

In general the guidelines aim to promote and support the practical use of SEA, and guidelines from EU member countries also aim to ensure compliance with the SEA Directive. Target audiences of the guidelines therefore vary from those responsible for undertaking SEA to those ensuring that the SEA Directive is enforced, from decision-makers to consultants, non-governmental organizations (NGO), academia and persons with an interest in SEA in general.

In total, 96 webpages in 20 countries were searched; those of multilateral organizations (n=12), international associations or networks (n=3), international development agencies (n=8), and environmental (n=35) or health authorities (n=29), local/regional authorities (n=6),

and other governmental authorities (n=2) (see list of key actors in Annex 8). While for the majority of environmental authorities (n=20) a total of 24 SEA guidelines could be identified, only 6 guidelines were found on 6 out of 29 health authority webpages– see Fig. 15.

Fig. 15. Internet webpages with SEA guidelines per organization type, 2010 research

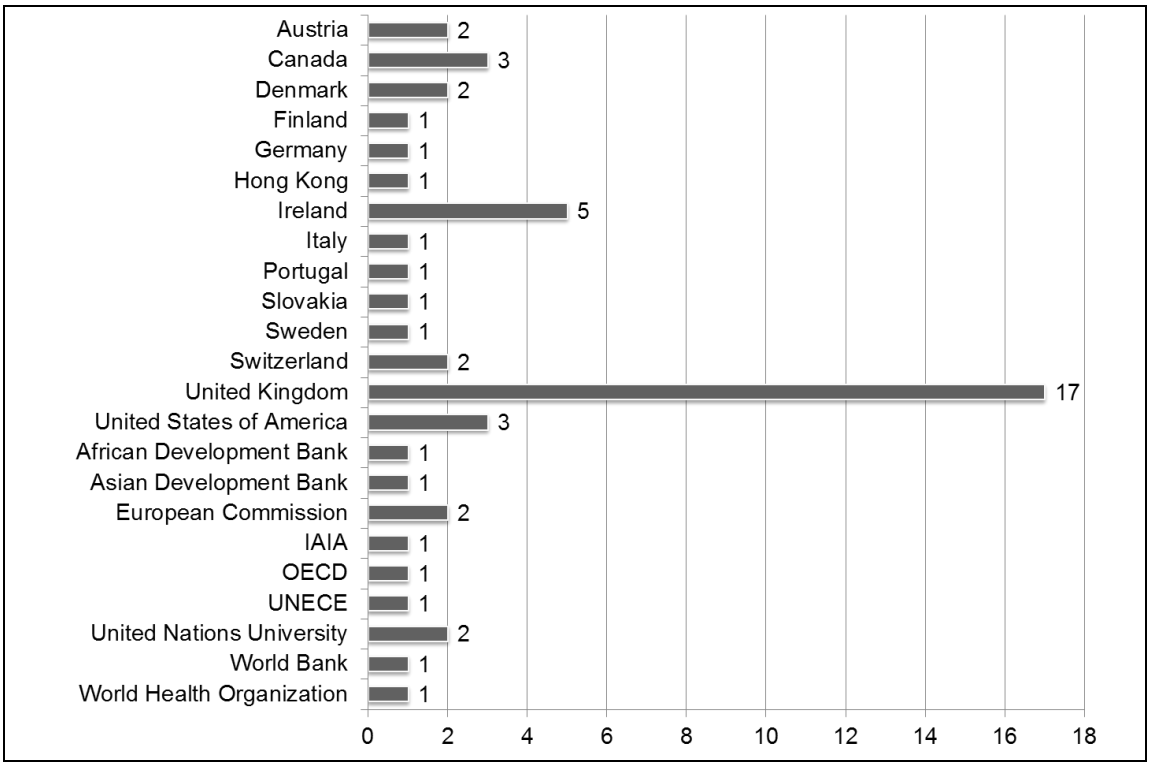


Note: Internet webpages searched (total n=96) by organization type, by number of organization type with SEA guidelines (n=43), and by number of SEA guidelines, webpages and downloadable documents, (n=52) identified per organization type.

On 45% of the 96 webpages searched (n=43), a total of n=52 SEA guidelines could be identified: 79% (n=41) from governmental authorities or agencies from 14 different countries and 21% (n=11) from multilateral organization or international associations. 33% (n=17) of these guidelines identified were located on webpages of governmental authorities of the United Kingdom, followed by 10% (n=5) of guidelines on webpages of governmental authorities of Ireland – see Fig. 16.

The n=43 newly obtained guidelines of the research update 2016/17 give a similar picture: 37% (n=16) of the guidelines were published by environmental authorities (of Australia, Austria, Canada, France, Hong Kong, Ireland, the Netherlands, Portugal, South Africa and the United Kingdom), 33% (n=14) by multilateral organizations (Asian Development Bank, EU, OECD, UNDP, UNECE, UNEP, and the World Bank), 14% (n=6) by other governmental authorities (the Canadian Ministry of Justice, and, from the United Kingdom, the Central Lincolnshire Joint Planning Unit, the Ministry of Defence, the Scottish Government, and the Government Committee on Climate Change), 9% (n=4) by development agencies (of CIDA, Canada, and giz, Germany) , 5% (n=2) by NGOs (the Heinrich Boell Foundation and a spatial planning & health group in the United Kingdom), only 1 (2%) guideline was issued by a health authority, in this case jointly by the United Kingdom's Department of Health and Department of Transport.

Fig. 16. Internet webpages with SEA guidelines per country/organization, 2010 research

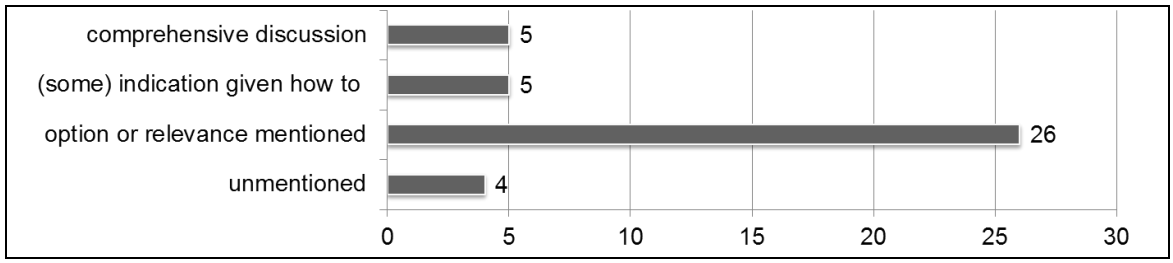


Note: number of guidelines (n=52 webpages and downloadable documents) identified per country or international or multilateral organization.

5.2.2 Health aspects in SEA guideline documents

Out of the 40 guideline documents, 10% (n=4) don't mention health at all, the vast majority of 65% (n=26) merely refer to health as one aspect to consider, 13% (n=5) also give some indication on how to consider health aspects, and 13% (n=5) discuss health comprehensively – see Fig. 17.

Fig. 17. Number of guidelines mentioning health by a 'health scale' from not mentioning health to comprehensive discussion, 2010 research



Note: by number of guidelines, total n=40

In 25% (n=10) of the guidance documents, health authorities are mentioned as key agencies to consult during the various phases of the SEA process: in n=2 guidelines, in the screening phase, n=4 during scoping, n=2 during scoping and consultation, and n=2 only during the decision-making.

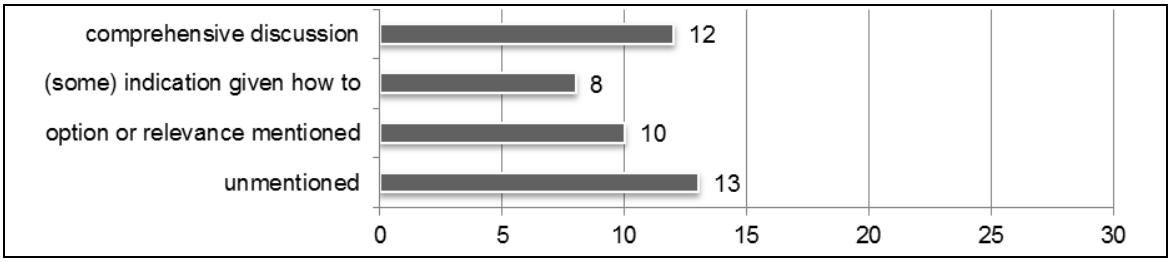
HIA is mentioned in 20% (n=8) of the guidance documents as a specific tool to assess health issues; one guidance document is specifically concerned with the relation of HIA and

environmental assessment and how to better link them (CDC - Centers for Disease Control and Prevention, n.y.).

The majority of the guidelines (n=32; 80%) give no indication on the health data to be used in the assessment; the other documents mention baseline health data (n=2; 5%), routinely collected data (n=1; 3%) or a combination of both (n=5; 13%) to be used for the assessment. No guideline indicates to collect new health data. Thus, only few documents talk about a mix of qualitative and quantitative health data to be used (n=4; 10%) or point out the relevance of quantifying health data (n=4; 10%).

The picture on the newly obtained guidelines indicates that health is gaining more recognition in the SEA guidelines – see Fig. 18. Still the majority of 43 of the newly obtained guidelines do not mention health at all (n=13; 30%) or only mention the need to also consider health issues (n=10; 23%), but a higher percentage than in the 2010 review gives at least some indication on how to assess health impacts (n=8; 19%), and 28% (n=12) included a more comprehensive discussion on health impacts.

Fig. 18. Number of guidelines mentioning health by health scale – 2016/17 research



Note: by number of guidelines, total n=43

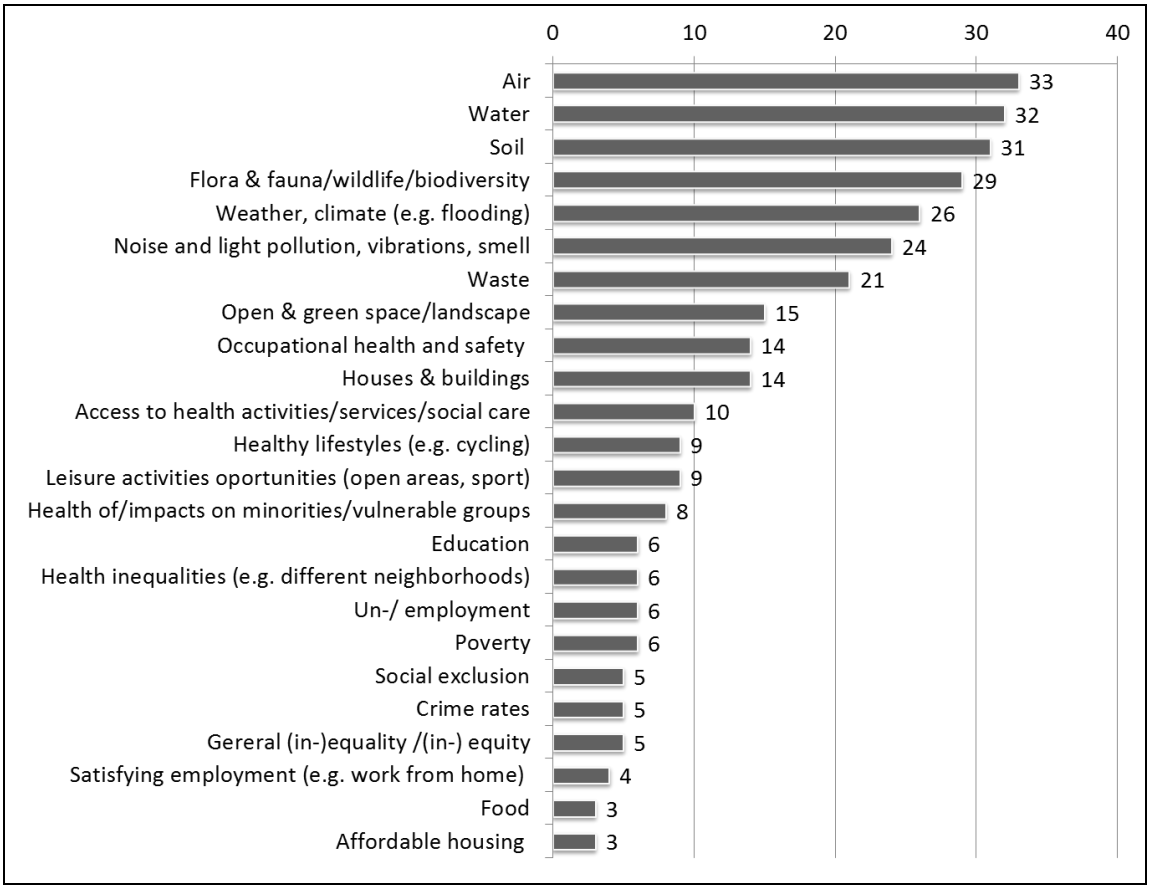
5.2.3 Reference to health determinants

A majority of the 40 guideline documents of the 2010 research consider biophysical aspects of the natural environment like air (n=33; 83%), water (n=32; 80%), soil (n=31; 78%), flora and fauna, wildlife and biodiversity (n=29; 73%), and noise or light pollution, vibrations and smell (n=24; 60%). Weather and climate as aspects of the global ecosystem are mentioned in more than half of the guidance documents (n=26; 65%). Determinants of the built environment presented in landscape, open and green space (n=15; 38%) as well as in dwellings and other buildings (n=14; 35%) are mentioned in less than half of the documents. Out of the determinants referring to human activities, waste is mentioned in more than half of the guidelines (n=21; 53%), while aspects like occupational health and safety issues, for example, avoiding accidents and injuries (n=14; 35%), access to health services (n=10; 25%), the education system (n=6; 15%) and satisfying employment conditions (n=4; 10%) are less often mentioned – see Fig. 19.

The local economy is considered in a minority of the guidelines through aspects like affordable housing (n=3; 8%), poverty (n=6; 15%) and un-/employment (n=6; 15%). Community determinants can be seen in discussions on general in-/equality or in-/equity aspect (n=5; 13%), health inequalities, for example, in different neighbourhoods (n=6; 15%), health status of minorities and vulnerable groups (n=8; 20%), social exclusion (n=5; 13%), as well as in the considerations of crime rates (n=5; 13%). While community aspects are considered only in 20% (n=8) or less of all guidelines, lifestyle aspects are more often considered: healthy lifestyles, for

example, cycling (n=9; 23%), opportunities for leisure activities (n=9; 23%) followed by food (n=3; 8%) – see Fig. 19.

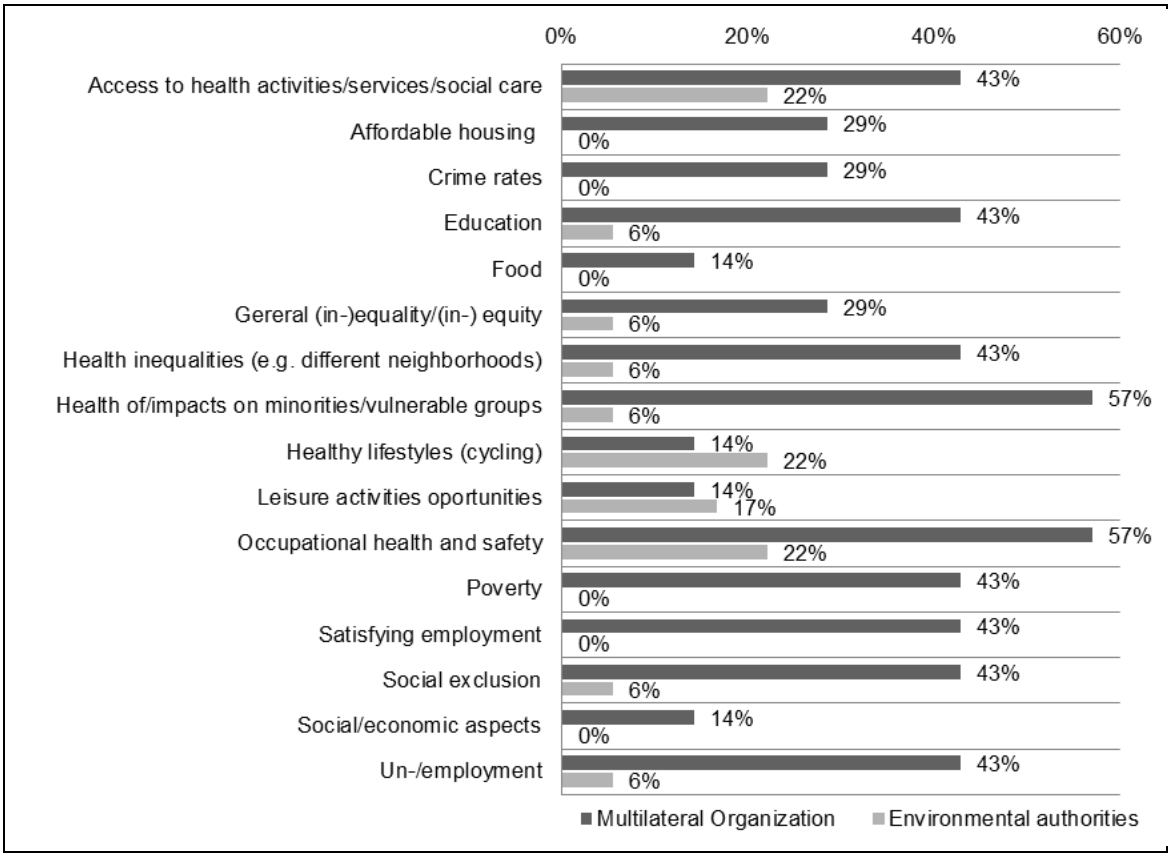
Fig. 19. Number of SEA guidelines mentioning different health determinants



Note: total of n=40 SEA guidelines, multiple determinants could be mentioned in the guidelines

While environmental authority guidelines (total n=18 guidance documents identified) rarely consider social or economic health determinants or equity issues, guidelines of multilateral organizations (total n=7) and development agencies (total n=4) mention these determinants more often when comparing percentages per organization type: education, satisfying employment, un-/employment, poverty, social exclusion, health inequalities, and access to health activities or services is mentioned in 43% (n=3) of the SEA guidelines of the multilateral organizations but only in 6% (n=1) by the environmental authorities – if at all – see Fig. 20.

Fig. 20. Non-environmental health determinants mentioned by multilateral organization and environmental authorities

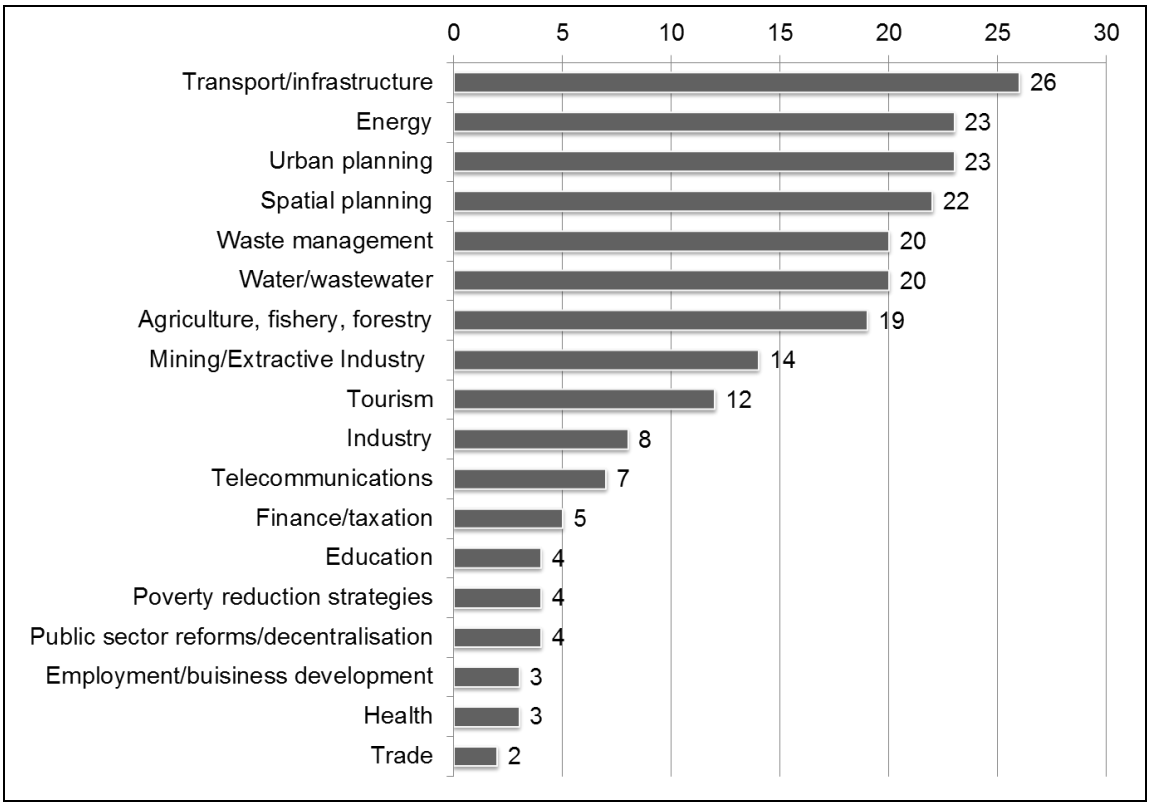


Note: in per cent of organization type, multilateral organizations (n=7) and environmental authorities (n=18) guidelines

5.2.4 References to specific sectors and activities

SEA guidelines are mainly 'generic', referring to classic environment sectors such as – in the SEA Directive – transport and infrastructure (n=26; 65%), energy (n=23; 58%), urban (n=23; 58%) and spatial planning (n=22; 55%), water (n=20; 50%) and waste management (n=20; 50%), agriculture, fishery, forestry (n=19; 48%), mining and extractive industries (n=14; 35%), tourism (n=12; 30%), industry (n=8; 20%) and telecommunications (n=8; 20%). A minority of the guidelines also refer to other sectors such as finance and taxation (n=8; 20%), public sector reforms (n=4; 10%), education (n=4; 10%), poverty reduction strategies (n=4; 10%), health (n=3; 8%), or employment and business development activities (n=3; 8%) – see Fig. 21.

Fig. 21. Number of guidelines by sectors/activities mentioned



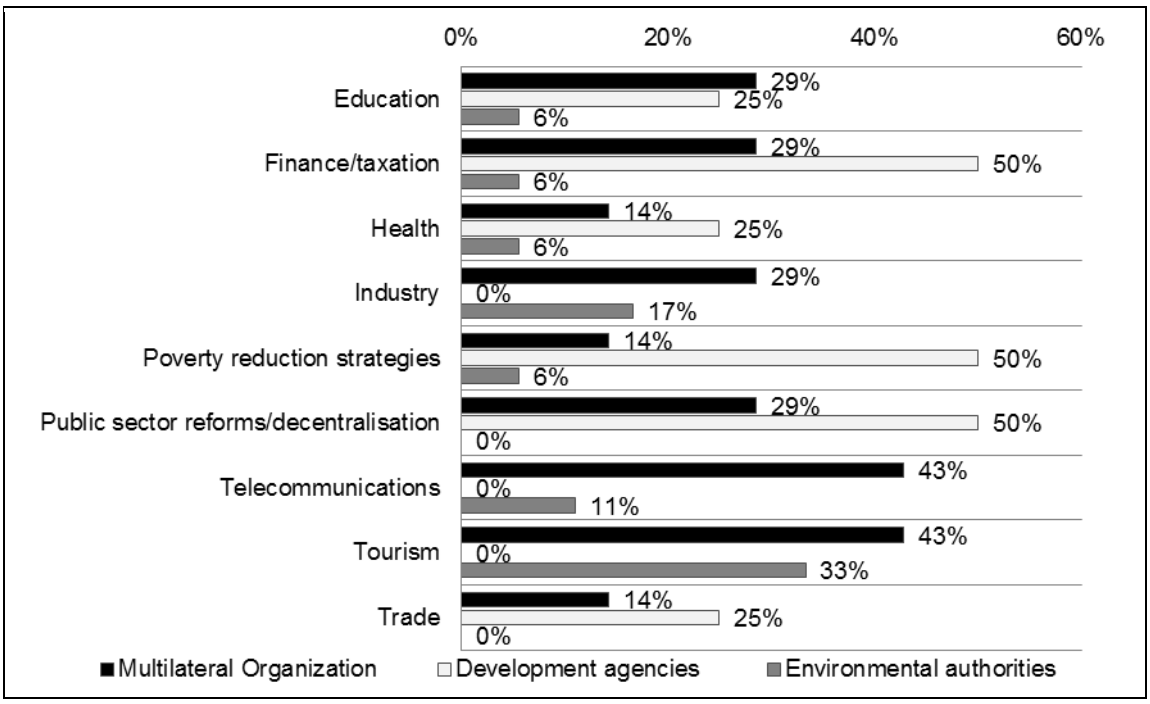
Note: total number of guidelines n=40; selection of multiple sectors possible.

When comparing the guidelines of a) environmental authorities, b) development agencies and c) multilateral organizations, the latter seem to cover a much broader spectrum of sectors or are more generic in nature while environmental authorities seem to look more into classic environmental sectors. For example, education is mentioned in half of the documents of the multilateral organizations (n=2) and poverty reduction strategies in half of the guidelines of development agencies (n=2), while education or poverty reduction strategies are only mentioned in n=1 guidance document of an environmental agency – see Fig. 22.

Comparing the different sectors with the environmental health determinants mentioned in the guidelines, guidelines discussing transport and infrastructure, urban and spatial planning, energy, waste and water management sectors would refer to behavioural risk factors and lifestyle, livelihood and local economy, and social community factors on average more often than guidelines discussing other sectors such as tourism, telecommunication or other industries – see Fig. 23.

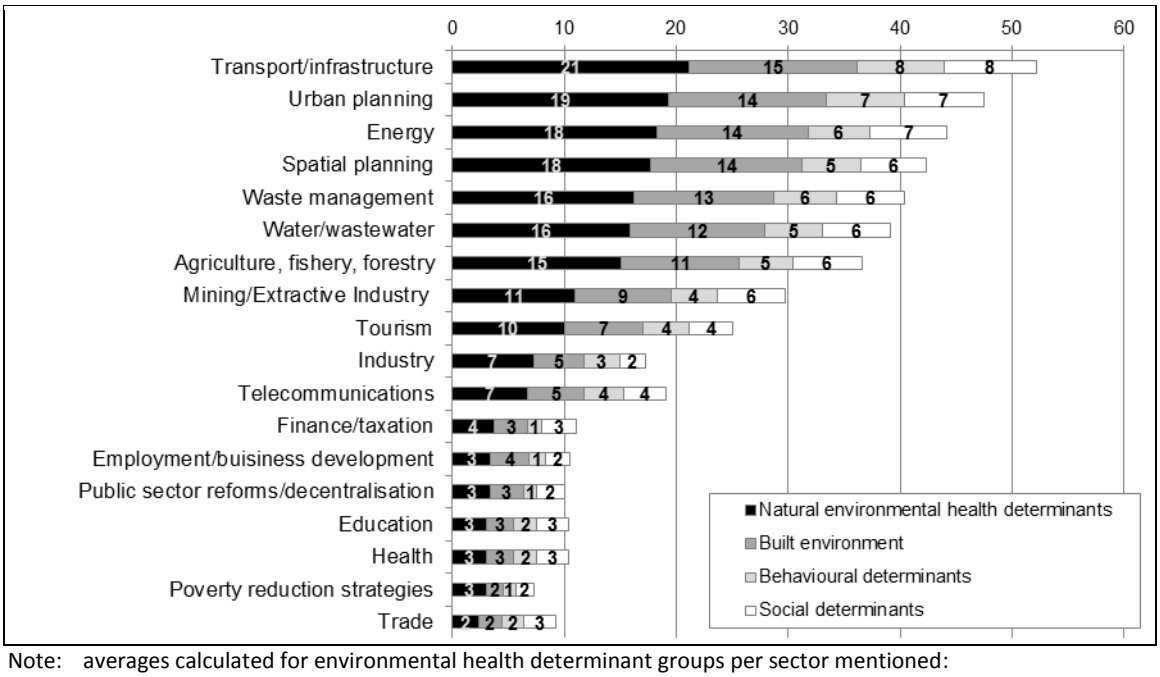
Out of the 40 guidance documents identified, only a limited number give practical examples or refer to specific case studies (n=6); slightly more (n=7) mention specific SEA tools such as screening checklists, or give detailed information on tools (n=2) for SEA.

Fig. 22. Non-environmental sectors mentioned by multilateral organization, development agencies and environmental authorities



Note: in per cent of organization type, multilateral organizations n=7 guidelines, development agencies n=4 guidelines, and environmental authorities n=18 guidelines.

Fig. 23. Guidelines by sectors mentioning different main categories of environmental health determinants



Note: averages calculated for environmental health determinant groups per sector mentioned:

- natural environmental health determinants include: category biophysical aspects such as air, flora, fauna, noise, light, smell, soil, water as well as climate and flooding;
- built environment includes houses and buildings, open and green spaces, landscape;
- behavioural aspects include leisure and physical activities, food, as well as occupational health; and
- social determinants include economic aspects, such as un-/employment, poverty, affordable housing, as well as education, access to services, crime rate, social exclusion, in-/equities, health of minorities and vulnerable groups.

5.3 Summary of the literature review, SEA guideline research and document analysis

The aim of the generic literature review was to explore consideration of health impacts in environmental assessments with a special focus on SEAs. In this regard, the literature review clearly revealed that health impacts have played a role in environmental assessments since their beginning but that mostly only a very limited assessment is taking place, with a clear focus on the 'classic' factors of the natural environment, such as biological, chemical and physical factors, and of the built environment. Different assessment approaches have been developed to address this limited health assessment application within environmental assessment, such as EHIA, standalone HIA, or IEHIA, but due to a lack of legal regulations these applications only seem to have a limited effect, but in countries with some kind of legal regulation their application seems to have at least some influence on the decision-making process.

The aim of the internet research and document analysis on health considerations in SEA guidelines was to explore the inclusion of health aspects. The research showed that SEA guidelines do consider health aspects but as in the generic literature review, mainly factors of the natural environment, such as biological, chemical and physical factors, while social and psychosocial factors are only considered in a few guidelines, mainly in those of multilateral organizations or development agencies. Thus, experience from developing countries could be used to improve the coverage of a wider spectrum of health determinants in SEAs based on the SEA Directive. Although health is mentioned in almost all guidelines, only few guidelines give an indication on how to assess health impact or discuss comprehensively the health implications. Further knowledge and guidance is needed in the environmental sector regarding the use of health data, the relations between exposures and health effects and the differential distribution of health in populations. In this regard, the analysis of the guidelines showed a difference in the broader spectrum of health aspects considered between environmental authorities and multilateral organizations and development agencies. Furthermore, the research of the 29 webpages of health authorities illustrated that specific guidance and training material for the health sector is still rare, and that there is still a need to raise awareness within the health sector on the opportunities SEA and environmental assessments in general can provide for health protection and promotion.

6 Results II: Case study on integrating health into environmental assessments through capacity building – the CBEH project example

As already described in chapter 4.4, the CBEH project was implemented from January 2009 to July 2012 by the WHO Regional Office for Europe and co-funded by DG Sanco. It was chosen as a case study as it is closely linked to question number 5 on the needs to further support capacity building. This chapter first gives a short overview on the background of the project and the development of the main international training week in Riga, Latvia, from 19 to 23 March 2012. The main evaluation results of the international training week are then presented with a focus on the feedback of the modules on health in environmental assessments, followed by the further developed follow-up workshops and the conceptual frameworks based on the results and feedback of the international training week and the follow-up workshops.

6.1 Background of the CBEH project

The overall objective of the CBEH project was strengthening in-country capacity for dealing with environment and health issues in eight Member States in the WHO European Region. To achieve this, a comprehensive capacity building package was developed to support environment and health risk governance in the following Member States: Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia (WHO Regional Office for Europe, 2013f). The main activities carried out were two preparatory workshops with environment and health experts of the participating Member States to develop the concept for the international training week, the international training week, and two national follow-up workshops (Gibson, Nowacki & Cave, 2013a,b; WHO Regional Office for Europe, 2013e). Based on these workshops, the developed training package for environment and health experts of the international training week was further revised. Finally, a framework for the use of impact assessments in environment and health, as well as a concept note for continuous training in environment and health were developed (WHO Regional Office for Europe, 2013f–h).

6.1.1 The preparatory workshops

The two preparatory workshops, held in October 2011 in Tallinn, Estonia, and Budapest, Hungary, brought together representatives from the participating countries to identify, compare and contrast current capacity needs, review country specific priorities on environment and health, national environment and health policies as well as existing institutional frameworks and training options for environment and health in the countries. In preparation for the workshops, environmental health challenges and main problems in the participating countries were identified and compiled by using existing resources such as the European HfA Database, Environment and Health Information System (ENHIS), EBoD country profiles, Environment and Health Performance Reviews, and other country specific information available online. The data obtained were then presented at the workshops and discussed with country representatives from the environment and health sectors. Additionally, participants presented the environment and health challenges and main problems in their countries based on a questionnaire developed by WHO (WHO Regional Office for Europe, 2011).

Based on the discussion at the preparatory workshops, common areas of concern and capacity building needs in environment and health were identified, presented in Box 23.

Box 23. Common areas of concern and requested capacity building topics

Common areas of concern:

- a lack of intersectoral collaboration
- insufficient implementation and evaluation of risk assessment methodology
- limited implementation of HIA and health in environmental assessments (EIA/SEA)
- problems with water quality, especially in rural areas
- difficulties with air quality, especially in larger cities
- need of strategies for pollution prevention, treatment of hazardous waste and contaminated sites
- lack of consideration of health effects in energy policies/projects and extraction industry.

Capacity building activities needed on:

- how to use existing data for environment and health interpretation, for example, through linking environmental data with health effects and linking this data further with socio-economic data
- how to integrate health issues better in environmental assessments like EIA and SEA (training programs, trainers, methodologies, guidelines)
- risk assessment methodology, for example, for small area geographical assessments
- policy analysis, tools and methods for priority settings
- risk communication and interaction with stakeholders
- biomonitoring.

(Source: adjusted from WHO Regional Office for Europe, 2011)

6.1.2 The international training week

The concept of the main training event, a five-day international training on environment and health, was thus developed. The training aimed at providing:

- new insights on environment and health key topics;
- in-depth training options on specific areas in environment and health;
- opportunities for networking among participants of different sectors and countries; and
- opportunities for further promotion and dissemination of good environment and health practice in the eight countries and beyond (WHO Regional Office for Europe, 2013e).

The training was targeted at environmental health professionals working in the environment and health sector, who have **"**undergone formal training and engaged in evaluating or managing environmental hazard and risk to health, including legislative, administrative and technical measures" (Theakstone, 2006).

Accordingly, the training comprised four main components. The final programme can be found in Annex 11.

- Module 1 covered the policy framework, with key lectures on the current status of environment and health field topics;
- Module 2 consisted of case studies from the participating countries on various environment and health issues;
- Module 3 consisted of three parallel in-depth workshops on different aspects of impact assessments:

  3A) health in EIA, with a focus on energy projects,
  3B) health in SEA, with a focus on energy policies, and
  3C) quantitative methods on 1) contaminated sites, 2) quantitative risk assessment (QRA), and 3) EBoD.

- Module 4 comprised two parallel training of trainers workshops (WHO Regional Office for Europe, 2013e).

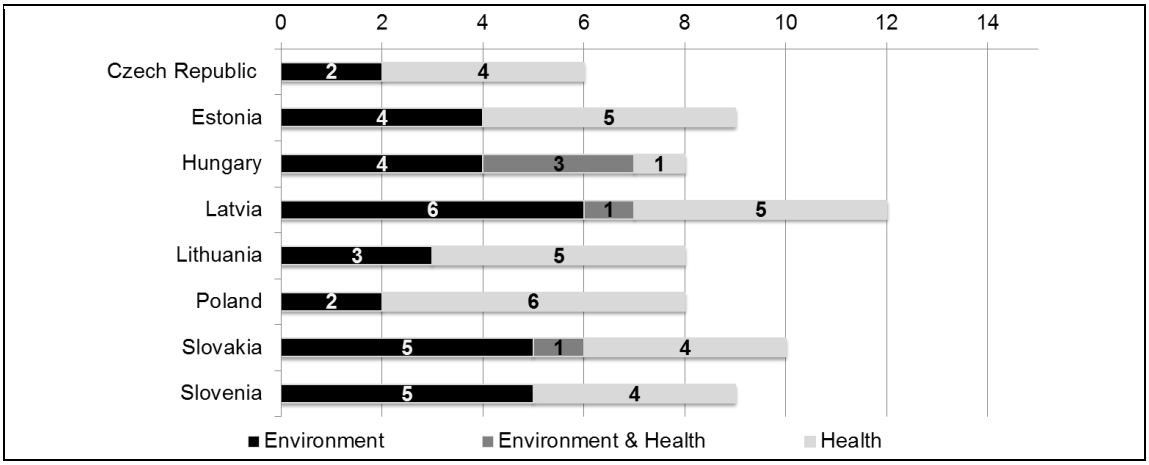
The parallel in-depth workshops of Module 3 were placed at the heart of the training and took place on days 2–4. Participants could indicate their preferred parallel workshop upon registering and were then assigned to one of the workshops which they followed over the whole training week.

In order to achieve the essential balanced participation from the environment and health sectors, ministries of health and of environment were invited to nominate participants. A total of 70 environment and health experts representing eight countries – the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia and Slovenia – participated in the training event in Riga from 19 to 23 March 2012 (WHO Regional Office for Europe, 2013e).

6.1.3 Background information on the participants of the international training week

Before the start of the training week, the participants were asked to indicate their main area of work, their years of working and their experience in the different themes of the parallel modules, ranging from "1 – having no working experience at all in this area" to "5 – working in this area daily", and in which parallel module they would prefer to participate. Out of the 70 participants 71% (n=50) were female and 29% (n=20) male; 49% (n=34) were working in the health sector, 44% (n=31) in the environment sector, and 7% (n=5) indicated the environment and health sector – see Fig. 24. Experience ranged between 1 and 40 years with 60% (n=42) of the participants having between 1 and 10 years' experience, 24% (n=17) between 11 and 20, and 16% (n=11) between 21 and 40 years.

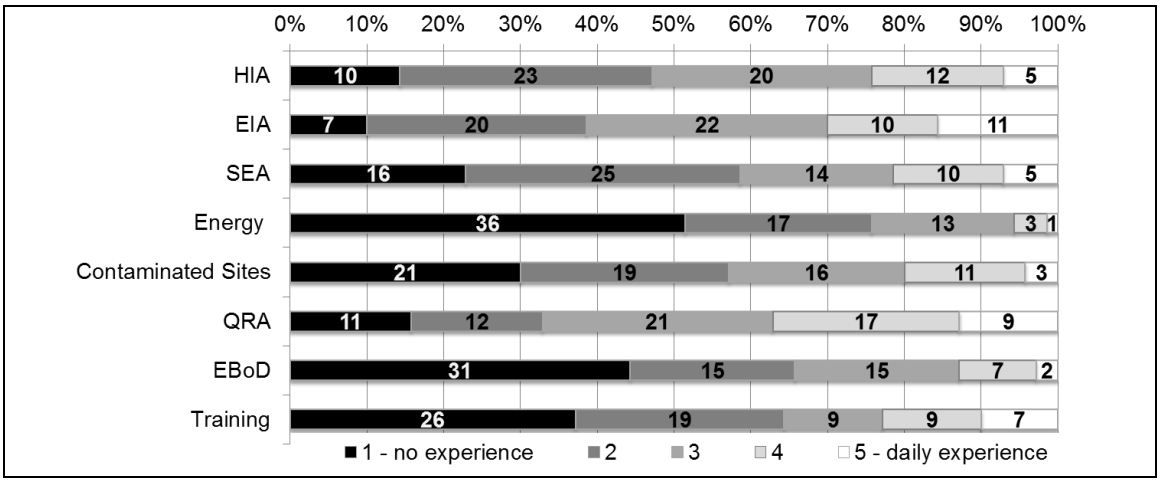
Fig. 24. Main area of work and country represented by participants



(Source: adjusted from WHO Regional Office for Europe, 2013e, Fig. 2)
Note: By country and number of participants. Total number of participants n=70.

While the majority of the participants indicated having some if not daily experience (on the scale values 3, 4 or 5) in the fields of EIA (61%, n=41), HIA (53%, n=37), and QRA (67%, n=47), 43% (n=30) had this experience with contaminated sites, and only 41% (n=29) in SEA, 34% (n=24) with EBoD calculations, and even less (24%, n=17) had experience in the area of energy projects or policies, with 51% (n=36) having no experience at all in this area. Furthermore, 64% (n=45) had no or very little experience in training for trainers – see Fig. 25.

Fig. 25. Work experience of participants in the different thematic areas



(Source: adjusted from WHO Regional Office for Europe, 2013e, Fig. 3)

Note: Number of participants having experience in the different thematic areas, by frequency of experience. Total number of participants n=70.

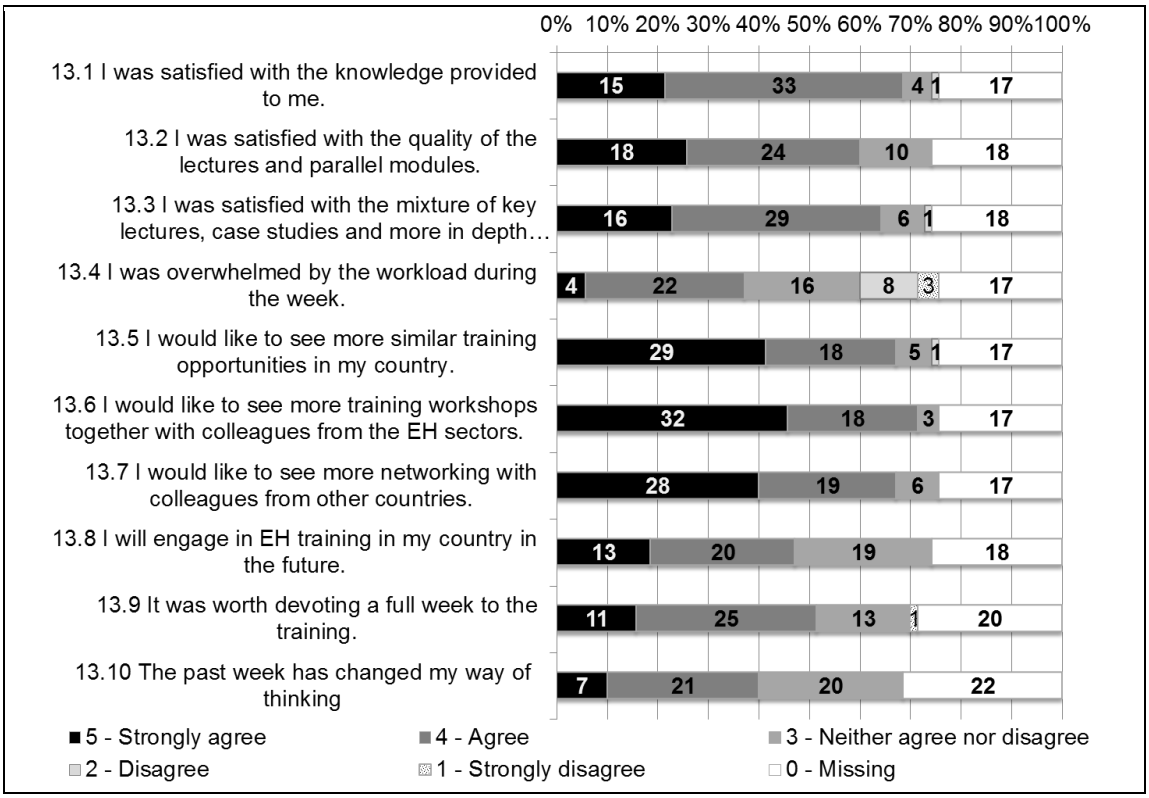
6.2 Results of the evaluation of the international training week

As described in chapter 4.4, participants were asked to fill in daily evaluation sheets and a final overall evaluation at the end of the training week. On average 54 participants (77%) responded to the evaluation sheets, with the highest response on day 2 (80%, n=56) and the lowest on day 3 (74%, n=52).

6.2.1 Overall feedback

The overall feedback of the participants showed that the vast majority (68%, n=48) were either very satisfied or satisfied with the overall knowledge provided during the training week, 6% (n=4) were neither satisfied nor dissatisfied and 1% (n=1) was not satisfied, 24% (n=17) did not respond to the question. A similar picture is given in regard to the quality of the key lectures and parallel modules with 60% (n=42) being satisfied or very satisfied and 14% (n=10) neither satisfied nor dissatisfied, none was dissatisfied but 26% (n=18) did not answer the question. The mixture of key lectures, case studies and in-depth modules was rated similarly, with 64% (n=45) being satisfied or very satisfied and 9% (n=6) neither satisfied nor dissatisfied, only 1% (n=1) dissatisfied, and 26% (n=18) not answering the question. Up to 71% (n=50) of the participants would like to see not only more joint capacity building activities with colleagues form the environment and health sectors, but also more networking with colleagues from other countries as well as further training opportunities similar to the international training week in their country (both items 67%, n=47). While 63% (n=44) of the participants rated the training of trainers module as relevant (see Fig. 27 below), only 47% (n=33) either agreed or strongly agreed to engage in training on environment and health in future in their country – see Fig. 26.

Fig. 26. Overall impression of the training week



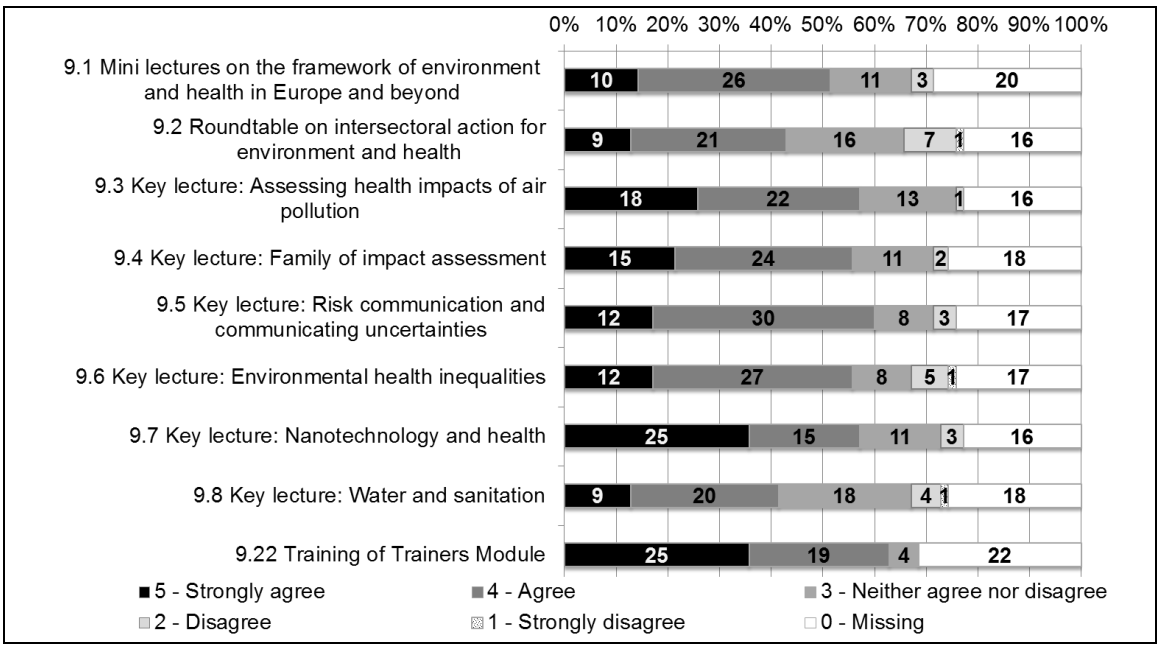
(Source: adjusted from WHO Regional Office for Europe, 2013e, Fig. 8)

Note: Number of participants agreeing or not agreeing to the above statements, by scale of agreement. Total number of participants n=70.

Out of the eight key lectures the overall rating of six in regard to their relevance for vocational and professional needs was above 50%, with the highest relevance given to the key lecture on risk communication and communicating uncertainties (60%, n=42), followed by the lectures on air pollution and nanotechnologies (both 57%, n=40), those on the family of impact assessment and on environmental inequalities (both 56%, n=39), and the mini lectures on the frameworks for environment and health in Europe (51%, n=36). Only the roundtable on intersectoral action for environment and health (43%; n=30) and the key lecture on water and sanitation received a lower agreement (41%, n=29) – see Fig. 27 below.

In regard to the case studies presented by the nominees of the eight countries, the majority agreed that five case studies were relevant for their vocational and professional needs: those on HRA of a red sludge catastrophe in Hungary and climate change (57%, n=40), risk assessment of waste burning (56%, n=39), air pollution and bottom-up HIA (54%, n=38), HIA of an onshore wind farm, and HIA implementation in Slovakia (both 53%, n=37). Less relevant were found to be the case studies on the new public health strategy in Latvia (47%, n=33), mobile phones and electromagnetic fields (44%, n=31), and on flash floods and mosquitos (33%, n=23) – see Fig. 28 below.

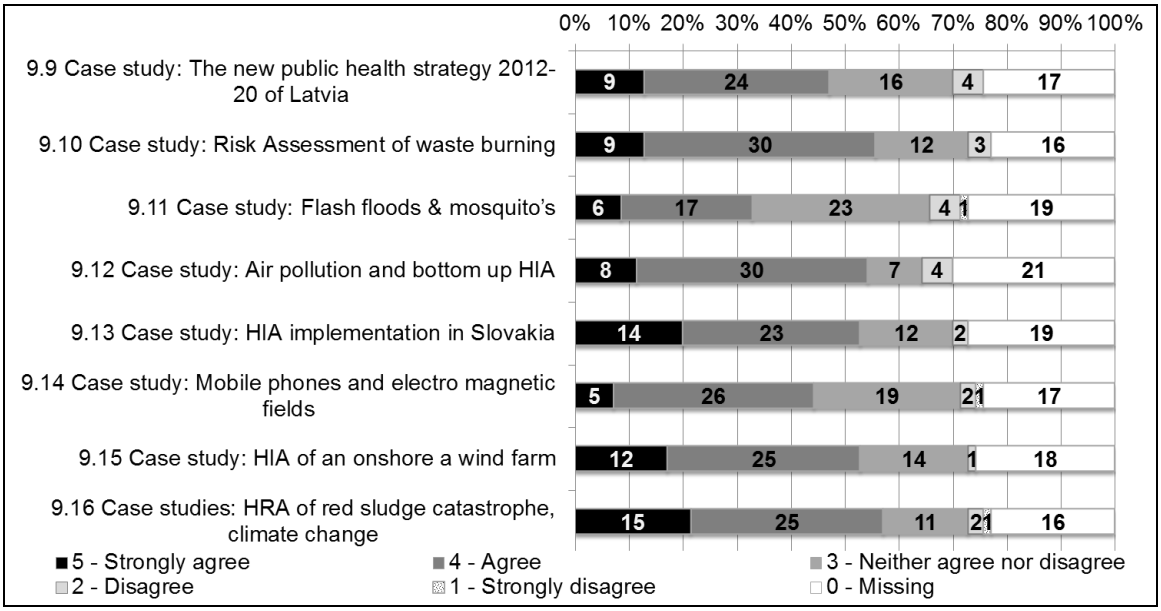
Fig. 27. Overall relevance of the key lectures and the training of trainers for the vocational and professional needs of the participants



(Source: adjusted from WHO Regional Office for Europe, 2013e, Fig. 6)

Note: Participants agreeing or not agreeing with the relevance for their vocational and professional needs, by number and scale of agreement per key lecture/training of trainer module. Total number of participants n=70.

Fig. 28. Overall relevance of the case studies for the vocational and professional needs of the participants



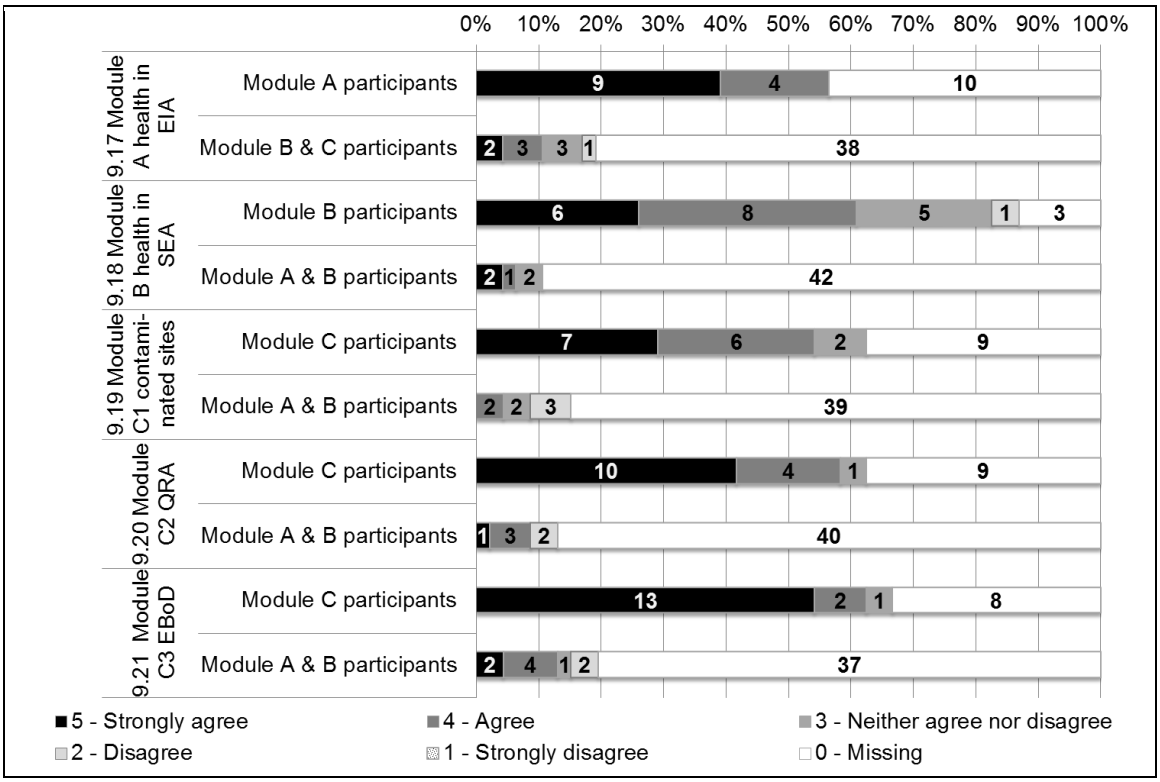
(Source: adjusted from WHO Regional Office for Europe, 2013e, Fig. 7)

Note: Participants agreeing or not agreeing with the relevance for their vocational and professional needs, by number and scale of agreement per case study. Total number of participants n=70.

6.2.2 Feedback on the parallel workshops of Module 3

The parallel workshops of Module 3 consisted of a Module 3A on health in EIA, Module 3B on health in SEA, and Module 3C with C.1 on contaminated sites, C.2 on QRA, and C.3 on EBoD. The overall evaluation of the training week also contained a question on the agreement on the relevance of modules for the vocational and professional needs of all participants. As participants took part in different parallel modules, there is a high number of participants skipping the answers – the further on called 'non-participants' of the module under question. Agreement on the relevance of modules for the vocational and professional needs ranged from agreement to strong agreement: the strongest agreement was for Module 3C.3 on EBoD with 63% (n=15) of the participants of the Module 3C.3 on EBoD and 13% (n=6) of the participants of the other modules showing agreement or strong agreement, followed by 61% (n=14) of the Module 3B on SEA participants but only 6% (n=3) of the non-participants, 58% (n=14) of the Module 3C.2 on QRA participants with 9% (n=4) of the non-participants, and 57% (n=13) of the Module 3A on EIA participants with 11% (n=5) of the non-participants. The lowest agreement was on Module 3C.1 on contaminated sites with 54% (n=13) of the participants and 4% (n=2) of the non-participants – see Fig. 29.

Fig. 29. Overall assessment of relevance, for the vocational and professional needs, of the parallel workshops of Module 3



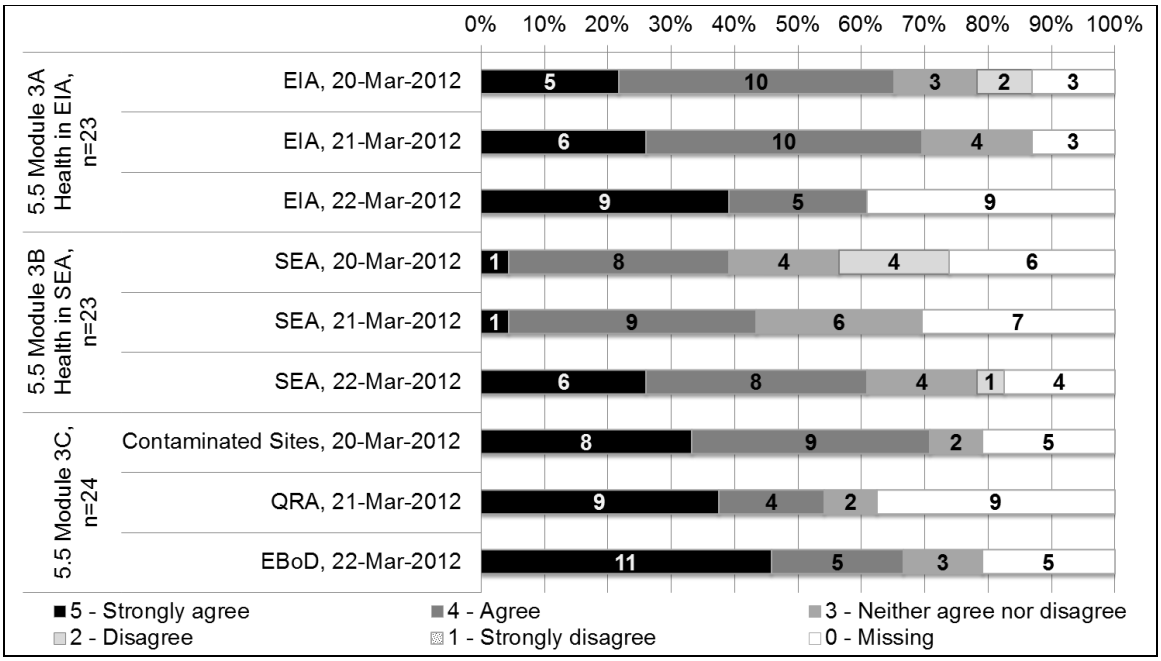
(Source: own calculations based on unpublished data of WHO Regional Office for Europe, 2013e)

Note: By number of module participants and number of participants of the other modules. Total number of participants n=70, with n=23 participants in Module 3A and 3B, and n=24 participants in Module 3C. Number of participants who skipped the question on average n=8 for their specific module and n=39 for respondents not participating in the specific module.

Looking into the daily assessments of the parallel workshops, there is a clear picture that strong agreement on the relevance of the module increased over the three days while on the

overall agreement the picture is more varied. The highest agreement by module participants was with 71% (n=17) on the first day on Module 3C.1 on contaminated sites, followed by 70% (n=16) on the second day of Module 3A on EIA, 67% (n=16) on the third day on Module 3C.3 on EBoD, 65% (n=15) on the first day of Module 3A on EIA, and 61% (n=14) on the third day of Module 3A on EIA and Module 3B on SEA – see Fig. 30.

Fig. 30. Daily assessment of relevance for the vocation/professional needs of the parallel workshops of Module 3

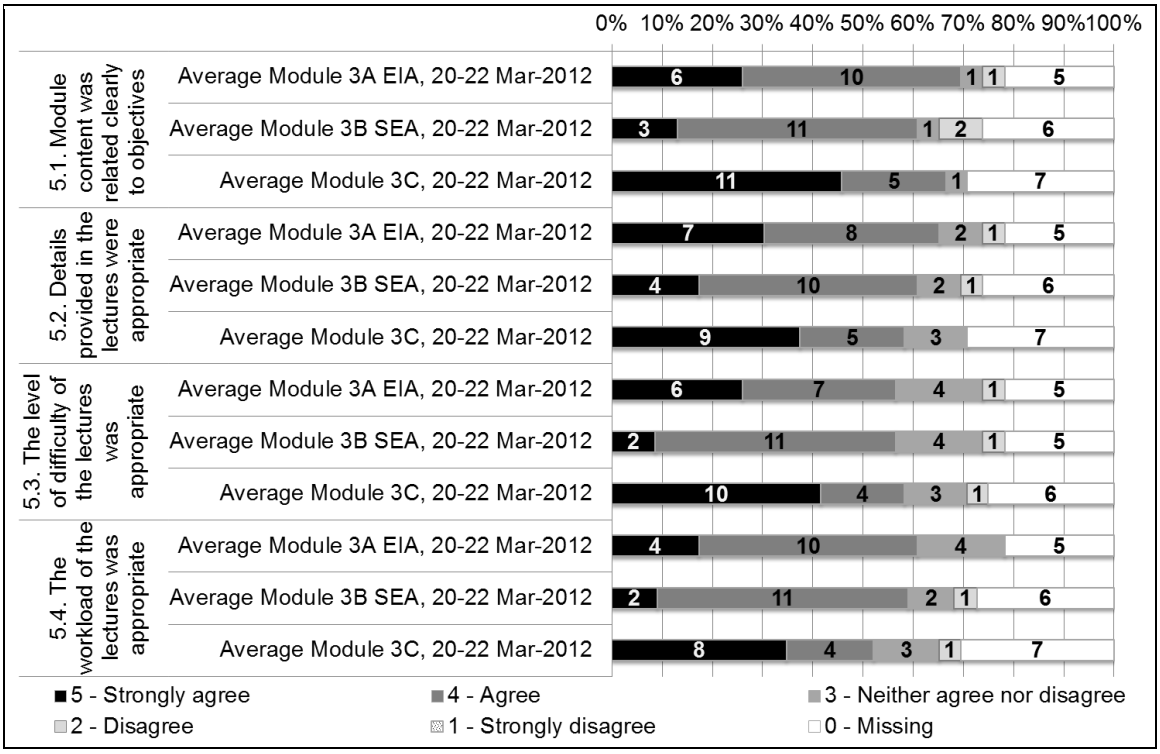


(Source: adjusted from WHO Regional Office for Europe, 2013e, Fig. 5)

Note: By number of module participants and days of the sessions. Total number of module participants n=70, Module 3A n=23, Module 3B n=23 and Module 3C n=24 participants.

Overall the majority of the participants agreed that the content of the three modules was clearly related to the modules' objectives, with the highest average agreement over the three days of 70% (n=16) of Module 3A on EIA participants, followed by participants of Module 3C with 67% (n=16), and Module 3B on SEA with 61% (n=14). A similar picture showed the agreement on the appropriateness of the details provided in the modules with the highest average over the three days for Module 3A on EIA with 65% (n=15) of the participants, followed by Module 3B on SEA with 61% (n=14) and Module 3C with 58% (n=14). On the appropriateness of the difficulty of the modules 58% (n=14) of the Module 3C participants agreed on average over the three days, as did 57% (n=13) of the participants of both Module 3A on EIA and Module 3B on SEA. In regard to the workload of the modules, 61% (n=14) of Module 3A on EIA participants agreed in average over the three days that it was appropriate, while 59% (n=13) of the Module 3B on SEA participants but only 52% (n=12) of the Module 3C participants agreed on the same – see Fig. 31.

Fig. 31. Average of daily assessments of the parallel workshops of Module 3 on their objectives, level of details and difficulty, and workload



(Source: own calculations based on unpublished data of WHO Regional Office for Europe, 2013e)

Note: By average number of module participants and question items. Total number of module participants n=70, Module 3A n=23, Module 3B n=23, and Module 3C n=24 participants.

When asked about the three most useful things learned during the international training week, 60% (n=42) mentioned a total of 109 items. The integration of health or HIA into EIA and/or SEA was mentioned by 29% (n=12) of the participants, followed by 26% (n=11) mentioning EIA or SEA, 24% (n=10) mentioning the exchange of experiences, such as through the practical case studies presented and in the parallel workshops, with an additional 10% (n=4) mentioning networking as the most useful, and 21% (n=9) mentioning the Module 3C.2 on QRA as the most useful. Another 14% (n=5) mentioned impact assessment in general, the differences between the different types, and procedures, while 12% (n=5) mentioned HIA implementation, procedure, health assessment, and aspects to be considered. Closely linked with the SEA module was the concept of strategic thinking, which was mentioned by 12% (n=5) of the participants who answered this question – see Table 16.

Table 16. The 14 most useful things learned during the training week

Main category	Number of times mentioned	% of the 42 participants responding to the question
Health/HIA in EIA/SEA	12	29%
EIA/SEA	11	26%
Practical cases/Experience exchange	10	24%
QRA	9	21%
Nanotechnology	7	17%
Methodology of EBoD	7	17%
Impact assessment	6	14%

Table 16. contd.

Main category	Number of times mentioned	% of the 42 participants responding to the question
Train the trainers	6	14%
Strategic thinking	5	12%
HIA	5	12%
Networking	4	10%
Air pollution and health	3	7%
Risk communication	3	7%
Decision-making	3	7%

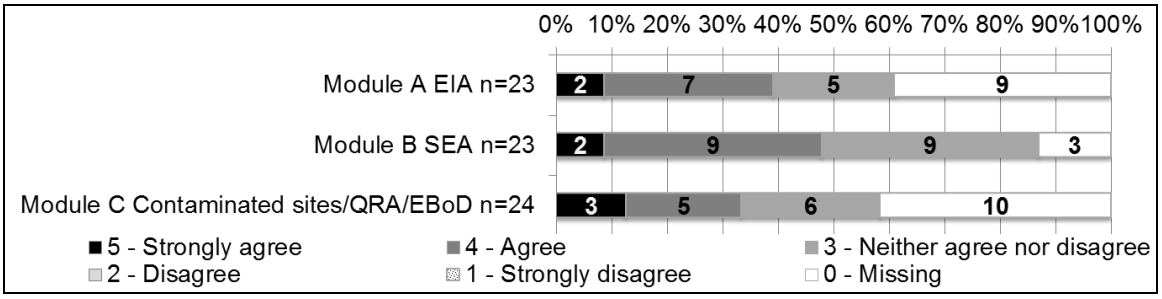
(Source: own calculations based on unpublished data of WHO Regional Office for Europe, 2013e)

Note: multiple answers were possible resulting in a total of 109 selections which were clustered into a total of 29 main categories which shared similarities, fitting logically and intuitively together.

Among the participants of the Module 3 on health in EIA and SEA, the most useful things mentioned in their modules were how health could be integrated into the environmental assessments (n=12), the difference between the different impact assessment forms (n=12) and the impact assessment procedures and steps (n=5).

Forty per cent (n=28) of the participants indicated that their way of thinking had changed during the training week (see also Fig. 26, above) with the highest percentages from Module 3B – health in SEA (48%, n= 11) followed by the Module 3A – health in EIA participants (39%, n=9) – see Fig. 32. For example, participants declared that "their thinking got larger, more strategic in the sense of positive and forward looking thinking; others reflected that 'there is no need for hundreds of data and details in order to make a decision' (ID46) and on the importance of addressing health issues in 'EIA/SEA in more detail and more profoundly' (ID37)" (WHO Regional Office for Europe, 2013e).

Fig. 32. Changes in the way of thinking over the training by the participants



(Source: own calculations based on unpublished data of WHO Regional Office for Europe, 2013e)

Note: by number and kind of agreement per module; total number of participants n=70.

Among the topics that participants would like to see more risk assessment methods ranged first (n=13), followed by nanotechnology and health (n=10). The impact assessment topics on HIA and SEA implementation and the linkages between the assessment types come together to a total of being mentioned n=21 times – see Table 17.

Table 17. 10 leading topic areas that should be covered more

Topic area	Times mentioned	% of the 36 participants responding to the question
Risk assessment (quantitative methods - in HIA, on specific topics: contaminated sites, water, small population groups)	13	36%
Nanotechnology and health	10	28%
HIA implementation / in practice	9	25%
Case studies, exercises	8	22%
EBoD	7	19%
Linkages of HIA, EIA and SEA / Family of IA	7	19%
Inequalities (environmental) / social determinants	6	17%
SEA implementation / in practice	5	14%
Noise and health	4	11%
Water pollution and health	3	8%

(Source: adjusted from WHO Regional Office for Europe, 2013e, Table 3)

Note: multiple answers were possible resulting in a total of 86 selections clustered in a total of 21 categories.

Twenty-one participants commented on what they would like to see changed in the future workshops. The comments ranged from thanking the workshop organizers (n=9) for a useful workshop, to comments on organizations aspects (n=9) such as the duration of the workshop and the facilities, to comments on the content such as wanting to see more practical exercises and/or case studies (n=4), more time for discussions (n=1) and more in-depth training on HIA, QRA, EBoD (n=1), and on wanting to see more opportunities for networking and exchanging experience (n=4) or more similar events (n=2).

Based on the results of the international training week, the materials used were revised and a training package for environment and health experts was developed on Module 3 (A – health in EIA, B – health in SEA, C1 – contaminated sites, C2 – QRA, C3 – EBoD) and Module 4 – training for trainers, (WHO Regional Office for Europe, 2013f). Additionally, two follow-up workshops were held, one in Estonia (Gibson, Nowacki & Cave, 2013b) and one in Slovenia (Gibson, Nowacki & Cave, 2013a). The training week with its revised training package as well as the two workshops were the basis for the development of two conceptual documents: a framework for using impact assessment in environment and health (WHO Regional Office for Europe, 2013h), and a concept for continuous training in environment and health (WHO Regional Office for Europe, 2013g), both developed by the author of this publication. As these documents and activities also resulted from the evaluation of the international training week and are relevant for this research, they will be summarized in the following subchapters.

6.3 Design and results of the follow-up workshops in Estonia and Slovenia

Participants from Estonia and Slovenia at the training week in Riga were interested in further capacity building activities to develop in-country capacities in environment and health. Based on the evaluation of the international training week, two separate in-country workshops were developed for more in-depth review of the countries' experiences in HIA, and the integration of health in EIA and SEA. The two workshops were held in Tallinn, Estonia, 14-15 June 2012 and in Ljubljana, Slovenia, 18-19 June 2012 (Gibson, Nowacki & Cave, 2013a,b).

Again a special focus was laid on mixed participation from the health and environmental sectors. The workshops were designed through technical input on HIA, EIA and SEA from the

workshop facilitators, using HIA, EIA and SEA case studies from the countries, on data collection and availability of data in the countries, and through facilitated discussions on the options and obstacles for the further inclusion of health in environmental assessments. Outputs of the two day workshops were two country specific reports presenting a gap analysis and a way forward to strengthen health in environmental assessments in Estonia and Slovenia (Gibson, Nowacki & Cave, 2013a,b).

6.3.1 Results from the country workshop on strengthening health in environmental assessments in Estonia

Two major fires in refuse-derived fuel (RDF) warehouses in Kunda City in the north of Estonia in June and August 2008 acted as a catalyst for the Estonian Health Board to jointly organize with WHO a workshop on country specific opportunities for HIA implementation and further health assessment within environmental assessments. A total of 21 experts from Ministry of Environment and the Ministry of Social Affairs as well as subordinated institutions like the Health Board and its regional services, the Environment Inspectorate, the Estonian Rescue Services, University representatives, and national consultancies attended the workshop. While the facilitators presented the background and technical input for HIA, EIA and EBoD and facilitated the group discussions, several participants presented case studies and existing data sources in Estonia for impact assessments. Discussions during the workshop were frank and open, revealing opposite points of view for example, in relation to the problems surrounding the Kunda fires. Following the presentations, the issues raised and discussed were how the quality of the impact assessments could be ensured if the ministry commissions an impact assessment; how impartiality could be ensured and findings challenged, if the ministry conducts the impact assessment; who would accept the findings of the ministry's own impact assessments; and what the mechanism to commission an HIA would be. Furthermore, a lack of expertise in HIA was recognized as well as "a lack of understanding of the interplay between SEA and HIA" (Gibson, Nowacki & Cave, 2013b).

Main areas in need of improvement centred on capacity development for health experts in planning and environmental assessment and for planners and environmental experts in health, licensing of experts for HIA similar to EIA experts licensing, and integration of a health module into the EIA licensing training; the inclusion of health and environmental assessments in higher education such as "curricula for planners, environmental scientists and public health" (ibid.); and the need to develop a pool of national experts as well as participation in international networks.

The final report summarized the workshop findings and identified actions to be taken (ibid.):

1. existing laws need to be reviewed to determine the legal drivers that can be used for HIA implementation or better integration of health assessment in EIA and SEA;
2. responsibilities of the organizations that should oversee the mechanisms for undertaking standalone HIA or health assessments within the environmental assessment need to be identified;
3. quality assurance criteria need to be established, recognizing the Estonian context;
4. a system for licensing experts is needed, and must be maintained "by continuing professional development" (ibid.) and a mentoring programme;

5. a process should be developed for health input in environmental assessment and/or standalone HIA, starting at the screening stage through to guideline development;
6. further capacity building needs were identified, for example, in small scale area risk assessment, and to integrate environmental assessment into university curricula as an intersectoral approach that involves among others public health, planning and environmental experts, building up national networks and linkages to international networks;
7. communication at different levels across ministries responsible for internal and external communication should be identified as does guidance on what needs to be communicated, by whom, to whom, when, how, who will receive the responses, and how should they be acted upon;
8. resources – need to clarify who will pay for activities in the different departments dealing with incidents, to, for example "collate the reports, commissioning of analyses, etc." (ibid.) and to allocate resources for commissioning HIA and getting involved into environmental assessments, trainings, guideline development etc.; and
9. joint projects should be undertaken, as they provide an "excellent opportunity to develop capacity in health input to environmental assessment and/or HIA" (ibid.).

6.3.2 Results from the country workshop on strengthening health in environmental assessments in Slovenia

As with the workshop in Estonia, the training week in Riga led to interest from the National Public Health Institute of Slovenia in looking into country specific opportunities for HIA implementation and further health assessment within environmental assessments. A total of 29 experts from Ministry of Agriculture and the Environment, the Ministry of Social Affairs as well as subordinated institutions like the Slovenian Environmental Agency, National and Regional Institutes for Public Health, university representatives, and national environmental consultants attended the two day workshop. While the workshop facilitators presented the background and technical input for HIA, EIA and SEA, and facilitated the group discussions, several participants presented case studies, as well as existing data resources and national legislation on environment and health (Gibson, Nowacki & Cave, 2013a).

Key discussion points and findings from the different case studies and the technical input from the workshop facilitators can be summarized as follows (ibid.):

1. HIA has been already introduced through several pilot projects and capacity building activities but there are no legal obligations to conduct HIA. In addition, HIA is conducted more by consultants than by the public sector authorities, and guidelines and recognized training opportunities are missing. HIA is recognized to support sound decision-making and tackling health inequalities, for example, through considering living conditions.
2. Regarding health in environmental assessments, health is considered in SEA but with a focus on environmental health determinants; no clear responsibilities are identified for the health assessment between the various ministries involved in the SEA; the National Institute for Public Health reviews only the health section of EIA and SEA reports and therefore has a limited picture of the whole EIA/SEA.

The workshop findings and next steps to be taken were summarized around six thematic areas (ibid.):

1. Responsibility: participants suggested that the National Institute for Public Health should oversee the mechanisms when a standalone HIA or health assessment within environmental assessment is required and commission it.
2. Quality assurance: criteria need to be established recognizing the Slovenian context.
3. Develop a process for health input to environmental assessment and/or standalone HIA: starting at the screening stage, and through the development of national guidelines.
4. Licensing experts: as one option, with the need to back up a licensing system "by continuing professional development" (ibid.) and a mentoring programme.
5. Capacity building: further needs were identified like small scale area risk assessment, and the need to integrate environmental assessment into university curricula as an intersectoral approach involving public health, planning and environmental experts; national networks should be built up and linkages to international networks established.
6. Joint projects: providing an "excellent opportunity to develop capacity in health input to environmental assessment and/or HIA" (ibid.).

6.4 Conceptual outcomes of the international training week and the national workshops

Based on the evaluation results of the international training week, presented above (WHO Regional Office for Europe, 2013e), and the discussions at the two national workshops on HIA and health in EIA and SEA in Estonia (Gibson, Nowacki & Cave, 2013b) and Slovenia (Gibson, Nowacki & Cave, 2013a), and the experience from an earlier review of options for HIA implementation in Latvia (Guliš et al., 2012), the author of this publication developed a framework for the use of impact assessment in environment and health (WHO Regional Office for Europe, 2013h) as well a proposal for continuous training in environment and health (WHO Regional Office for Europe, 2013g). The main concepts and ideas will be summarized in the following subchapters.

6.4.1 The framework for using impact assessment in environment and health

The diverse activities of the CBEH project resulted in the identification of common issues that would need to be tackled when countries, regions or any other interested entity wants to increase integration of HIA and health into environmental assessments. The common issues identified were

- legal requirements and responsibilities
- quality assurance
- communication
- guidelines and training.

These common issues were then integrated into the framework consisting of seven steps that should be considered when a country that has not yet established HIA wants to promote HIA and health in environmental assessments at the national level. At each step a number of items and questions should be considered in order to move to the next step. This process is summarized in Box 24. The full framework, depicted in a flowchart, can be found in the respective publication of WHO Regional Office for Europe (2013d).

Box 24. Steps to establish HIA and health in environmental assessments in countries

1) Identification and review of legal and policy frameworks on environmental assessment and HIA:
   a) whether there is legal provision for environmental assessments and if it provides for health inclusion; and
   b) existing plans and political support to further implement health in EIA or SEA and establish HIA.

2) Convene an expert consultation process on the further integration of health into environmental assessments and HIA implementation at the national and municipal level to:
   a) identify key entry points in existing environmental and public health legislation for HIA and health in environmental assessments; and
   b) analyse current practices and identify gaps in communication, knowledge, data collection etc.

3) Establish a joint working group on HIA and health in environmental assessments to:
   a) define the next steps to be taken
   b) assign responsibilities
   c) set a possible time frame.

4) Develop a communication strategy in order to strengthen political and administrative support within the ministries as well as with the public. This would require:
   a) an internal communication strategy within the process leading ministry/department and between the involved ministries/departments;
   b) communication with the public on the HIA procedures and results and in case of emergencies; and
   c) establishment of links with international networks of impact assessment practitioners.

5) Develop a plan for enhanced integration of health into environmental assessments and standalone HIA implementation at the national and municipal level. This involves:
   a) establishing a national or transboundary HIA support unit;
   b) defining overall responsibilities for HIA implementation at the national and municipal levels;
   c) defining tasks of ministries and clarify how departments will be reimbursed for activities such as commissioning of analyses, etc.;
   d) allocation of financial resources for HIA implementation;
   e) development of national guidance on the stages of HIA including the development of a screening tool;
   f) defining key entry points for health in environmental assessment – see step 2;
   g) development of national guidance on the inclusion of health into environmental assessments including a guide on data available for the assessment and contact persons;
   h) defining how HIA experts can demonstrate competence, for example, through a licensing system;
   i) developing a monitoring and evaluation framework for the execution of HIA, including quality assurance and definition of standards; and
   j) development of a monitoring and evaluation framework on HIA implementation at national and municipality level.

6) Develop a training program for health in environmental assessments and standalone HIA, which would require the following steps:
   a) define the training aims and target group(s);
   b) identify options for continuous training instead of a single event;
   c) identify trainers/institutions capable to deliver training on health in EA and standalone HIA;
   d) identify HIA trainings already available, review its content and applicability to the country;
   f) identify gaps in knowledge and practice that may limit implementation of health in EA and standalone HIA;
   g) identify capacity and capabilities needs to undertake the risk assessment stage of the HIA process;
   h) define learning objective and expected outcome of the training;
   i) define the time frame for the training;
   j) develop the training methods and materials, including real case studies, practical exercises, recommended readings etc.;
   k) identify required resources for the training, person time for preparation, delivery and training evaluation, training venue, materials need etc.;
   l) implement a 'learning by doing' approach to HIA pilots; and
   m) develop quality standards for the training.

Box 24. contd.

7) Monitor and evaluate the national health in environmental assessment and HIA plan two to three years after its implementation, including recommendations for future implementation:
   a) analyse gaps in implementation
   b) analyse political support for health in EA and HIA implementation
   c) define next steps to fill the gaps in implementation.

(Source: adjusted from WHO Regional Office for Europe, 2013h)

6.4.2 A proposal for continuous training in environment and health

Continuous training in environment and health is defined as "an uninterrupted series of trainings to further qualify environmental and health experts and with regular replication to allow access to new students/participants" (WHO Regional Office for Europe, 2013g). The basis for the development of the continuous training concept for environment and health built the definition of health with its broader concept of environmental and social determinants of health and the need for intersectoral approaches to protect and enhance health. Ideally a joint training should be developed for public health experts, environmental experts, planners, and social scientists, to build up a joint understanding of health and how health is influenced from outside the health sector. Impact assessments can be seen as tools which are familiar by now to many public health practitioners in the form of HIA, are widely used in the area of environmental protection as EIA and SEA, and are known to social scientist as SIA. Building a continuous training around HIA and health in environmental assessment would not only allow for the inclusion of basic environment and health knowledge, but also horizontal thematic areas:

- "policy-analysis, relevant for the screening phases of impact assessment;
- quantitative risk assessment, analysis of small area data, and linking environment, health and socioeconomic data when preparing and doing the assessment; and
- risk perception, risk communication and working with stakeholders when preparing the consultation, and stakeholder participation as well as the decision-making" (ibid.).

Such a training could be organized regularly, for example, as yearly 'summer schools', as monthly or quarterly thematic workshops of 2 or 3 days, or as weekly lectures (for example, with up to 40 hours for accreditation purposes), and hence it could address different audiences at different levels, for example at undergraduate or postgraduate university level included in curricula for public health and medical students, as well as for environmental and social scientists, as mandatory training for accreditation purposes of environmental auditors and HIA assessors, as advanced training for environment and health authorities and practitioners.

Importantly, no matter which training option – summer school or weekly seminars – is chosen, crucial questions to consider at the beginning are:

- "Who will be in charge of developing the programme, assure its regular delivery and guarantee the quality of the training?
- Is there funding available? If not, how can funding of the programme be made available and secured?" (ibid.)

Further issues to be considered are listed in the framework under number 6 – 'develop a training program' – see Box 24 above. For the preparation of the parallel workshops of the international training week a template was developed which was then used for the revision

and finalization of the training package (WHO Regional Office for Europe, 2013f). This template was used to exemplify a continuous training course on health in environmental assessments and standalone HIA. Examples were given for the following main categories presented in Box 25, details of the outline can be found in the respective publication (WHO Regional Office for Europe, 2013g).

Box 25. Main categories for the planning of a training course

1. Outline of [course name] and short description of the module(s)
2. Aims – the aims of this module are to…
3. Target audience [prerequisites of participants, number of participants, their expertise, etc.]
4. Learning objectives – by completing the course, participants should be able to…
5. Possible content of the module by slot(s) [including time, content title and name of the trainer]
6. Methods to be used
7. Expected output of the training
8. Recommended readings for participants
9. Recommended case studies (links) for participants
10. Required materials for the training delivery
11. Participant's evaluation – to complete the course, participants will take an exam in…
12. Training evaluation – the training content, teaching methods and trainers will be evaluated through…

(Source: adjusted from WHO Regional Office for Europe, 2013g, Appendix)

6.5 Summarizing the results of the CBEH project activities in relation to health in EIA and SEA

The results from the evaluation of the international training week and the discussions at the national workshops on health in environmental assessments clearly revealed that there is a need in countries for further capacity building. This ranges from specific topics such as risk assessment in small scale areas to the broader frameworks of HIA and the integration of health into environmental assessments. Training needs exist at different levels – from first introductions to the issue, for example at university level, to advanced training for practitioners. Ideally, these trainings should be conducted for environment and health experts together to achieve a better understanding between these expert groups. Furthermore, joint projects and more networking opportunities between different sectors and different countries are important to further develop HIA and health in environmental assessments.

Closely related to the capacity building needs are questions regarding quality assurance, which could be tackled through a licensing system for HIA assessors and the integration of a health module into the mandatory training for environmental auditors, as well as the development of quality criteria for HIA and health in environmental assessments.

In general, there is a need for review of existing legal regulations and the identification of key entry points for either separate HIA implementation or further in-depth health assessments within environmental assessments. In addition to a leading organization or unit that would need to be identified, responsibilities would need to be clearly defined for commissioning and conducting assessments, as well as awareness-raising and capacity-building activities, and internal and external communication.

7 Results III: HIA and health assessment in environmental assessment – results of the online questionnaire

The following chapter will summarise the results of the online questionnaire on HIA implementation and health in environmental assessments conducted by the WHO European Centre for Environment and Health, EUPHA and Bielefeld University. The online questionnaire includes specific questions on the implementation of health within EIA and SEA, thus relating to questions 1 and 2 on how these environmental health aspects are implemented in SEA in the Member States of the WHO European Region, as well as to question 4, on the main barriers and facilitators, and question 5 on capacity building needs. The description of the results considered relevant for the research will mainly focus on the questions that can give further insight into the main tools, methods and institutional and procedural factors that facilitate the integration of a broad range of environmental health factors into environmental assessments.

Results will be presented mainly as percentages calculated using the total number of respondents to the online questionnaire (n=64). Data are based on unpublished data by WHO and all calculations were made by the author; also all figures and tables are generated by the author. The full questionnaire can be found in Annex 14.

7.1 Response rate and general information on the background of respondents

As described in chapter 4.5.2, a total of 225 persons were contacted by email to participate in the questionnaire. Nine respondents could not be reached as their emails were no longer valid and alternative addresses could not be identified. Hence a total of 216 persons could potentially respond to the questionnaire. During the 3½ months the questionnaire was accessible, several reminders were sent to invited HIA experts and WHO European Environment and Health Focal Points.

By 23 November 2016, 58 respondents had completed the questionnaire and an additional seven respondents had completed Part 1 but not officially submitted the questionnaire. Sixteen respondents (7%) had only started the questionnaire with some data on personal experience but then discontinued. These questionnaires were not considered in the data analysis. Out of the 58 completed questionnaires one respondent had to be excluded as the answers were referring to a country outside of the WHO European Region. Hence, a total of 64 questionnaires were considered for the data analysis, representing a response rate of 30% (n=64) of a total of 216 invited experts – see Table 18.

Table 18. Response rate by collector group

Group of invitees (excluding the participants not reached)	Invitees included in the analysis	
	Number of respondents	in %
HIA Experts (n=132)	39	32%
Environment and Health Focal Points(n=86)	22	26%
HIA Pre-Tester (n=7)	3	43%
Total (n=216)	**64**	**30%**

Source: own calculations

Out of the experts from 52 Member States[34] contacted, responses from experts in 28 countries could be gathered, representing a response rate of 54% of the countries. Out of the 64 respondents, nine (14%) referred their answers to a specific subnational region, federal state or province, and three (5%) to a specific municipality in their country. In the following analysis these answers will be consolidated under the respective country: no further analysis on possible differences between respondents referring to a country, a region or a municipality was undertaken as numbers for the categories region or municipality were too low – see Table 19.

Table 19. Number of respondents by country

Country for which respondents considered their answers	Number of respondents
Armenia	1
Austria (1x Styria)	3
Belgium	2
Czech Republic	1
Denmark (1x Municipality of Copenhagen)	5
Estonia	1
France	4
Georgia	1
Germany	1
Greece	1
Hungary	2
Ireland	1
Israel	1
Italy	4
Lithuania	4
Malta	1
Montenegro	1
Netherlands (1x Southern Limburg Province – 18 municipalities)	3
Norway	1
Poland (1x Lodz)	1
Portugal	1
Serbia	1
Slovakia	3
Spain (2x Basque Country)	5
Sweden	2
Switzerland (1x Canton of Geneva)	4
The former Yugoslav Republic of Macedonia	1
United Kingdom (1x England, 1x Northern Ireland, 1x Scotland, 2x Wales)	8
Total number of respondents **Total number of countries**	**64** **28**

Note: In parentheses the number of respondents which refer their answers to a specific subnational region, federal state, province or municipality. All others refer to the whole country [see question 1 of the online questionnaire in Annex 14].

[34] only 52 Member States were contacted as one Member State had not nominated an Environment and Health Focal Point at the time of the online questionnaire.

Table 20 shows that a vast majority of the participants represented EU member countries (71%, n=20 of all countries) and only two participants represented the group of Newly Independent States (NIS) (7%, n=2). For the different country groups please refer to Annex 13.

Table 20. Number of participants and countries by country groups

Country group	Number of countries	Number of participants
EU 15 (EU member countries before 2004)	13	40
EU 13 (EU member countries of 2004, 2007 or 2013)	7	13
EU (potential) candidate country	3	3
European Economic Area (EEA)	2	5
Newly Independent State (NIS)	2	2
Other Member State of the WHO Regional Office for Europe	1	1
Total	**28**	**64**

Note: Total number of member countries: EU (potential) candidate countries total n=6 countries, EEA total n=4 countries, NIS total n=12, Member States in the WHO Regional Office for Europe total n=53.

Forty-one of the 64 respondents had participated in environmental assessments (EA) during their careers, comprising 64% and 19% of all invitees (n=216). The majority of respondents were women (n=43 respondents, 67%) with a majority coming from a professional background in public health (PH), medicine or epidemiology (n=24 of all women, and n=11 of all 20 participating men). A total of 13 respondents (20%) claimed a professional background in environmental sciences, environmental health or environmental engineering, with a slightly higher per cent (28%, n=11) among those respondents involved in environmental assessments (n=41).

7.2 Overview of the respondents' professional experience with HIA, and with health assessment within environmental assessment

The total number of HIA proposals each respondent had conducted or been involved in ranged from 0–200, with a majority of respondents declaring intermediate (between 5 and 20 HIAs by n=26 respondents, 40%) to low experience (less than 5 HIAs of n=21 respondents, 33%). One respondent each from Armenia, the Czech Republic, Lithuania, Poland, Sweden, and Switzerland, and four respondents from the United Kingdom declared a higher involvement in HIAs with 20 or more HIAs. Respondents with the most experience were those from the United Kingdom with a total number of 500 proposals among all eight respondents, with two respondents from Wales having been involved in 150 and 200 HIAs respectively – see Table 21.

Table 21. Involvement of respondents in HIA, by country

Country of respondent	Number of respondents	Earliest start year with HIA	Most recent start year with HIA	Total of HIAs involved
Armenia	1	1997	1997	20
Austria	3	2004	2013	6
Belgium	2	2004	2008	7
Czech Republic	1	2005	2005	25
Denmark	5	1991	2010	20
Estonia**	1			
France*	4	1995	2015	25
Georgia**	1			
Germany	1	2001	2001	15
Greece	1	2004	2004	10

Table 21. contd.

Country of respondent	Number of respondents	Earliest start year with HIA	Most recent start year with HIA	Total of HIAs involved
Hungary	2	2001	2003	15
Ireland	1	2004	2004	10
Israel	1	2006	2006	5
Italy	4	1990	2010	27
Lithuania**	4	2005	2005	37
Malta**	1	2008	2008	
Montenegro	1	2015	2015	2
Netherlands	3	1993	2007	29
Norway	1	2012	2012	2
Poland	1	1977	1977	30
Portugal	1	2012	2012	3
Serbia**	1			
Slovakia	3	2004	2007	13
Spain	5	2005	2013	26
Sweden	2	2002	2002	50
Switzerland	4	2001	2010	41
The former Yugoslav Republic of Macedonia	1	1990	1990	10
United Kingdom	8	1984	2008	500
Total **Extreme values**	**52**	**1977**	**2015**	**928**

Notes: Earliest start year and most recent start year with HIA mentioned in the respondents' HIA involvement, and number of total HIAs conducted by respondents (n=64). No data available for Estonia, Georgia and Serbia [see question 3a & 3b]. * The respondent of this country had been involved in "0" HIAs. ** the one respondent of this country did not mention any number of HIAs .

The vast majority of respondents (n=43, 67%) started with their involvement in HIA in the year 2000 or later – see Table 22.

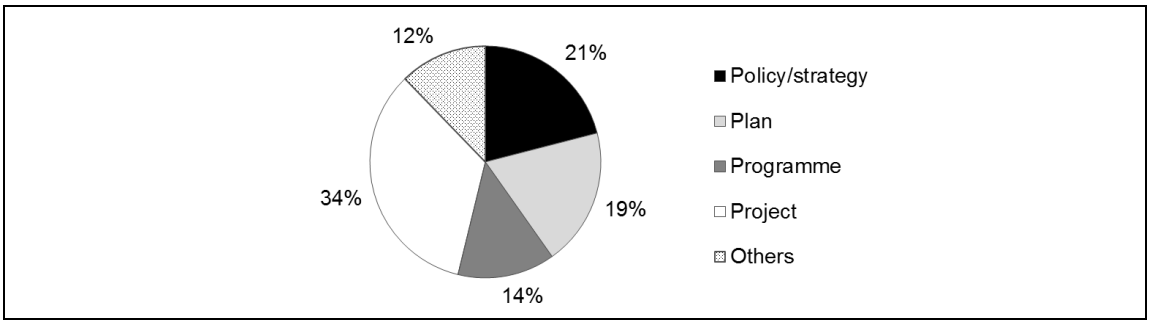
Table 22. Years respondents started their involvement in HIA

Start year with HIA	Number of respondents	In percent
before 1979	1	2%
between 1980 and 1984	1	2%
between 1985 and 1989	0	0%
between 1990 and 1994	4	6%
between 1995 and 1999	9	14%
between 2000 and 2004	13	20%
between 2005 and 2009	17	27%
between 2010 and 2015	13	20%
no data available	6	9%
Total	**64**	**100%**

Note: By number and per cent of total respondents (n=64) in 5-year clusters [see question 3a].

A total of 53 respondents (83%) indicated not only the number of HIAs they had conducted but also the types: 34% were conducted at the project level, followed by 21% at the policy/strategy level and 19% at a planning level – see Fig. 33. The category of "others" include mainly research activities tackling different topics such as environmental risk and exposure assessment, development of methodologies and tools for the appraisal stage within the HIA process, and/or education and capacity building actions for local or regional public health authorities.

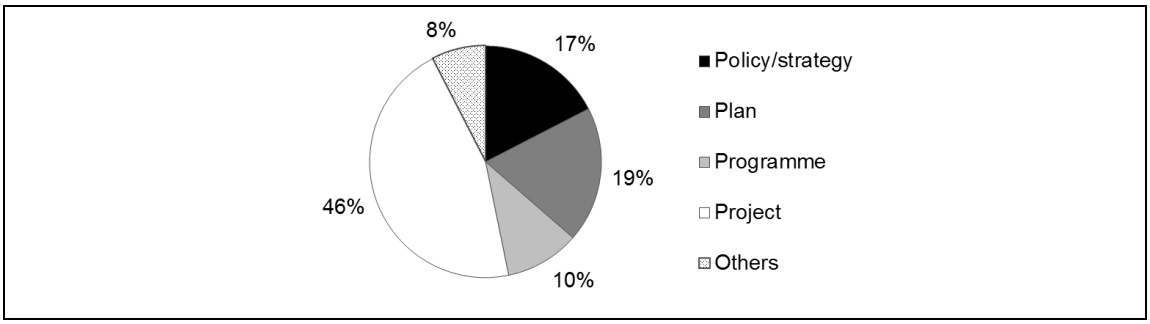
Fig. 33. Main proposal types of HIAs involved in



Note: Proposal types of HIAs as a percentage weighted by total number of HIAs (n=928) conducted per respondent answering the question, total number respondents for this question n=53 [see question 3c].

The 39 respondents (61% of respondents) with experience in environmental assessments also indicated that their involvement in environmental assessments was mainly at the project level (46%), followed by plan development (19%) and at the policy/strategy development level (17%) – see Fig. 34.

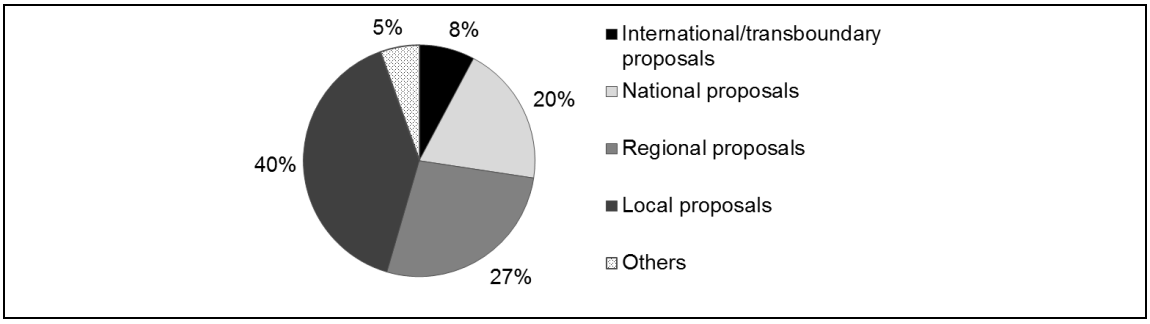
Fig. 34. Main proposal types of environmental assessments involved in



Note: Involvement of respondents (n=39) in environmental assessments by proposal types as percentage [see question 14].

The biggest proportion of HIAs were conducted at local level (40%), followed by regional proposals (27%), national (20%), international (8%) and others (5%) – see Fig. 35.

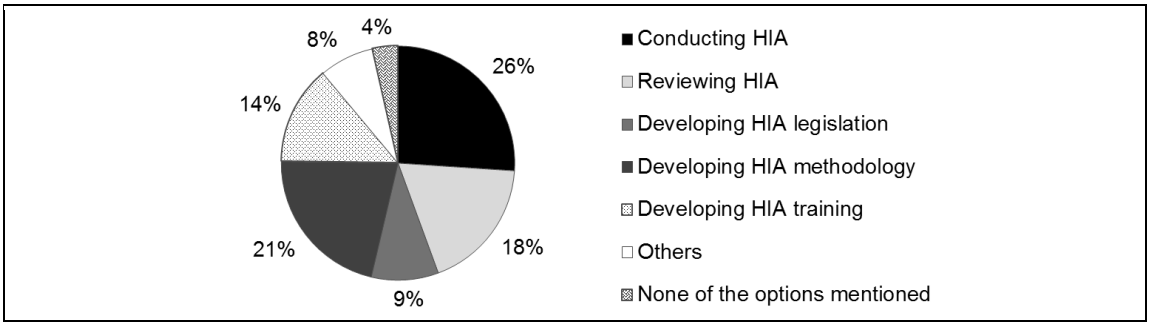
Fig. 35. Levels of HIAs conducted



Note: Level of HIAs conducted as percentage weighted by total number of HIAs (n=928) conducted per respondent answering the question, total number respondents for this question n=53 [see question 3e].

When asked about their role within the HIA case studies, on average respondents spent 26% of their time conducting HIA as such, followed by developing HIA methodology (21%), reviewing HIA (18%), developing training sessions (14%), legislation (9%), and other activities (8%) such as development of guidelines and stakeholder engagement – see Fig. 36.

Fig. 36. Main role of respondents in HIA



Note: Total number respondents for this question n=59 [see question 3d].

7.3 HIA institutionalization

As with the years respondents had first been involved in HIA, the start of HIA implementation across the countries of the WHO European Region varies widely, with an early start in England, United Kingdom, around 1980 and the latest starting year reported, 2011, in Styria, Austria, and in the Basque Country, Spain – see Table 23.

Table 23. Earliest and most recent starting years of HIA in countries

Country	Number of respondents	Earliest year of HIA introduction in the country	Latest year of HIA introduction in the country
Austria	3	2005	2011
Czech Republic	1	2006	2006
Denmark	5	1995	2005
France	4	1996	2009
Germany	1	1990	1990
Greece	1	2008	2008
Hungary	2	1990	1995
Ireland	1	2001	2001
Israel	1	2006	2006
Italy	4	2000	2004
Lithuania	4	2004	2004
Montenegro	1	2008	2008
Netherlands	3	1991	2007
Poland	1	2003	2003
Portugal	1	2000	2000
Slovakia	3	2007	2008
Spain	5	2002	2011
Switzerland	4	1996	2006
The former Yugoslav Republic of Macedonia	1	1990	1990
United Kingdom	8	1980	2004
Total number of respondents **Extreme values**	**64**	**1980**	**2011**

Note: 51 respondents (80%) from 20 countries answered the question; no data available from Armenia, Belgium, Estonia, Georgia, Malta, Norway, Serbia and Sweden [see question 4].

In 42% of the countries (n=12) some kind of HIA institutionalization has been taking place since 2000 and in seven countries (25%) since the 1990s– see Table 24.

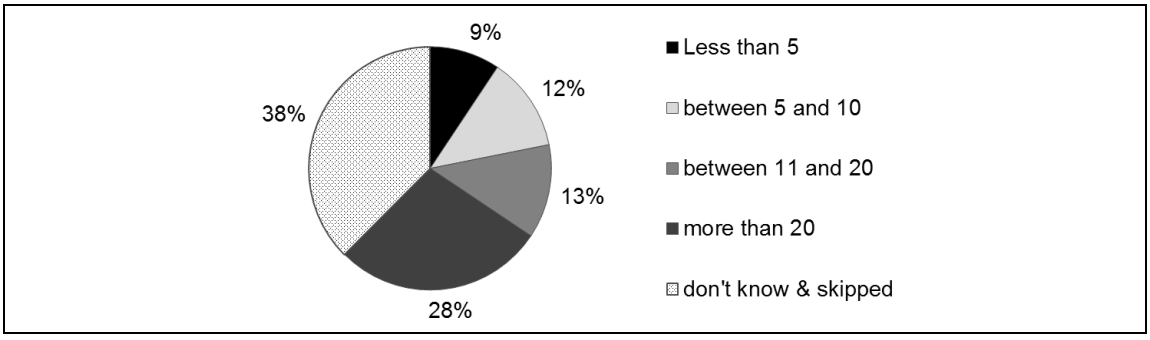
Table 24. Earliest start year of HIA institutionalization in countries

Earliest start year of HIA	Number of countries	Percentage of countries
between 1980 and 1984	1	4%
between 1985 and 1989	0	0%
between 1990 and 1994	4	14%
between 1995 and 1999	3	11%
between 2000 and 2004	6	21%
between 2005 and 2009	6	21%
between 2010 and 2015	0	0%
no data available	8	29%
Total	**28**	**100%**

Note: By number and as percentage of total respondents (n=64) in clusters of 5 years. No data available from Armenia, Belgium, Estonia, Georgia, Malta, Norway, Serbia and Sweden [see question 4].

A relatively high HIA experience in their country declared 28% of the respondents (n=18), with more than 20 HIA activities having taken place or taking place, most notably in Denmark, Lithuania, and the United Kingdom – see Fig. 37. But an even higher per cent, 38%, could not give an estimate, answering "don't know" or skipping the question. The rest of the respondents reported according to their knowledge between 11 and 20 cases (13%), or less than 10 cases (21%) – see Fig. 37.

Fig. 37. Range of HIA experience according to respondents in their countries



Note: HIA experiences in countries ranging from less than 5 to more than 20 HIA activities as percentage of respondents (n=64) [see question 4b].

While 20% of the respondents (n=13) did not know if HIAs are currently conducted in their country, a vast majority of 66% indicated that they are. Nevertheless, this information is contradictory when more than one respondent for the same country is reporting, for example, respondents from Italy and Spain differ in their assessment of the current situation in their country – see Table 25.

Table 25. Are HIAs currently conducted in your country?

Country (total number of respondents)	Yes	No	Don't know
Armenia (1)	1		
Austria (3)	3		
Belgium (2)	2		
Czech Republic (1)	1		
Denmark (5)	5		
Estonia (1)			1
France (4)	4		
Georgia (1)		1	

Table 25. contd.

Country (total number of respondents)	Yes	No	Don't know
Germany (1)			1
Greece (1)			1
Hungary (2)	1		1
Ireland (1)	1		
Israel (1)		1	
Italy (4)	1	3	
Lithuania (4)	3		1
Malta (1)	1		
Montenegro (1)	1		
Netherlands (3)	2		1
Norway (1)			1
Poland (1)	1		
Portugal (1)	1		
Serbia (1)		1	
Slovakia (3)	1		2
Spain (5)	1	2	2
Sweden (2)	1		1
Switzerland (4)	3		1
The former Yugoslav Republic of Macedonia (1)	1		
United Kingdom (8)	7	1	
Total number of respondents **Total number of countries**	**42** **21**	**9** **6**	**13** **11**

Note: Total number of respondents (n=64), total number of countries (n=28) with multiple respondents for some countries [see question 4c].

The differences in the United Kingdom can be accounted for due to the countries the respondents are referring too, i.e. for England, Scotland and Wales respondents agree that HIAs are currently conducted, while in Northern Ireland not.

In regard to institutionalization of HIA in countries, respondents draw a similar picture, with 62% indicating that some kind of HIA institutionalization is taking place and only 8% being unable to answer the question. Again respondents have different perceptions in regard to the situation in their country – see Table 26.

Table 26. Institutionalization of HIA in countries

Country (total number of respondents)	Yes	No	Don't know
Armenia (1)	1		
Austria (3)	2	1	
Belgium (2)	2		
Czech Republic (1)	1		
Denmark (5)	2	1	2
Estonia (1)			1
France (4)	1	3	
Georgia (1)		1	
Germany (1)	1		
Greece (1)	1		
Hungary (2)	2		

Table 26. contd.

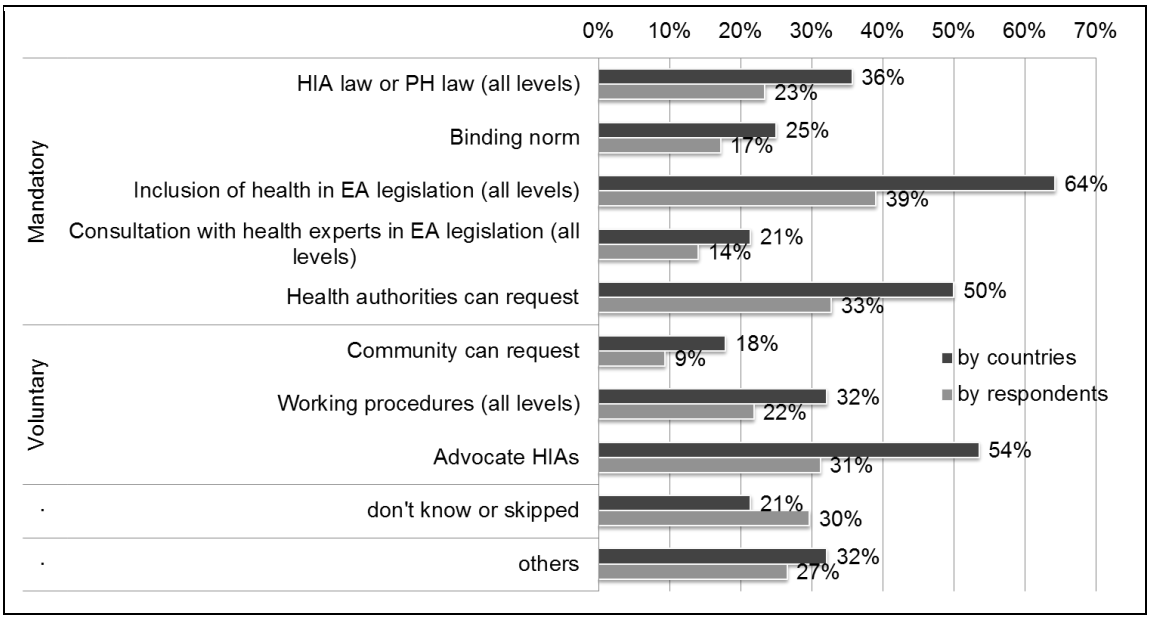
Country (total number of respondents)	Yes	No	Don't know
Ireland (1)		1	
Israel (1)		1	
Italy (4)	1	3	
Lithuania (4)	3		1
Malta (1)		1	
Montenegro (1)	1		
Netherlands (3)	2	1	
Norway (1)	1		
Poland (1)	1		
Portugal (1)	1		
Serbia (1)		1	
Slovakia (3)	3		
Spain (5)	4	1	
Sweden (2)	1	1	
Switzerland (4)	3		1
The former Yugoslav Republic of Macedonia (1)	1		
United Kingdom (8)	5	3	
Total number of respondents **Total number of countries**	**40** **22**	**19** **13**	**5** **4**

Note: Total number of respondents (n=64) from n=28 countries [see question 5].

According to 25 respondents (39%), the institutionalization of HIA is formalized in 17 countries (64%) mainly through the inclusion of HIA or health assessment in environmental assessment legislation and through the possibilities for health authorities to request an HIA, if they expect significant health effects on the population (33% of the respondents in 50% of the countries). Among the voluntary mechanisms the advocated HIAs are more prominent (33%), which means they take place outside the formal decision-making process, for example, by universities or community-based organizations, which have no authority over the decision-making process but a specific interest in the proposal – see Fig. 38.

Only 5% of the respondents from 3 countries (11%) indicated that in their country a specific national law on HIA exists, while 19% from 7 countries (25%) indicated that in their countries HIA is required through a public health act, law or regulation, and another 17% of the respondents (n=11) from 7 countries (25%) specified that subnational or locally binding norms exist that require HIAs.

Fig. 38. Instruments for the formalization of HIA in countries



Notes: Percentage of countries (n=28) with HIA institutionalization mechanisms and % of respondents (n=64) referring to these mechanisms with multiple answers where possible and multiple respondents for some countries [see question 5a]. *EA – environmental assessment; **PH – public health

While according to 25 respondents (39%) HIA is either required under national environmental laws as with EIA and/or SEA, or the assessment of health impacts is mandatory under the national environmental laws of 17 of the countries (64%), consultation with health experts on possible health impacts in EIA or SEAs is only mandatory in 5 of the countries on EIA (18%) according to 8 respondents (13%) and in 6 of the countries in SEAs (21%) according to 9 respondents (14%). Importantly, as respondents could give multiple answers to the question, they revealed that in many countries several legal instruments or voluntary mechanisms coexist and are operating simultaneously at different levels or even at the same level. For details see Table 27 for mandatory instruments and Table 28 below for voluntary instruments.

Table 27. Mandatory instruments supporting HIA implementation in countries

Country (Number of respondents of the country)	Specific national law on HIA.	HIA is required through our Public Health act/law/regulation.	All major national policies are subject to HIA.	Subnational or local binding norms require HIA, for example, public health act, local planning directives.	HIA is required in the national environmental laws	Assessing health impacts is mandatory in national environmental laws	Consultation with health experts is mandatory in our EIA legislation.	Consultation with health experts on is mandatory in our SEA legislation.	Health authorities can request HIA when they expect significant health effects .
Armenia (1)							1	1	
Austria (3)				1			1	1	
Belgium (2)		1			1				
Czech Republic (1)				1					1
Denmark (5)						1			
France (4)		1			1				1
Germany (1)				1		1			
Hungary (2)	1		1		1	1			1
Italy (4)						1			1
Lithuania (4)	1	4	1		1	4	4	4	3

Table 27. contd.

Country (Number of respondents of the country)	Specific national law on HIA.	HIA is required through our Public Health act/law/regulation.	All major national policies are subject to HIA.	Subnational or local binding norms require HIA, for example, public health act, local planning directives.	HIA is required in the national environmental laws	Assessing health impacts is mandatory in national environmental laws	Consultation with health experts is mandatory in our EIA legislation.	Consultation with health experts on is mandatory in our SEA legislation.	Health authorities can request HIA when they expect significant health effects .
Malta (1)						1			1
Montenegro (1)			1		1	1			
Netherlands (3)				1		1			1
Norway (1)		1			1	1			
Poland (1)					1				
Portugal (1)*									1
Slovakia (3)	1	3			1	1			2
Spain (5)		1		1	2		1	1	1
Sweden (2)						1			
Switzerland (4)		1		2	1	1			2
The former Yugoslav Republic of Macedonia (1)					1		1	1	1
United Kingdom (8)			1	4	3	2		1	4
Total respondents	**3**	**12**	**4**	**11**	**15**	**17**	**8**	**9**	**21**
Total countries	**3**	**7**	**4**	**7**	**12**	**13**	**8**	**6**	**14**

Note: In total 47 respondents (73%) answered the question representing n=22 countries (82%). Multiple answers were possible and there were multiple responses for some countries. No data is available for Estonia, Georgia, Ireland, Israel, and Serbia. *For Portugal no mandatory instruments are in place – only voluntary ones [see question 5a].

Most mandatory instruments are in place in Lithuania, followed by Spain and the United Kingdom. Some respondents further commented that, although there are legal requirements either through a public health act or environmental legislation, the responsibilities and methodology are not well defined, and therefore, real implementation is not taking place.

Table 28. Voluntary instruments supporting HIA implementation in countries

Country (Number of respondents of the country)	Residents can request HIA when they expect significant effects on their health.	HIA is a working procedure of the departments within the Ministry of Health.	HIA is a working procedure of the regional health department.	HIA is a working procedure of the local health department.	HIAs are undertaken outside the formal-decision making process.
Armenia (1)*					
Austria (3)			1		2
Belgium (2)					1
Czech Republic (1)			1		
Denmark (5)					1
France (4)	1		1	1	1
Germany (1)					1
Greece (1)					1
Hungary (2)					1
Italy (4)	1		1	1	1
Lithuania (4)	1	3	3	1	
Malta (1)*					

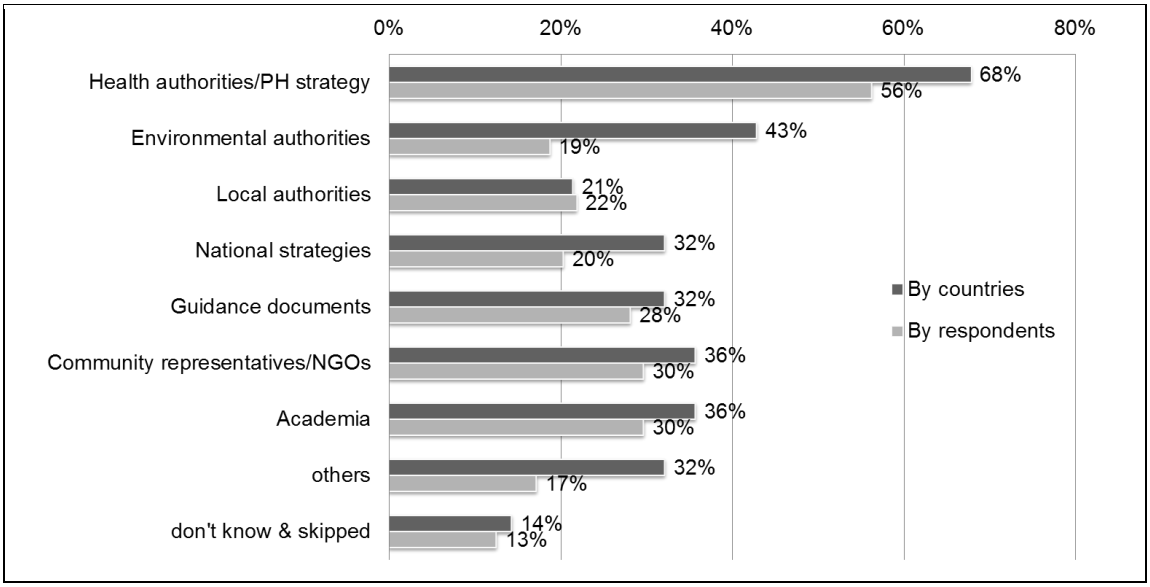
Table 28. contd.

Country (Number of respondents of the country)	Residents can request HIA when they expect significant effects on their health.	HIA is a working procedure of the departments within the Ministry of Health.	HIA is a working procedure of the regional health department.	HIA is a working procedure of the local health department.	HIAs are undertaken outside the formal-decision making process.
Netherlands (3)					1
Norway (1)					
Poland (1)					1
Portugal (1)					1
Slovakia (3)					1
Spain (5)	1		1		2
Sweden (2)*					
Switzerland (4)				1	2
The former Yugoslav Republic of Macedonia (1)		1			
United Kingdom (8)	2	1	2	1	3
Total respondents	**6**	**5**	**10**	**5**	**20**
Total countries	**5**	**3**	**7**	**5**	**15**

Note: In total 47 respondents (73%) answered to the question representing n=23 countries (82%). Multiple answers were possible, with multiple responses for some countries. No data is available for Estonia, Georgia, Ireland, Israel and Serbia. * In Armenia, Malta and Sweden only mandatory mechanisms are in place [see question 5a].

According to 56% of the respondents (n=36) in the vast majority of the countries (68%, n=19) HIA is recommended to be conducted either by the health authorities or is included in an official public health strategy. It also is recommended in 43% of the countries (n=12) but only according to 12 respondents (19%). Furthermore, academic institutes, as well as community representatives/stakeholders or NGOs (both 30% of respondents, n=19, from 36% of countries, n=10), recommend conducting HIA. According to 28% of respondents (n=18) from 36% of countries (n=10) HIA is also recommended in various guidance documents – see Fig. 39.

Fig. 39. Sources of recommendation to conduct HIAs



Note: As percentage of respondents (n=64) and of countries (n=28). Multiple answers were possible and multiple respondents for some countries. No data available for Estonia and Portugal [see question 5b]. *PH – public health

According to 58% of respondents (n=37) some kind of resources and activities are offered that support the implementation of HIA in the majority of countries (75% of countries, n=21). Most of these activities are ad hoc activities like the development of specific guidelines (47% of respondents, n=30; from 57% of countries, n=16) and HIA tools (44% of respondents, n=28; from 46% of countries, n=13), as well as capacity building activities for public health authorities (42% of respondents, n=27; from 50% of countries, n=14), health experts (36% of respondents, n=23), researchers (44% of respondents, n=21), and environmental assessors (28% of respondents, n=18) all from 43% countries (n=12) – see Table 29.

Only in a few countries are there also regular capacity building activities for public health authorities, health experts as well as for environmental assessors, with the majority of these activities taking place in Lithuania and the United Kingdom.

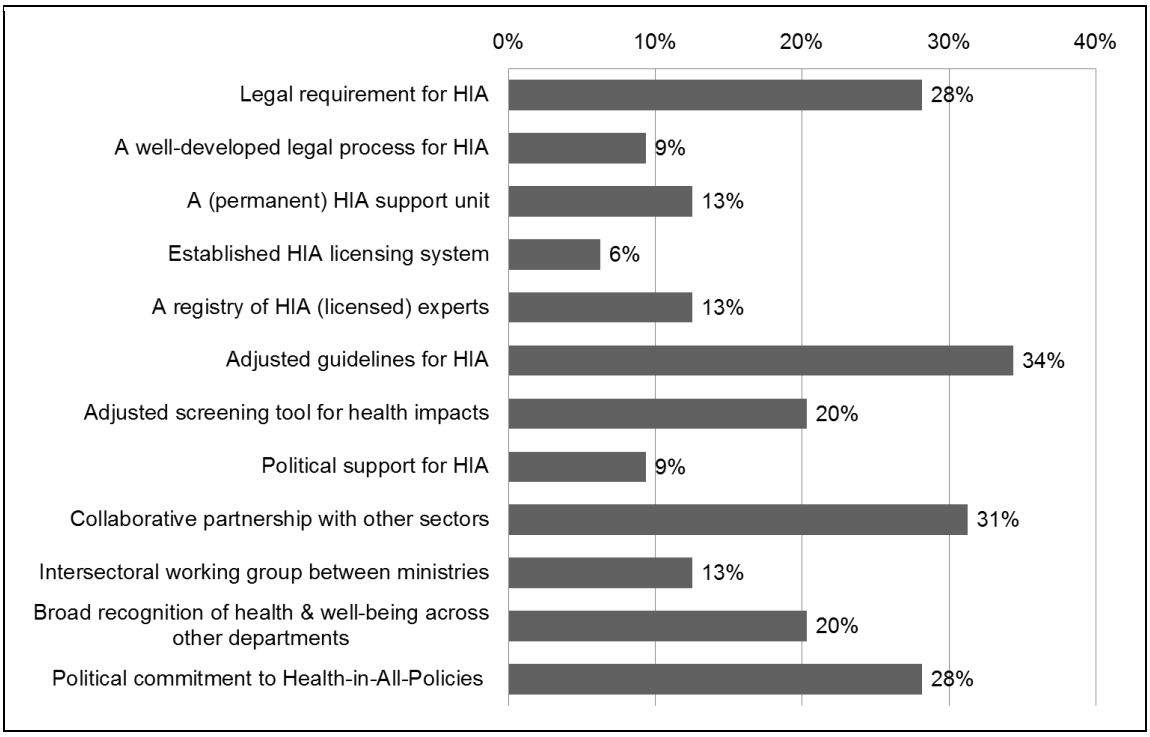
Table 29. Resources and activities supporting the implementation of HIA

Frequency / Category	by country/ by respondents	regularly	ad hoc	N/A	don't know or skipped*
HIA training for public health authorities	by country	3	14	5	6
	by respondents	8	27	7	22
HIA training for health experts	by country	6	12	3	6
	by respondents	11	23	4	26
HIA training for environmental assessors	by country	2	12	7	6
	by respondents	3	18	10	33
HIA training for researchers	by country	1	12	9	6
	by respondents	1	21	11	31
Development of specific HIA guidelines	by country	5	16	7	6
	by respondents	7	30	7	20
Development of specific HIA tools	by country	6	13	6	6
	by respondents	8	28	7	21

Note: By number of respondents (n=64) from a total of n=22 countries as n=15 respondents (23%) completely skipped this question and one respondent indicated "Don't know" for all items. No data available for Estonia, Georgia, Montenegro, Poland, Portugal and Serbia [see question 7a].

Other activities or elements reported by the respondents supporting HIA implementation were adjusted guidelines for HIA (34% of respondents, n=22), followed, among others, by collaborative partnership with other sectors (31% of respondents, n=20), the availability of legal requirements for HIA (28% of respondents, n=18), the political commitment by national, regional or local authorities to the strategy of HiAP (28% of respondents, n=18), the broad recognition of health and well-being across other departments (20% of respondents, n=13), and adjusted screening tools for health impacts (20% of respondents, n=13) – see Fig. 40.

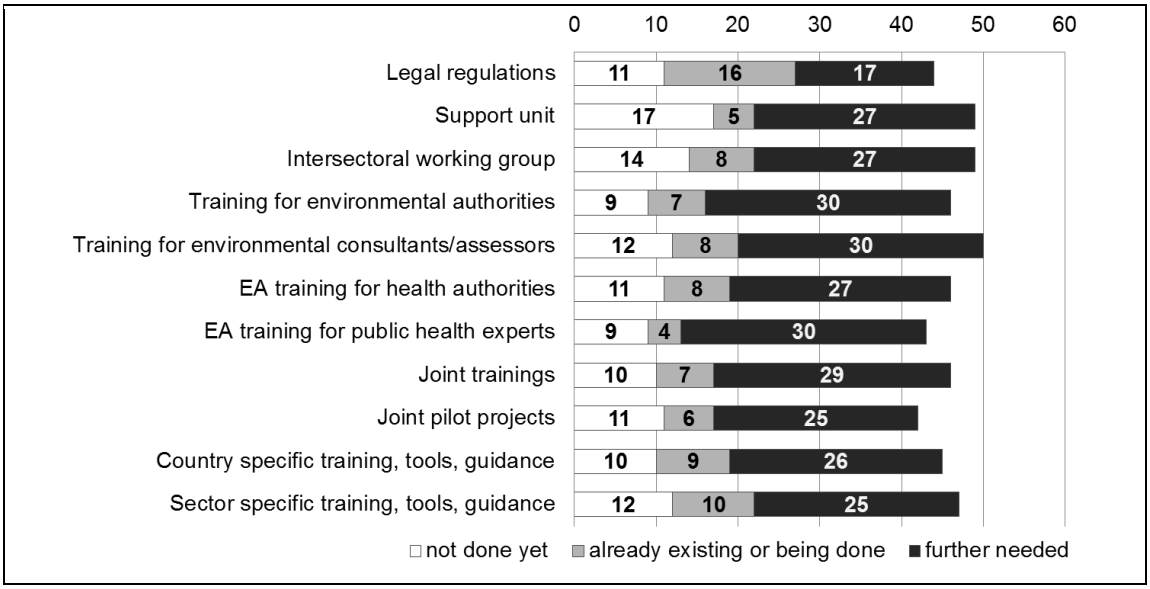
Fig. 40. Other kinds of support for the implementation of HIA existing in the countries



Note: By percentage of respondents (n=64). Multiple answers were possible [see question 7b].

In regard to activities or tools that are either already in place or are needed to support the integration of health in EIA or SEA, most respondents agreed that further support for the integration of health in environmental assessments is needed in their countries and only a few activities or tools exist. The items most often mentioned as needed were further training on health for environmental authorities and consultants/assessors (47% of respondents, n=30), environmental assessment training for public health experts (47% of respondents, n=30), and joint trainings (45% of respondents, n=29) – see Fig. 41.

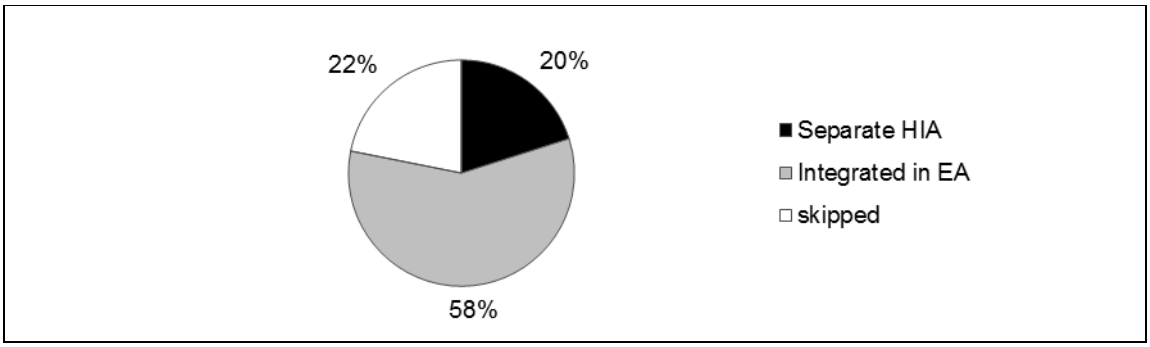
Fig. 41. Existing support and further needs for the integration of health in environmental assessments



Note: By number of respondents with multiple answers possible. A total of n=8 respondents skipped the question and another n=7 answered "Don't know" for all items. These numbers and all additional "Don't know" answers are not shown in the figure. Percentages in the text relate to the total of all respondents (n=64) of the questionnaire [see question 20]. *EA – environmental assessment

According to the respondents, overall 58% of the health assessments are included in environmental assessment: only in 20% they are done as separate HIAs – see Fig. 42.

Fig. 42. Is the health assessment within environmental assessments done as a separate HIA or integrated in the environmental assessment?



Note: All figures as percentage of total respondents n=64. Calculation done on the basis of the percentage of respondents indicated per category. A total of n=14 respondents skipped the question completely [see question 17]. *EA – environmental assessment

Furthermore, 27% of the respondents (n=17) indicated that there are projects or HIA-like work conducted in 36% of the countries (n=10) which are not officially labelled as HIA [see question 23]. In general, over 50% of the respondents (n=36) were convinced that there is a further need for HIA implementation in 71% of the countries (n=20) [see question 24]. Another 42% of respondents (n=27) from 71% of the countries (n=20) also indicated that there is a further need to strengthen the health assessment within the environmental assessments [see question 29]. These questions were included in the voluntary Part II of the questionnaire, which was answered by 63% of respondents (n=40).

7.4 Facilitators and barriers for HIA and health assessment in environmental assessment

Asked for factors that would support the further implementation of HIA, those most often mentioned were capacity building (by 30% of respondents, n=19), followed by political and/or organizational support (by 27% of respondents, n=17) to legal instruments and legislation (by 20% of respondents, n=13) – see Table 30 for the main categories.

Table 30. Factors facilitating further HIA implementation

Main categories of facilitating factors mentioned by the respondents	Number of times mentioned	In per cent of total respondents (n=64)	In per cent of respondents proceeding with Part II (n=40)
Capacity building	19	30%	48%
Support (political or organizational)	17	27%	43%
Legislation	13	20%	33%
Sufficient resources	11	17%	28%
Guidelines	8	13%	20%
Increased knowledge	8	13%	20%

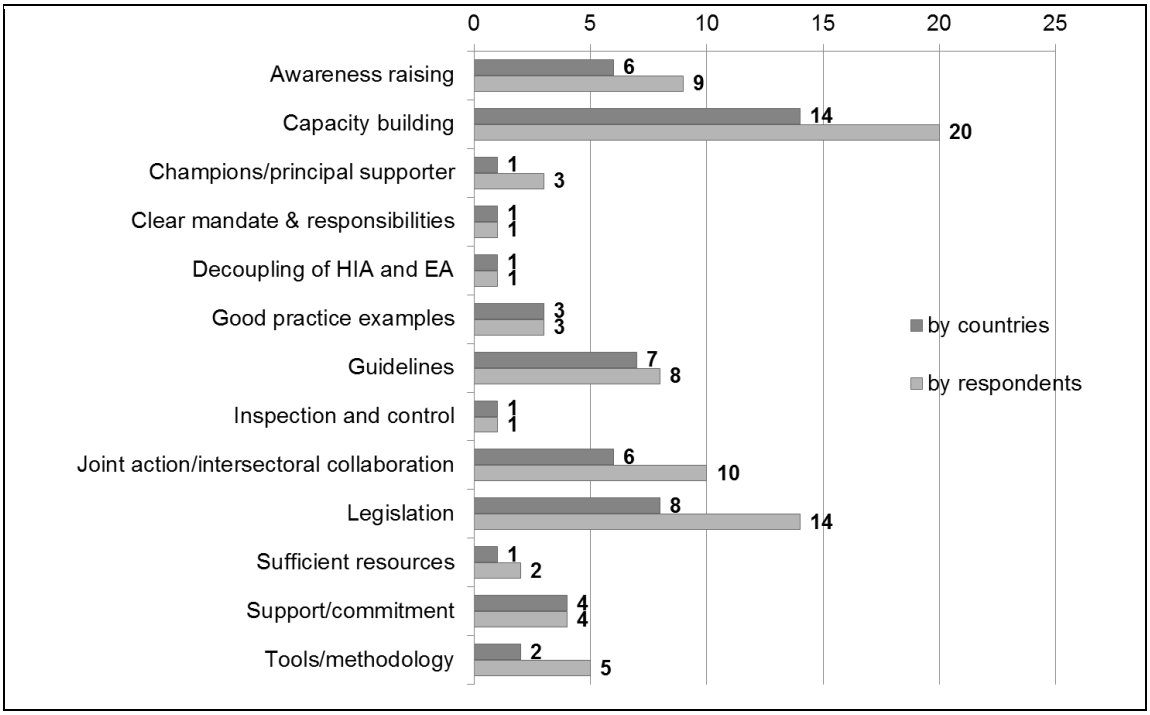
Table 30. contd.

Main categories of facilitating factors mentioned by the respondents	Number of times mentioned	In per cent of total respondents (n=64)	In per cent of respondents proceeding with Part II (n=40)
Tools	8	13%	20%
Networking & knowledge exchange	5	8%	13%
Champions/principal supporter	4	6%	10%
Pilot projects	4	6%	10%
Awareness raising	3	5%	8%
Recognition of the added value of HIA	3	5%	8%
Integration	2	3%	5%
Joint action/intersectoral working	2	3%	5%
Certification of HIA practitioners	1	2%	3%
Decoupling of HIA and EIA as long as EIA is limited to checking legal limit values.	1	2%	3%
Managerial accountability	1	2%	3%
Recognition of HIA	1	2%	3%

Note: A total of n=40 respondents (63% out of all respondents, n=64) from n=22 countries (79%) were interested in proceeding with the voluntary Part II of the questionnaire; therefore both percentages are shown in the table. Respondents could name up to three facilitating factors [see question 24a].

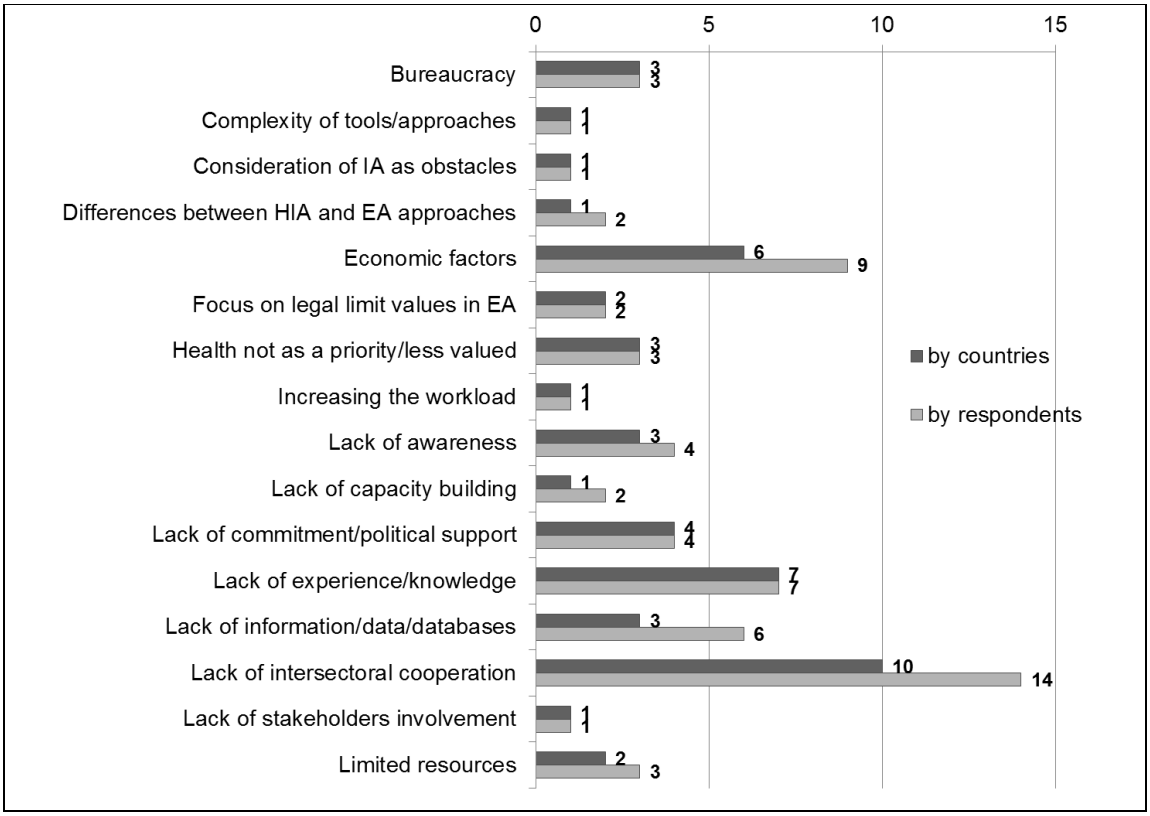
These facilitating factors were also listed for advanced integration of health in environmental assessments with capacity building mentioned by 31% of respondents (n=20) from 50% of countries (n=14), followed by legislation (22% of the respondents, n=14, from 29% of the countries, n=8), and joint action/intersectoral collaboration (16% of the respondents, n=10, from 21% of the countries, n=6) – see Fig. 43 for the main categories.

Fig. 43. Facilitating factors for further integration of health in environmental assessments



Note: A total of n=40 respondents (63% out of all respondents, n=64) from n=22 countries (79%) were interested in proceeding with the voluntary Part II of the questionnaire. Respondents could name up to three facilitating factors [see question 29]. *EA – environmental assessment

Fig. 44. Main barriers for further integration of health in environmental assessments



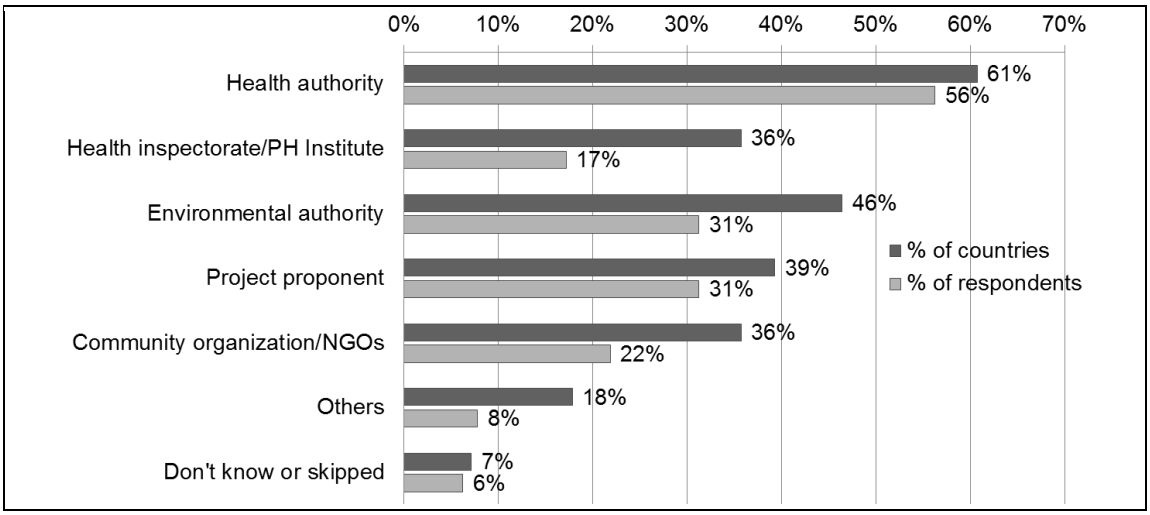
Note: A total of n=40 respondents (63% of respondents, n=64) from n=22 countries (79%) answered the voluntary Part II of the questionnaire. Respondents could name up to three factors preventing further integration of health in environmental assessments [see question 30]. *EA – environmental assessment; **IA – impact assessment

Among the barriers for further integration of health in environmental assessments, the lack of intersectoral cooperation ranked highest, being mentioned by 22% of the respondents (n=14, from 36% of the countries, n=10), followed by economic factors such as priorities given to economic benefits, or costs of the assessment (14% of respondents, n=9, from 21% of the countries, n=6), and a lack of experience and/or knowledge (11% of respondents, n=7, from 25% of the countries, n=7) – see Fig. 44 above for the main categories.

7.5 Main actors in HIA and health assessment within environmental assessments

The main institutions commissioning HIAs in countries across the WHO European Region, are, according to 56% of the respondents (n=36), health authorities at different levels (national, regional and local) followed by environmental authorities at national, regional and local levels, and the project proponent (both according to 31% of the respondents, n=20). Looking at the national level also community organizations and NGOs as well as health inspectorates or public health institutes (both 36% of the countries, n=10) seem to be important players in commissioning HIAs – see Fig. 45.

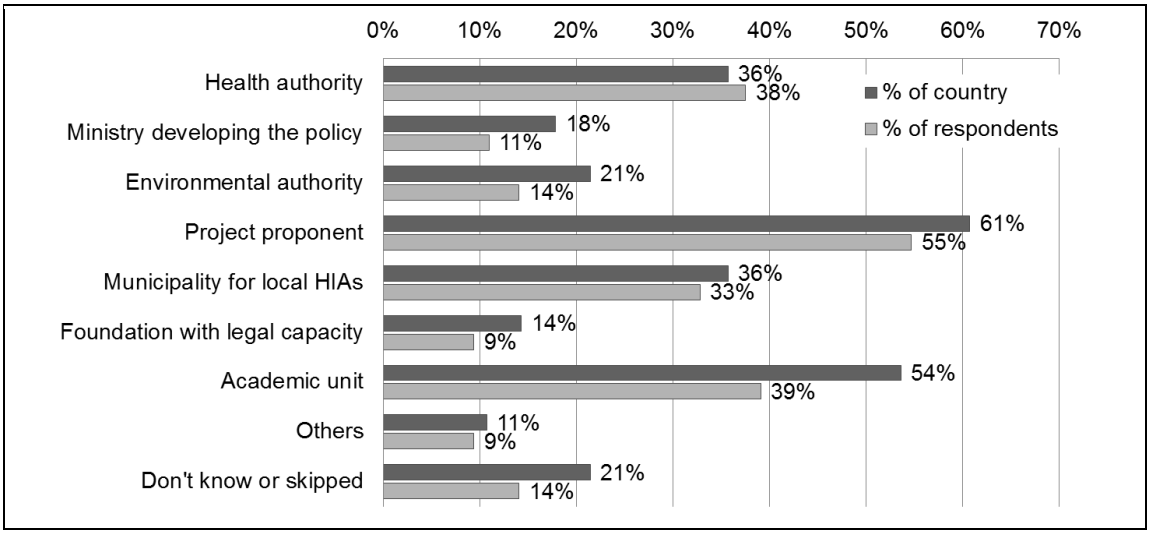
Fig. 45. Main institutions commissioning HIAs



Note: By percentage of respondents (n=64) and countries (n=28) with multiple respondents in some countries. A total of n=5 respondents skipped the question. There is no data available for Estonia [see question 8].
*PH – public health

Similar figures were reported regarding funding of HIAs with 55% of respondents (n=35) mentioning the project proponents, 39% academic units (n=25), 36% health authorities at different levels, and municipalities for local HIA (n=24 each). When looking at the picture across the countries, it is particularly project proponents (in 61% of the countries, n=17) and the academic units (in 54% of the countries, n=15) which seem to play an important role in regard to funding – see Fig. 46.

Fig. 46. Main institutions funding HIAs

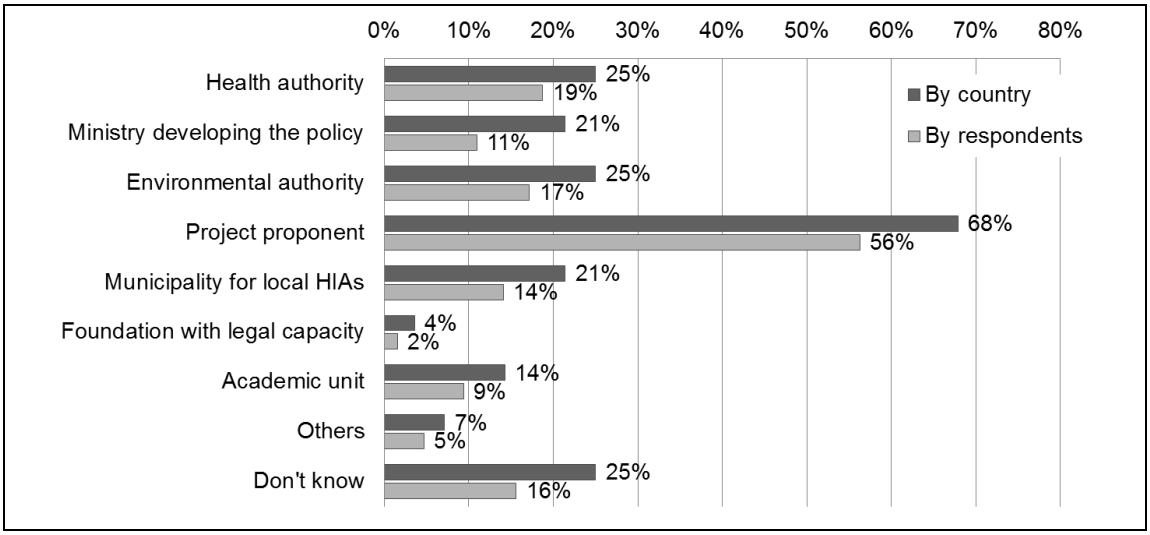


Note: By percentage of respondents (n=64) and countries (n=28) with multiple respondents in some countries. A total of n=4 respondents skipped the question and for 2 countries all respondents answered "Don't know". Hence, there is no data available for Estonia, Georgia, Portugal and Sweden [see question 6].

When looking into the funding of health assessment within environmental assessments, the project proponent plays an even more important role, as 56% of the respondents (n=36) from 36 countries (68%) indicated that the proponents finance the health assessment. Both health and environmental authorities at all levels (national, regional, or local) are financing health assessment in environmental assessments in 25% of the countries (n=12 each) corresponding

to 19% (n=12) of the respondents indicating the health authorities and 17% (n=11) of the respondents indicating the environmental authorities – see Fig. 47.

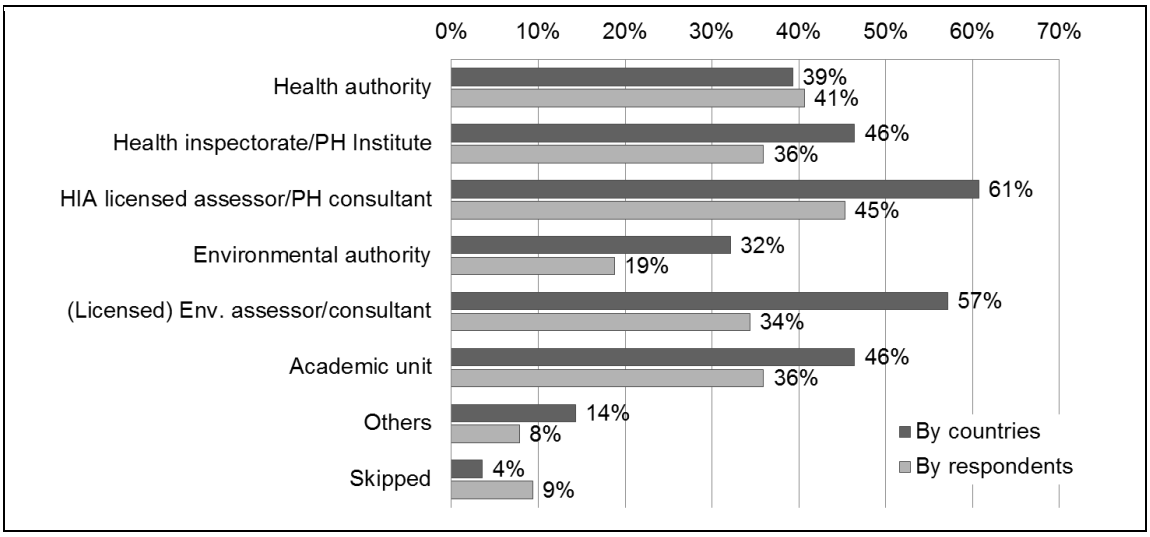
Fig. 47. Main agencies financing health assessment within environmental assessments in countries



Note: By percentage of respondents (n=64) and countries (n=28) with multiple respondents in some countries. A total of n=6 respondents skipped the question and for 3 countries all respondents answered "Don't know". Hence, there is no data available for Austria, Georgia, and Portugal [see question 18].

Many different professional profiles seem to be involved in conducting HIA. As mentioned above, the health sector plays a key role in driving the implementation of HIA in many countries, mainly through HIA licensed assessors or public health consultants (according to 45% of the respondents, n=29, and in 61% of the countries, n=17), health authorities at national, regional, or local levels (according to 41% of the respondents, n=26, and in 39% of the countries, n=11), and health inspectorates or public health institutes (according to 36% of the respondents, n=23, and in 46% of the countries, n=13). In addition, academic units (according to 36% of the respondents, n=23, and in 46% of the countries, n=13) as well as licensed environmental assessors or consultants play a relevant role, especially the environmental assessors and consultants in the majority of countries (57%, n=16, according to 34% of the respondents, n=22) – see Fig. 48 below.

Fig. 48. Main professional groups and agencies conducting HIAs in the countries

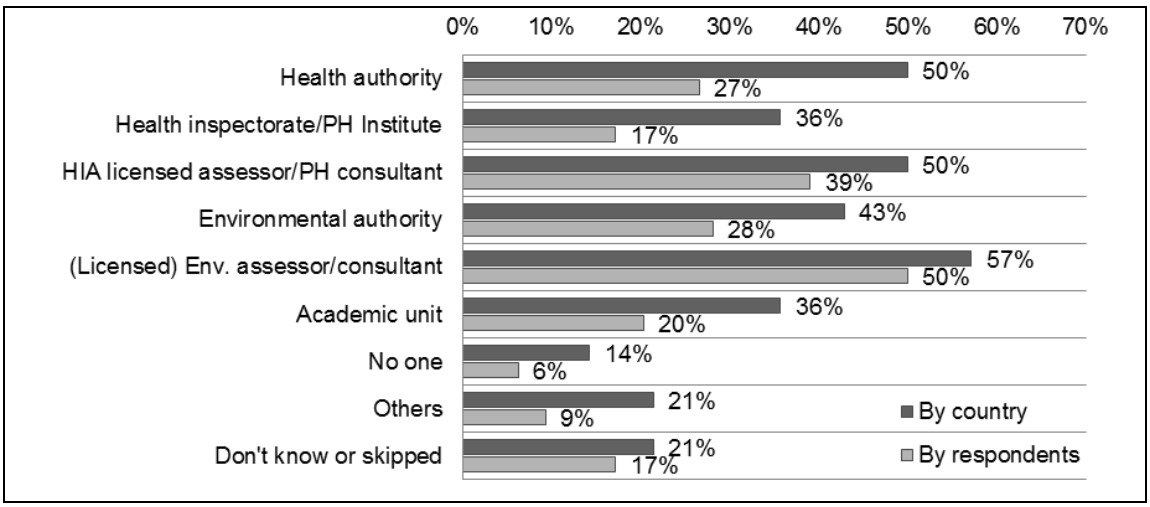


Note: By percentage of respondents (n=64) and countries (n=28) with multiple respondents in some countries. A total of n=6 respondents skipped the question. There is no data available for Estonia [see question 9].
*PH – public health; **env. – environmental.

In regard to the main professional groups conducting the health assessments within environmental assessments, again the health sector professionals play an important role, but even more so does the environmental sector: according to 32 respondents (52%) the licensed environmental assessors or consultants would undertake health assessment in 57% of the countries (n=16) but in 50% of the countries (n=14) licensed HIA assessors or public health consultants (according to 39% of the respondents, n=25) or even the health authorities (according to 27% of the respondents, n=17) would also be involved – see Fig. 49 below.

A quarter of the respondents declared that in the HIAs they are routinely involved at the scoping, appraisal/risk assessment stages, and at the reporting stage and/or in the development of recommendations, while only 20% of respondents (n=13) are routinely involved already at the screening stage. Another 17% to 23% of respondents (n=11 to n=15) indicated to be at least sometimes involved in any of these stages. The picture across the countries differs a little from these figures with the highest percentage (46%) of all countries (n=13) having respondents involved at least sometimes in the monitoring stage and only in 29% of countries (n=8) are respondents routinely involved in the scoping and appraisal/risk assessment stage – see Table 31.

Fig. 49. Main professional groups and agencies conducting the health assessment within environmental assessments in the countries



Note: By percentage of respondents (n=64) and countries (n=28) with multiple respondents in some countries. A total of n=4 respondents skipped the question and for 2 countries all respondents answered "Don't know". Hence, there is no data available for Georgia and Norway [see question 16].

Table 31. Involvement of health experts in HIA phases

Frequency HIA phases	by country/ by respondents	routinely	sometimes	rarely	never
Screening	by country	7	10	4	2
	by respondents	13	11	4	2
Scoping	by country	8	9	3	2
	by respondents	16	11	3	2
Appraisal/risk assessment	by country	8	10	3	1
	by respondents	16	14	3	1
Reporting/ recommendations	by country	7	11	0	3
	by respondents	16	15	0	3
Stakeholder engagement	by country	6	11	0	3
	by respondents	11	10	8	4
Monitoring	by country	4	13	4	4
	by respondents	5	13	8	5
Information about the decision taken	by country	5	9	8	3
	by respondents	9	14	9	3
Process evaluation	by country	2	9	7	10
	by respondents	2	16	8	10
Impact evaluation	by country	2	6	9	11
	by respondents	2	9	12	14

Note: A total of n=40 respondents (63% out of all respondents, n=64) from n=22 countries (79%) were interested in proceeding with the voluntary Part II of the questionnaire. There is no data available for Georgia and Norway [see questions 25 to 27].

When asked about their involvement in environmental assessments and at which stages they were mainly involved, the data show that health experts are less involved as a matter of routine, and if then, mainly at the appraisal/risk assessment stage (30% of respondents, n=19, from 50% of countries, n=14), followed by the scoping stage (22% of respondents, n=14, from

39% of countries, n=11). They were also at least sometimes involved more in the stakeholder engagement activities (19% of respondents, n=12, from 29% of countries, n=8) than in the screening stage (17% of respondents, n=11, from 32% of countries, n=9), and least of all in monitoring activities (16% of respondents, n=10, from 32% of countries, n=9) – see Table 32.

Table 32. Involvement of health experts in environmental assessment stages

Frequency HIA phases	by country/ by respondents	routinely	sometimes	rarely	never
Screening	by country	4	9	6	1
	by respondents	6	11	6	1
Scoping	by country	5	11	5	2
	by respondents	7	14	5	2
Appraisal/risk assessment	by country	5	14	5	0
	by respondents	6	19	7	0
Reporting/ recommendations	by country	7	7	5	0
	by respondents	10	8	8	0
Stakeholder engagement	by country	4	8	9	0
	by respondents	5	12	10	0
Monitoring	by country	2	9	8	1
	by respondents	2	10	13	1

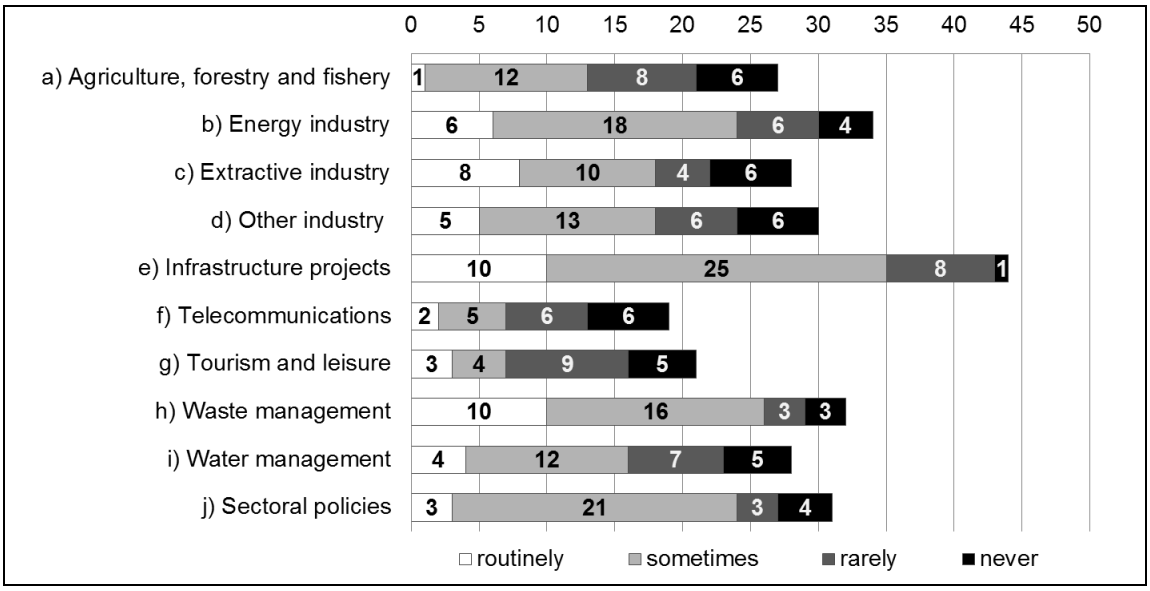
Note: A total of n=41 respondents (64%) were involved in environmental assessments but potentially all respondents could answer the question. A total of n=27 respondents (42%) from n=7 countries (25%) skipped the question. There is no data available for Armenia, Georgia, Germany, Ireland, Israel, Montenegro, and Norway [see question 19].

7.6 Main areas of HIA application and of the health assessment within environmental assessments

According to the respondents, HIAs are most often undertaken in infrastructure projects, either at least sometimes (39% of respondents, n=25, from 54% of countries, n=15) or even routinely (16% of respondents, n=10, from 7% of countries, n=25). Other sectors with a higher range of HIAs being conducted are waste management, with routinely conducted HIAs according to 16% of respondents (n=10, from 25% of countries, n=7) or at least sometimes (25% of respondents, n=16, from 43% of countries, n=12), the energy industry with HIAs being conducted at least sometimes (28% of respondents, n=18, from 39% of countries, n=11), and sectoral policies at least sometimes (33% of respondents, n=21, from 50% of countries, n=14). In general, according to the respondents, HIAs are rather conducted on an irregular basis with some respondents stating through all areas and sectors that HIAs are conducted rarely or even not at all – see Fig. 50 and Fig. 51.

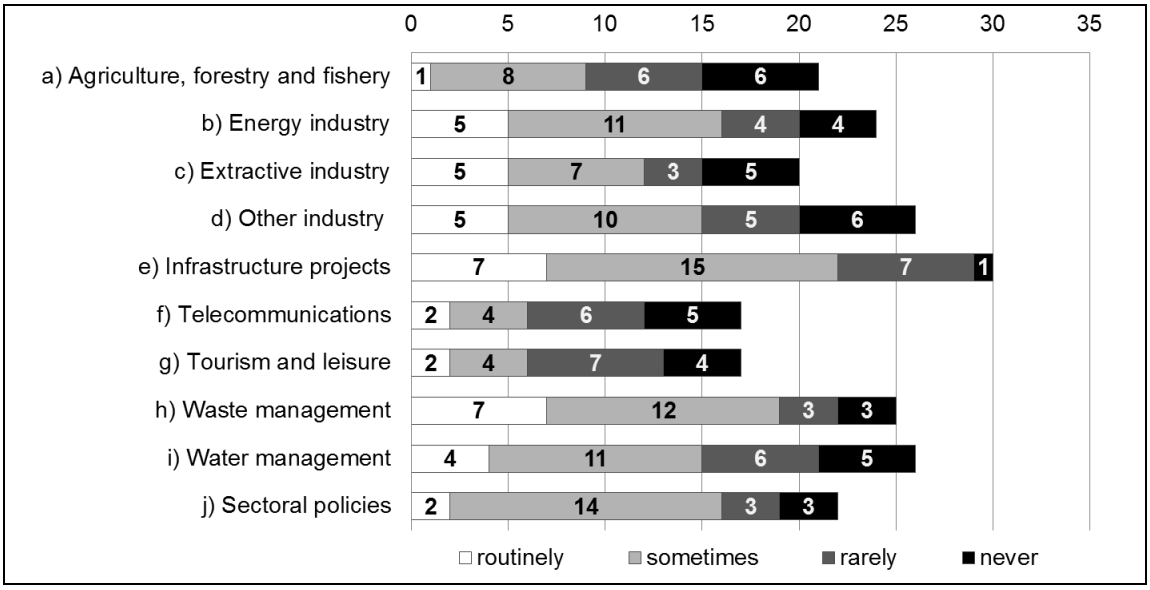
Across the countries there is a similar picture within the majority of areas or sectors where HIAs are mainly conducted on an irregular basis. Countries in which HIAs are conducted on a regular basis in the majority of sectors are the United Kingdom (with 70% of all area/sectors), Lithuania (70% of all area/sectors), and Spain (60% of all areas/sectors). Also for Germany 90% of the sectors were indicated to have HIAs being conducted on a regular basis, but comments revealed that the “answers relate to HIA as a mandatory part of EIA” (online questionnaire, ID 4161163575).

Fig. 50. Areas where HIAs have been undertaken or are currently undertaken by respondents



Note: By number of respondents (n=64). A total of n=8 respondents skipped the question. A relatively high number of respondents, between 18 and 41 depending on the area/ sector, answered with "Don't know". These data are not shown in the figure [see question 11].

Fig. 51. Areas where HIAs have been undertaken or are currently undertaken by countries



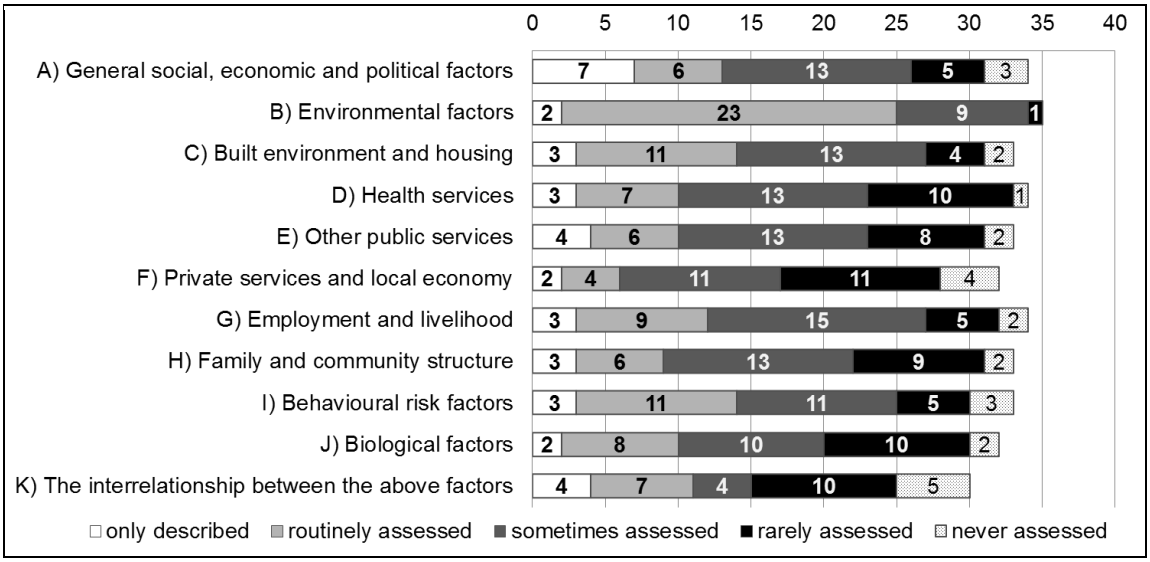
Note: By number of countries (n=28) with multiple respondents for some countries. A total of n=8 respondents skipped the question, therefore there is no data available for Estonia and Georgia [see question 11].

When looking into the areas and sectors in which a health assessment is mostly done within environmental assessments, the picture is very similar to that of the standalone HIAs with infrastructure projects and waste management counting for the highest numbers of health determinants being assessed, followed by the energy industry, and the tourism and leisure industry.

7.7 Health determinants regularly included in HIAs and the environmental assessments

Health determinants and/or the related factors influencing health and well-being that are considered in analysing impacts on health within HIAs, focus especially around environmental factors and are usually assessed routinely, according to 36% of the respondents (n=23, from 46% of countries, n=13) or at least sometimes (14% of respondents, n=9, from 29% of countries, n=8). Health determinants around employment and livelihood are considered either routinely or at least sometimes according to 38% of respondents (n=24) and in 50% of countries (n=14), followed by the built environment and housing (routinely and sometimes by 38% of respondents, n=24, in 46% of countries, n=13) – see Fig. 52 and Table 33 below.

Fig. 52. Health determinants and factors related to health and well-being considered in HIAs



Note: By number of participants per category and frequency. This question was part of the voluntary Part II of the questionnaire in which n=40 participants participated. A total of n=39 respondents answered this question with some of them skipping some items. The data for skipped answers and answers on "Don't know" or "N/A" are not shown in the figure [see question 22].

The interrelationship between the health determinants was either routinely or sometimes assessed in only 21% countries (n=6) according to 17% respondents (n=11) – see Table 33. The country where all health determinants seem to be routinely included in HIAs is the United Kingdom with some slight differences between the respondents answering for the whole of the United Kingdom or for a country of the United Kingdom, i.e. England, Northern Ireland, Scotland, or Wales.

Table 33. Consideration of health determinants or factors related to health and well-being assessed in HIAs

Frequency / Health determinant	by number of countries or respondents	only described	routinely assessed	sometimes assessed	rarely assessed	never assessed
A) General social, economic and political factors	by countries	5	2	11	5	3
	by respondents	7	6	13	5	3
B) Environmental factors	by countries	2	13	8	1	0
	by respondents	2	23	9	1	0

Table 33. contd.

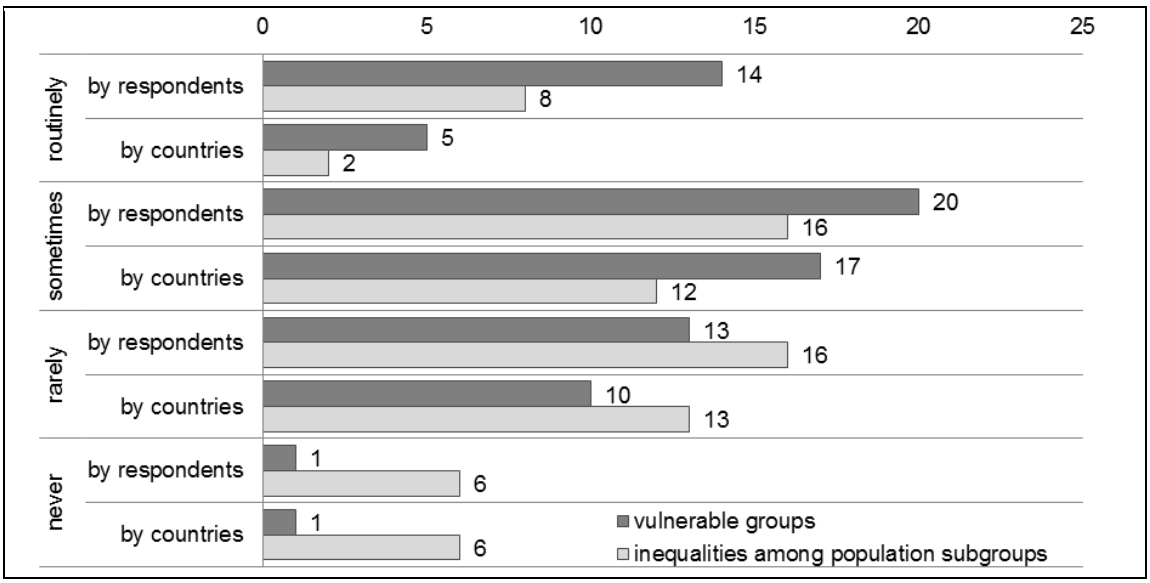
Frequency / Health determinant	by number of countries or respondents	only described	routinely assessed	sometimes assessed	rarely assessed	never assessed
C) Built environment and housing	by countries	3	4	10	4	2
	by respondents	3	11	13	4	2
D) Health services	by countries	3	3	10	8	1
	by respondents	3	7	13	10	1
E) Other public services	by countries	4	2	10	6	2
	by respondents	4	6	13	8	2
F) Private services and local economy	by countries	2	1	8	10	4
	by respondents	2	4	11	11	4
G) Employment and livelihood	by countries	2	4	13	5	2
	by respondents	3	9	15	5	2
H) Family and community structure	by countries	2	3	9	8	2
	by respondents	3	6	13	9	2
I) Behavioural risk factors	by countries	3	5	9	5	3
	by respondents	3	11	11	5	3
J) Biological factors	by countries	2	6	9	10	2
	by respondents	2	8	10	10	2
K) The interrelation-ship between the above factors	by countries	3	3	4	9	4
	by respondents	4	7	4	10	5

Note: This question was part of the voluntary Part II of the questionnaire in which n=40 respondents participated. A total of n=39 respondents answered this question with some skipping some items. The data for skipped answers and answers on "Don't know" or "N/A" are not shown in the table. Respondents from a total of n=19 countries completed the questionnaire, with multiple respondents for some countries. No data are available for Armenia, Estonia, France, Georgia, Israel, Malta, Montenegro, Portugal and Sweden.
Values in the text for the total number and percentage of countries differ to the values in the table when indicating the values for the items "sometimes" and "routinely" together. For those countries where both values were indicated by respondents they were only calculated as one. In this way double counting of countries could be avoided [see question 22].

Asked if HIAs go beyond the description of baseline conditions in the affected communities, i.e. do they also analyse (qualitatively or quantitatively) the impacts on vulnerable groups and inequalities among population subgroups, 31% of respondents (n=20) from 61% of countries (n=17) indicated that at least sometimes the impacts on vulnerable groups are assessed while inequalities among population subgroups are only considered sometimes according to 25% of respondents (n=16, from 43% of countries, n=12) – see Fig. 53 below.

Impacts on vulnerable groups are routinely assessed in only 18% of countries (n=5) according to 22% of respondents (n=14), and inequalities among subgroups in 7% of countries (n=2) according to 13% of the respondents (n=8). These two countries were namely the United Kingdom and Austria, with n=7 respondents from the United Kingdom and n=1 respondent from of Austria. Once more, the data show some clear differences in the assessment of the situation in a country with multiple respondents, for example, out of the three respondents of Austria, one respondent indicated "routinely" for the whole country, while another respondent indicated "never" for the whole country, and the respondent relating the answers to a region indicated "rarely".

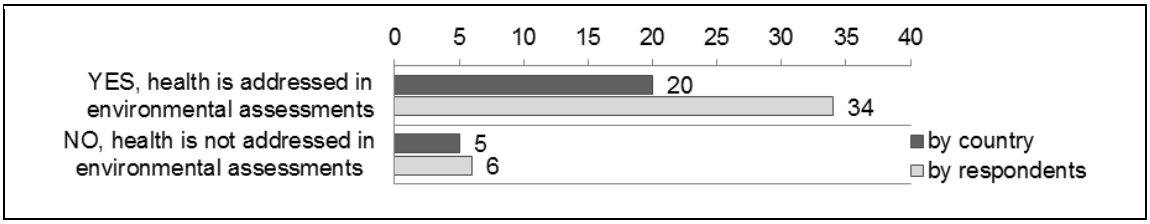
Fig. 53. Consideration of vulnerable groups and inequalities among population subgroups in HIAs



Note: by number of respondents (n=64) and number of countries (n=28) with multiple respondents for some countries. A total of n=6 respondents skipped the question; these data are not shown in the figure. There are no data available for Estonia [see question 10].

According to 53% of respondents (n=34) from 71% of countries (n=20), health is addressed in the environmental assessments in their country – see Fig. 54.

Fig. 54. Is health addressed in environmental assessments in the country?



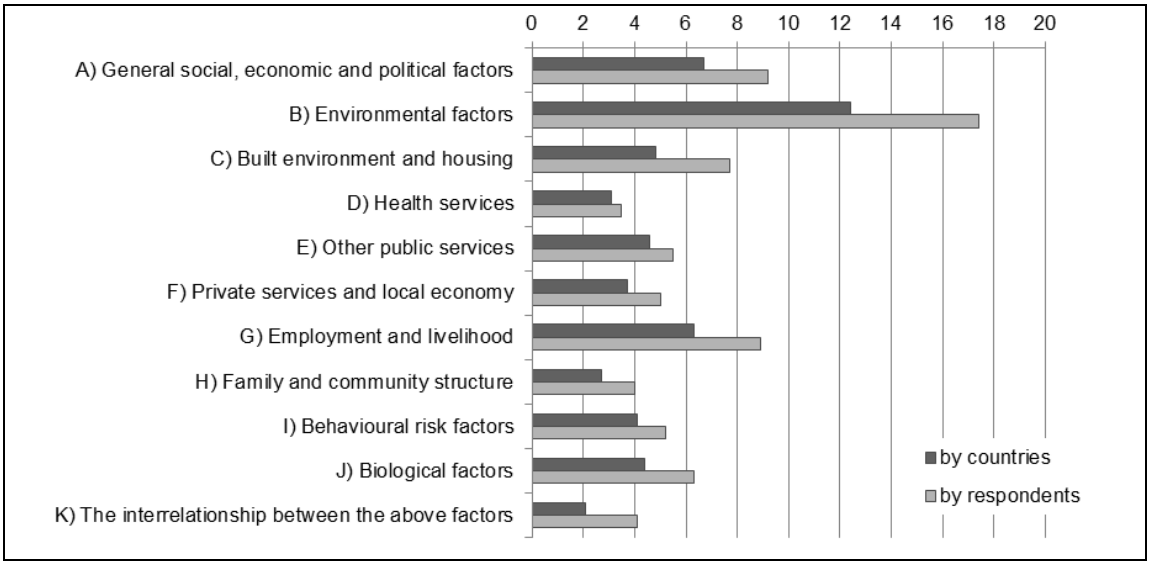
Note: By number of countries (n=28) and number of respondents (n=64). This question was part of the voluntary Part II of the questionnaire in which n=40 participants participated. A total of n=40 respondents answered this question, out of which n=28 were willing to further participate in the final Part IIb of the questionnaire. The n=40 respondents represented a total of n=20 countries. No data are available for Armenia, Estonia, France, Georgia, Israel, Malta, Montenegro, and Serbia [see question introducing Part IIb].

Health determinants mainly considered within environmental assessments are environmental factors (according to 27% of respondents, n=17, from 44% of countries, n=12), followed by factors of the built environment and housing (according to 12% of respondents, n=8, from 17% of countries, n=5), and employment and livelihood (according to 14% of respondents, n=9, from 23% of countries, n=6) – see Fig. 55 below.

Whether or not other health factors going beyond environmental factors are assessed in environmental assessments depends largely on the knowledge and/or experience of the person and/or team conducting the health assessment (according to 38% of respondents, n=24, from 48% of countries, n=13) as well as on the context of the EIA or SEA (according to 23% of respondents, n=15, from 46% of countries, n=13). Furthermore, if only environmental factors and their limit values are assessed, they are usually not linked to related health

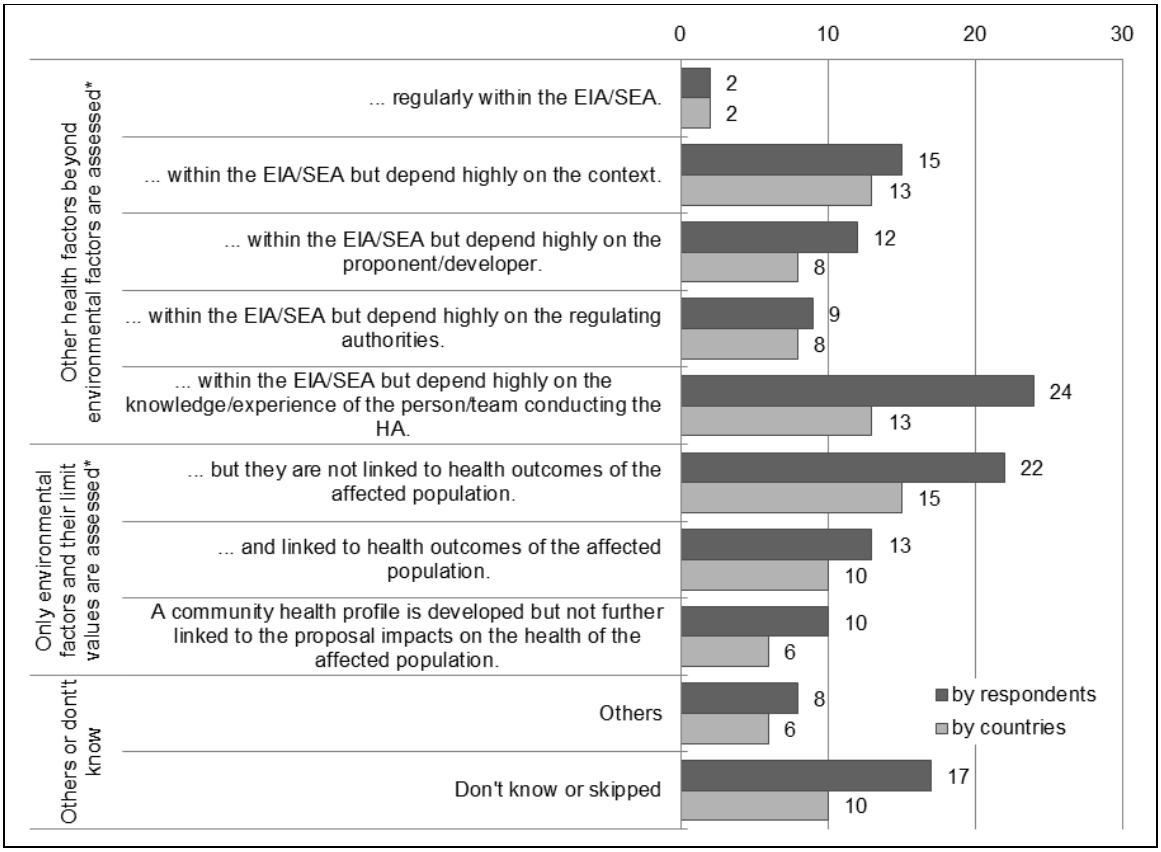
outcomes of the affected population (according to 34% of respondents, n=22, from 54% of countries, n=15) – see Fig. 56.

Fig. 55. Health determinants and related factors considered in health assessments within environmental assessments



Note: By average of health determinants mentioned across all 10 areas and sectors in which environmental assessments are conducted. This question was part of the voluntary Part II. A total of n=23 respondents (36%) from 19 countries (68%) participated in this question. No data available for Armenia, Estonia, France, Georgia, Germany, Israel, Malta, Montenegro, Norway, Portugal, and Serbia [see question 28].

Fig. 56. Health factors assessed within environmental assessments



Note: By number of respondents (n=64) and number of countries (n=28). A total of n=4 respondents skipped the question completely. No data available for Georgia, Norway, and Portugal [see question 15].
*HA – health assessment

When looking into the areas and sectors in which health determinants are analysed, again the main focus when assessing health impacts in environmental assessments is, according to up to 33% of respondents (n=21) on environmental factors across all areas and sectors as well as across all countries – see Table 34 and Table 35.

Table 34. Areas and sectors in which health determinants are assessed within environmental assessments – part 1

Area/sectors / Health determinants	1. Agriculture, forestry & fishery	2. Energy industry	3. Extractive industry	4. Other industry	5. Infrastructure projects
A) General social, economic and political factors	9	10	11	8	12
B) Environmental factors	18	20	17	16	20
C) Built environment and housing	5	11	5	6	13
D) Health services	2	2	3	4	6
E) Other public services	4	4	4	4	8
F) Private services and local economy	5	6	6	5	6
G) Employment and livelihood	9	12	11	8	11
H) Family and community structure	3	4	2	3	7
I) Behavioural risk factors	3	6	6	7	6
J) Biological factors	10	6	6	4	5
K) The interrelationship between the above factors	4	4	4	4	4
L) I don't know	4	2	4	3	3
Total	**76**	**87**	**79**	**72**	**101**

Note: Total represents the number of times the respondents have designated the specific health determinant being assessed in the respective area or sector. This question was part of the voluntary Part II. A total of n=23 respondents (36%) from 19 countries (68%) participated in this question. No data available for Armenia, Estonia, France, Georgia, Germany, Israel, Malta, Montenegro, Norway, Portugal, and Serbia [see question 28].

Table 35. Areas and sectors in which health determinants are assessed within environmental assessments – part 2

Area/sectors / Health determinants	6. Telecommu-nications	7. Tourism and leisure	8. Waste management	9. Water management	10. Sectoral policies
A) General social, economic and political factors	8	8	9	8	9
B) Environmental factors	14	15	21	20	13
C) Built environment and housing	7	7	10	7	6
D) Health services	1	4	5	4	4
E) Other public services	3	7	8	7	6
F) Private services and local economy	4	5	5	2	6
G) Employment and livelihood	7	10	9	5	7

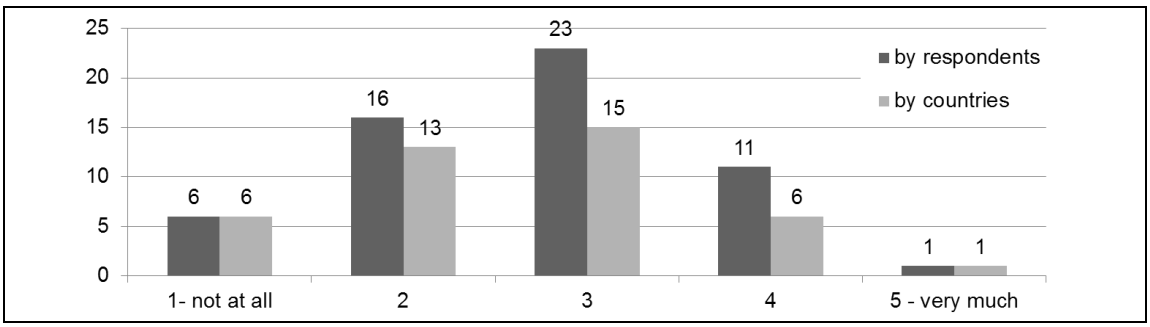
Area/sectors / Health determinants	6. Telecommu-nications	7. Tourism and leisure	8. Waste management	9. Water management	10. Sectoral policies
H) Family and community structure	3	5	4	3	6
I) Behavioural risk factors	4	6	6	5	3
J) Biological factors	3	5	9	11	4
K) The interrelationship between the above factors	4	4	5	4	4
L) I don't know	4	5	3	3	5
Grand Total	**62**	**81**	**94**	**79**	**73**

Note: Total represents the number of times the respondents have named the specific health determinant as one which is assessed in the respective area or sector. This question was part of the voluntary Part II. A total of n=23 respondents (36%) from 19 countries (68%) answered this question. No data available for Armenia, Estonia, France, Georgia, Germany, Israel, Malta, Montenegro, Norway, Portugal, and Serbia [see question 28].

7.8 HIA effectiveness

When asked about the effectiveness of HIAs in their country, respondents gave a rather negative picture: Only one respondent from one country considered HIA to be very effective in the country, while 9% of respondents (n=6) coming from 21% of countries (n=6) rate HIA as not effective at all in their country, and 25% of respondents (n=16 from 46% of countries, n=13) indicated that HIAs are more ineffective than effective in their country. Overall, 36% of the respondents (n=23) from 54% of countries (n=15) were undecided about HIA's effectiveness – see Fig. 57. Respondents from countries with a higher experience in HIA, for example, Lithuania and the United Kingdom, rated more in favour of HIA effectiveness than respondents from countries with less experience in HIA.

Fig. 57. Effectiveness of HIA in the countries



Note: By number of respondents (n=64) and number of countries (n=28) with multiple respondents for some countries. A total of n=7 respondents skipped the question; therefore there are no data available for Estonia and Poland. The skipped data are not shown in the figure [see question 12].

7.9 Summary: health assessments within environmental assessments

The online questionnaire was analysed to give further insight into the main tools, methods and institutional and procedural factors that facilitate the integration of a broad range of environmental health factors into environmental assessments. Overall, a total of 64 experts from 28 countries responded to the questionnaire. Respondents' experience in HIA was mainly at the project level, followed by the policy/strategy and planning levels. Thirty-nine of the

respondents also had experience in environmental assessments, also mainly at the project level, followed by plan development and at the policy/strategy development level.

In the majority of the countries some kind of HIA institutionalization is taking place, for example, through the mandatory inclusion of HIA or health assessment in national environmental assessment legislation. Although, according to the majority of the respondents, the health assessment is included in environmental assessment and less as a separate HIA. Meanwhile, consultation with health experts on possible health impacts in EIA or SEAs is only mandatory in few countries.

While in the majority of countries some kind of resources and activities are offered that support the implementation of HIA, most of these activities are ad hoc such as the development of specific guidelines and HIA tools, as well as capacity building activities for public health authorities, health experts, researchers, and environmental assessors. Most respondents agreed that further activities or tools supporting the integration of health in EIA or SEA are needed in their countries and that only a few activities or tools exist. The items most often mentioned as needed were further training on health for environmental authorities and consultants/assessors, environmental assessment training for public health experts, and joint trainings.

Facilitating factors for HIA implementation and for advanced integration of health in environmental assessments are capacity building, legislation, and joint action/intersectoral collaboration. Barriers to advanced integration are the lack of intersectoral cooperation, economic factors such as priorities given to economic benefits, costs of the assessment, and a lack of experience and/or knowledge.

The health assessments within environmental assessment as well as HIAs are mainly funded by the project proponents, academic units, as well as health authorities and environmental authorities or the municipalities. Furthermore, HIAs are mainly commissioned by health authorities at different levels (national, regional and local) followed by environmental authorities at different levels, and the project proponent.

While the health experts are the main professional group conducting a HIA, the health assessment within environmental assessments are more often conducted by (licensed) environmental experts than by health sector professionals. Overall, health experts are less involved as a matter of routine, and if then, mainly at the appraisal/risk assessment stage, followed by the scoping stage.

In regard to the areas and sectors in which a health assessment is mostly done within environmental assessments, the picture is very similar to that of the standalone HIAs: in infrastructure and waste management projects, followed by the energy industry, and the tourism and leisure industry.

While health is addressed in environmental assessments in the countries, the focus is clearly on environmental factors across all areas and sectors, as well as across all countries. Whether or not health factors going beyond environmental factors are assessed in environmental assessments depends largely on the knowledge and/or experience of those conducting the health assessment, as well as on the context of the EIA or SEA. Furthermore, if only environmental factors and their limit values are assessed, they are not usually linked to related health outcomes of the affected population.

8 Discussion: The integration of health in environmental assessments

The overall objective of this research project was to identify the main methods, tools, institutional and procedural factors that facilitate the integration of a broad range of environmental health aspects into environmental assessments such as SEA. Five research questions were addressed:

1. Which environmental health aspects, determined by natural (biological, chemical, physical), built, social and behavioural factors, are mainly considered in environmental assessments and specifically in SEAs?
2. How are these environmental health aspects considered in environmental assessments in Member States of the WHO European Region?
3. Do publicly available guidelines on SEA include guidance on the assessment of the broad spectrum of environmental health aspects?
4. What are the main barriers to and facilitators for the integration of health into environmental assessments?
5. Which kind of capacity building activities would be needed to further support the integration of health in environmental assessments?

This chapter will first discuss the methodological approach of the research, followed by a discussion of the results.

8.1 Critical appraisal of the methodological approach and limitations of the research

In 2010, there was limited information on the integration of health into environmental assessments based on existing legal obligations, available in the form of published case studies in peer-reviewed journal papers. There was no overview of the practices within Member States in the WHO European Region. To gain a comprehensive overview on the integration of health in environmental assessments and to explore the main objective of the research, a mixed methods approach, combining five methods, was used. The methods chosen were each linked to at least one of the research questions:

1. a generic iterative literature review, or so called scoping review, on environment and public health concepts and frameworks, on the most relevant impact assessment types and their relation to health, and on key developments of the integration of health determinants in environmental assessments and into legally binding international regulations for EIA and SEA; with research questions 1, 2, and 4 linked to this approach.
2. a literature and internet review on the inclusion of health in SEA guidelines; with research questions 1, 2, and 3 linked to this approach;
3. a document analysis of SEA guidelines obtained through the literature and internet research; with research questions 1, 2, and 3 linked to this approach;
4. an evaluation of a case study of capacity building workshops on health in EIA and health in SEA; with research questions 4 and 5 linked to this approach; and
5. an online survey on the implementation of HIA and health in environmental assessments in Member States of the WHO European Region; with research questions 1, 2, 4, and 5 linked to this approach.

8.1.1 Limitations of the literature review

The generic literature review, see chapters 2.1 and 4.1 was undertaken in order "to map the key concepts underpinning a research area as well as to clarify working definitions, and the conceptual boundaries" (Peters et al., 2015) of the topic. The review gave an overview on key historic developments on the integration of health in environmental assessments, and included workshop reports and scientific papers. Even though no assessment of the validity of the findings from the literature review had been undertaken at that stage, the later findings of the SEA guideline research as well as the online survey confirmed the findings of the literature review.

Nonetheless, a publication bias in relation to the 26 peer-reviewed journal articles cannot be excluded. It is considered to be limited as, besides peer-reviewed journal articles, the research also included grey literature, thus limiting the grey literature bias (Fanelli, Costas & Ioannidis, 2017). Furthermore, a review of the legal basis for the inclusion of health in environmental assessments was performed. However, the research was only undertaken in English and therefore may have missed out relevant reports published in other languages.

In regard to the reports included in the review, these are usually compiled by a group of experts and often undergo a multistage review process, for example, with the participants of a meeting or workshop. Therefore, they usually do not reflect the opinion of an individual but rather that of an expert group. It can therefore be assumed that the most relevant issues are reflected in such reports.

8.1.2 Limitations of the internet research on SEA guidelines

A number of limitations to this research, see chapter 4.2, should be mentioned: first, through the initial approach of a systematic internet review using predefined search strings it was not possible to identify SEA guidelines consistently. Therefore, the approach was changed to reviewing internet pages of international and national key actors in SEA. The selection of these key actors was on the one hand based on the SEA key references (Dalal-Clayton and Sadler, 2005; Fischer, 2007; Thérivel, 2010), and on the other hand expanded through an iterative literature research process using references in obtained literature. Hence, there is the possibility that the search missed out SEA guidelines developed by other organizations than those identified as key actors in the area. However, as this was an iterative process it is assumed that the most relevant guideline documents publicly available could be obtained.

Second, the internet search for SEA guidelines had to be restricted to documents or web-pages in English, French, Italian, German or Spanish due to language constraints of the author. Therefore, other countries known to have SEA guidelines were not further included in the analysis, as, for example, in the case of Sweden. Third, the number of guidelines identified from other than environmental authorities was small. This means that conclusions on the difference between the guidelines from diverse organization types have to be handled with care. However, variations in the need to assess activities and look into determinants outside the classic natural and built environment can be expected, given the different contexts for guidance documents developed by governmental authorities in European countries, or by multilateral organizations and development agencies – operating mainly in developing countries.

8.1.3 Limitations of the SEA guidelines document analysis

The document analysis, see chapter 4.3, is limited by the availability of the documents and limited through a language bias as documents in languages other than English, French, Italian, German or Spanish were not included in the analysis. While the researcher effect can be limited through a document analysis, the document analysis can only describe the content and observe patterns, but not the underlying motives behind it. As the latter was not the subject of this analysis, the method is considered appropriate to give answers to research question number 3. Additionally, as the research was done at two points of time, 2010 and 2015/16, it allowed an analysis of trends in relation to the health inclusion in such guidelines.

8.1.4 Limitations of the evaluation of the CBEH international training workshops on health in environmental assessments

The main objective of the CBEH international training week evaluation was to determine its utility and feasibility, see chapter 4.4. The Joint Committee on Standards for Educational Evaluation (JCSEE) has developed standards that should be taken into consideration when conducting a full scale evaluation of an education or training programme. A total of 20 evaluation standards are clustered in five groups. They assess utility (eight standards), feasibility (four standards), propriety (seven standards), accuracy (eight standards) and evaluation accountability (three standards) (for details on the evaluation standards please refer to Beywl & Widmer, 2012; and Yarbrough et al., 2011). The evaluation of the CBEH international training workshop cannot be regarded as a full scale evaluation, as it only looked into the usefulness of the training workshops and did not further consider the whole CBEH project. However, overall the evaluation was in line with the JCSEE evaluation standards, such as feasibility standards F2 on practical procedures or F4 on resource use, P4 on clarity and fairness, or P5 on transparency and disclosure, among others (Beywl & Widmer, 2012; Yarbrough et al., 2011). A full scale evaluation of the whole CBEH project would have needed to look further into the different aspects of the project as well as into a follow-up on the training outcomes, but this would have needed a separated budget and resources and was therefore not feasible.

The method used – one weekly evaluation form and four daily ones– provided valid and reliable information on the participants' perspectives of the training week. However, the evaluation has to take account of an average non-response rate of 23%. Reasons for non-response could have been that some participants simply forgot to return the forms or that it did not reach all participants. Further, the motivation to complete the questionnaire might have been higher in those participants more satisfied with the training week and more inclined to complete the evaluation forms. Nevertheless, the risk of overestimating the positive feedback due to a non-response bias is considered as minimal, as on average over three quarters of the participants (77%) took part in the evaluations.

8.1.6 Limitations of the online survey

A main limitation of the online questionnaire, see chapter 4.5, is the relative low response rate. Sixty-four persons out of the 216 who could potentially have responded to the online questionnaire did so, and were considered for the data analysis, representing an overall response rate of 30%. In order to achieve a higher number of responses, at least three reminders were sent out to non-respondents and the questionnaire was open for more than three months. The 70% non-response rate can be attributed to different causes such as emails to potential participants getting lost in spam filters, change of email address, or invitees no longer working in the area of HIA or environmental assessments and therefore not being interested in the questionnaire. For 7% the questionnaire might have been too complex or time consuming as they opened it but stopped working on it after question 3. The response rate of the 86 invited environment and health focal points was, with 26%, lower than the average. Reasons for a higher non-response rate among this group could lie foremost in the unfamiliarity of the focal point with HIA and health in environmental assessment and the non-practice of HIA in many of the countries. Therefore, in this group several potential participants in the survey might not have been able to respond or to nominate an alternative expert. Another reason could be language issues as the questionnaire was only available in English (see Table 19, chapter 7.1).

As respondents were not randomly selected but based on different sources of publications and references, or in their role as WHO environment and health focal points, in general a non-response bias cannot completely be excluded. This non-response bias can be defined as "systematic difference in characteristics between responders and non-responders" (Sedgwick, 2014). But as long as there is no international recognized registry, neither of HIA nor of environmental assessment experts, the identification of experts is challenging in many countries. Therefore, at this stage, the chosen selection process of possible respondents was considered the most pragmatic way to identify as many experts on the topic as possible. Nevertheless, a generalization of the findings cannot easily be done.

The vast majority (72%) of the 64 participants answered for a country, region or municipality in one of the 15 countries which joined the EU before 2004 (46% of 28 countries), members of the EEA (7% of the countries) plus Israel (4% of the countries). Thirty-six per cent of the participants answered for a country, region or municipality of the 13 countries to join the EU after 2004 (20% of the countries) or a potential candidate country (5% of the countries). Therefore, the answers reflect mainly the status of HIA and health in environmental assessments in more western oriented countries. The group of 12 NIS was underrepresented: one participant from Armenia and one participant from Georgia (7% of the participants). Reasons can be similar to those described above for the group of environment and health focal points (see Table 20, chapter 7.1). For the different country groups please refer to Annex 13.

As already mentioned in chapter 4.5.6, it is important to note that the online survey and the data analysis were developed in the first instance for a WHO report and status quo analysis of HIA implementation and health integration into environmental assessments across the WHO European Region. Since the author of this publication, a Technical Officer at WHO, was leading the development of the questionnaire and was deeply involved in obtaining the data, the data accessibility presented no problem. In fact, as the author led and conducted the data analysis,

she was very familiar with the data sets. The topic of the WHO research and that of this research are sufficiently close together as to make construction of own valid indicators unnecessary.

To the knowledge of the author, the questionnaire was the first to try to gain an in-depth overview on the usage of HIA and the integration of health in environmental assessments across different countries. Consequently the questionnaire became a very complex instrument which was therefore divided into two main parts – the first part containing a total of 18 questions and the second part containing another nine questions. The second part was considered optional and 38% of the initial 64 participants did not complete it. Forty participants (62%) were interested in proceeding on the voluntary part on HIA implementation, with an average of five then skipping different questions, and 28 participants (44%) proceeded further with the voluntary part on health in environmental assessments, with an average of four then skipping questions. In total out of the 64 participants that started the survey, a maximum of 24 participants (38%) responded to all questions (see Table 18, chapter 7.1). Reasons for this could have been the complexity of some of the questions and the overall length of the questionnaire. Participants that continued until the end might have had a special interest in the topic, in the case of a respondent of the expert group, or, in the case of a respondent of the WHO environment and health focal point group, feeling obliged to answer a WHO questionnaire – which could be a sign of response bias. A response bias has been defined by Sedgwick (2014) as "a systematic difference between the answers provided by the survey respondents and their actual experiences" (Sedgwick, 2014). As the questionnaire was foremost gathering information relating to the personal experience of the respondents and seeking their opinion, a response bias cannot completely be excluded. Therefore, this research project does not only rely on the results of the survey but also on the findings of the generic literature review and an SEA guideline document analysis, which turned out to be in accordance with the results of the online questionnaire. Hence, the risk of a systematic response bias is considered to be minimal and it is assumed that participants responded in line with their actual experiences.

Despite the mentioned possible limitations and the time that has passed since the survey was concluded in November 2015, the author assumes that the results based on the survey (analysis of the integration of health in environmental assessments and of facilitators and barriers) are still relevant and present a comprehensive picture on the implementation of HIA the integration of health in environmental assessments, and its facilitators and barriers across Member States in the WHO European Region.

Overall the combination of the five different methods used, presents a comprehensive overview on the integration of health in environmental assessments and can be considered to give robust evidence of the research results. The different methods revealed similar trends in the use of health assessments within environmental assessments, and in the facilitators and barriers for further integration, which have in fact existed since the beginning of discussions on the topic. This will be discussed further in the following subchapters.

8.2 Categories of environmental health aspects mainly considered in environmental assessments, specifically in SEAs

The data and information gathered through the generic literature review, the SEA guideline document analysis, and the online questionnaire on HIA implementation and health in environmental assessments, strongly implies that health aspects are generally considered in environmental assessment and specifically in SEAs. However, as described in chapter 5.1.2, the literature reviewed indicates that the focus is mainly on factors of the natural (biological, chemical, physical) environment, to a lesser extent on factors of the built environment, and only rarely are social and behavioural factors assessed. Moreover, the reviews of EIA and SEA case studies looking into health aspects clearly reveal that most of the time the identified possible health impacts are not further linked to health outcomes. Most often only limit values, such as on air pollution or noise levels, are considered but cumulative effects are not, and considerations for prevention and reduction of effects on health are lacking. Likewise, health inequities are rarely assessed. Out of the behavioural factors, options for physical activities are most likely to be considered, for example, in SEAs of spatial plans, but again these are seldom linked to further health outcomes (Bhatia & Wernham, 2008; Carmichael et al., 2012; Douglas, Carver & Katikireddi, 2011; Faith-Ell, Kalle & Lund-Iversen, 2014; Fischer, 2014b; Fischer, Martuzzi & Nowacki, 2009; Haigh et al., 2015; Kørnøv, 2009; Linzalone et al., 2014; Morgan, 2011; Steinemann, 2000). A focus on 'classic' natural environmental factors, can also be seen in the historic development of integrating health into environmental assessments, as described in chapter 5.1.1, for instance in NEPA focusing on air, soil, water and potentially high pollution risks (Bhatia & Wernham, 2008; Morgan, 2011), or the first guidelines and workshops on EHIA focusing on topics such as water-related issues like vector-borne disease, pollution, accidents and hazards (Birley, 1991; WHO Regional Committee for Europe & Environmental Resources Ltd, 1983; WHO Regional Office for Europe, 1987, 1979).

Furthermore, the international legal documents reviewed in chapter 5.1.3, such as the latest versions of the Directives on EIA and SEA, the Espoo Convention on EIA and its Protocol on SEA, all state that the effects on population and human health must be considered when conducting an EIA or SEA. Nonetheless, with the exception of the UNECE SEA Manual, they do not give any further indications on how to assess the health impacts nor which health aspects should be considered. Instead, they list besides population and human health the 'classic' natural environment factors, such as air, soil, water, biodiversity as well as climate, and factors of the built environment, such as material assets, cultural heritage and the landscape (EU, 2014, No. 22), but do not define risks to human health or likely significant effects. Necessary limit values have to be defined by the EU Member Countries.

The results of the online questionnaire on HIA implementation and health in environmental assessments are in accordance with the findings of the literature review. Similar results were obtained through the online questionnaire on HIA implementation and health in environmental assessments. According to the majority of all 64 respondents health is addressed in environmental assessments (see Fig. 54, chapter 7.7), with the 'classic' natural environmental factors being considered most often (according to 27% of respondents) followed by factors of the built environment and housing (according to 12% of respondents), and employment and livelihood (according to 14% of respondents) (see Fig. 55, chapter 7.7).

Even when looking into HIAs, the determinants most often routinely assessed are environmental determinants (according to 36% of respondents), followed by built environment and housing determinants (according to 17% of respondents), and behavioural risk factors and lifestyle (according to 17% of respondents). Furthermore employment and livelihood factors are at least assessed sometimes (according to 23% of respondents), as are the general social, economic and political factors (according to 20% of respondents), health and other public services (according to 20% of respondents), and family and community structures (according to 10% of respondents) (see Fig. 52, chapter 7.7). Thirty-one per cent of respondents also indicated that impacts on vulnerable groups are routinely assessed in HIAs, while inequalities among population subgroups are only considered sometimes (according to 25% of respondents) (see Fig. 53, chapter 7.7).

8.3 Consideration of environmental health aspects in environmental assessments in Member States in the WHO European Region

The review of international legal regulations and performance standards showed that there is a general basis for the integration of health in environmental assessments. For the WHO European Region these are in particular the Directives on EIA and SEA, which the 28 EU Member countries have to transpose into their national legislation. The directives also play an important role for the six (potential) candidate countries as well as in countries associated through different agreements, such as the four EEA members or customs union agreements with four more countries. In addition, funding of projects in countries outside the EU through EU development agencies and banks, such as the European Investment Bank (EIB), also have to consider EU legislation. Furthermore, out of the 56 UNECE member States a total of 44 plus the EU are Parties to the Espoo Convention, and 31 member States plus the EU are Parties to the Protocol on SEA. In particular because of the Protocol on SEA one would expect to see a broad integration of health as well as of health experts into SEAs across the WHO European Region. Nevertheless, the latest UNECE report on the implementation of the Protocol on SEA showed that there is still a need to ensure that SEA "documentation systematically contains information on health, including transboundary effects" (UNECE, 2017a). While most of the Parties to the Protocol on SEA have defined in their national laws the environmental and health authorities to be consulted, as well as the ways of informing and consulting with them, in one third of the countries this is done on a case-by-case basis. Furthermore, in the majority of cases the environmental and health authorities issue written statements or comments, only occasionally do consultation meetings take place (UNECE, 2017a) (see chapter 5.1.3).

These findings are also reflected in the online questionnaire on HIA and health in environmental assessments. In the majority of countries (64%) for which respondents were answering, HIA is formalized mainly through the inclusion of HIA or health assessment in either environmental assessment legislation at the national or regional level, or through regulations at the local level (according to 39% of the respondents). In addition, 33% of the respondents (from 50% of the countries) indicated that health authorities have the possibility to request an HIA, if they expect significant health effects on the population. Consultation with health experts on possible health impacts in EIAs is only mandatory in 18% of the countries (according to 13% of the respondents) and on SEA it is mandatory in 21% of the countries (according to 14% of the respondents) (see Fig. 38, chapter 7.3). Health assessments are mainly funded by

the proposal proponent in 68% of the countries (according to 56% of the respondents). Both health and environmental authorities at all levels (national, regional, or local) only finance health assessment in environmental assessments in 25% of the countries (see Fig. 47, chapter 7.3).

In 61% of the countries (according to 45% of the respondents) HIAs are conducted by public health consultants or HIA licensed assessors and by licensed environmental assessors or consultants in 57% of the countries (according to 34% of the respondents) (see Fig. 48, chapter 7.5). The picture is the opposite with health assessments within environmental assessments, which are conducted in 57% of the countries by licensed environmental assessors or consultants (according to 50% of the respondents), by public health consultants or HIA licensed assessors in 50% of the countries (according to 39% of the respondents), by health authorities in 50% of the countries (27% of the respondents) and by academic units in 36% of the countries (20% of the respondents) (see Fig. 49, chapter 7.5).

The implementation report of the Protocol on SEA does not specify at what stage environmental and health authorities are involved in the SEA (UNECE, 2017a). In this regard, the data of the online questionnaire show that health experts are less involved as a matter of routine in environmental assessments, and if then, in 50% of all countries mainly at the appraisal/risk assessment stage (30% of respondents), followed by the scoping stage in 39% of all countries (22% of respondents). At least sometimes health experts also get involved in 32% of all countries in the screening stage (17% of respondents), in stakeholder engagement activities in 29% of all countries (19% of respondents) and in monitoring activities also 32% of all countries but only according to 16% of respondents (see Table 32, chapter 7.5).

No or late involvement of health experts in environmental assessments is also frequently mentioned in the literature reviewed, for example, for Hilding-Rydevik et al. (2007) this is one of the key reasons for inadequate integration of human health aspects in EIA. Recommendations of a WHO workshop on the health and safety component of EIA in 1986 included the need to involve health experts at early planning stages, and to consult with health professionals during the scoping phase (WHO Regional Office for Europe, 1987). This call for the involvement of health experts at the scoping stage is repeated, among others, by Nowacki, Martuzzi and Fischer (2010), Douglas, Carver and Katikreddi (2011), as well as Cave et al. (2017a,b). Bond, Cave and Ballantyne (2013) also found that health experts were only rarely engaged in spatial planning processes, due to limited understanding of the process and hence no interest in influencing it (see chapter 5.1.2).

Out of the 12 NIS only respondents from Armenia and Georgia participated in the online survey (see chapter 7.1). Reasons for this could be language difficulties, or the fact that HIA and health assessment in environmental assessment are only rarely conducted in the NIS, if at all. A review on HIA and health in environmental assessments by Kustov et al. supports this assumption.

Through the literature review a number of meta-analyses on SEAs and the inclusion of health were retrieved (Bond, Cave & Ballantyne, 2013; Burns & Bond, 2008; Carmichael et al., 2012; Douglas, Carver & Katikireddi, 2011; Fischer, 2014b; Fischer, Martuzzi & Nowacki, 2009; Kørnøv, 2009; Linzalone et al., 2014; Nowacki, Martuzzi & Fischer, 2010) with a special focus on SEAs located in the urban and spatial planning sector (see chapter 5.1.2). When looking into

the SEA guidelines, those guidelines mentioning the transport and infrastructure sectors, urban or spatial planning, the energy sector, waste and water management or agriculture, fishery or forestry most often discussed or mentioned the 'classic' natural environmental health determinants such as air, flora and fauna, noise, light, smells, soil as well as climate and weather, and the built environment, including open and green spaces (see Fig. 21, chapter 5.2.4). Guidelines of health authorities, development agencies and multilateral organizations more often included economic aspects, such as un-/ employment, poverty, affordable housing, as well as education, access to services, crime rate, social exclusion, in-/equities, health of minorities and vulnerable groups (see Fig. 22, chapter 5.2.4).

The online questionnaire produced similar results. It depends largely on the knowledge and/or experience of the person and/or team conducting the health assessment (according to 38% of respondents) and on the context of the EIA or SEA (according to 23% of respondents), if determinants other than environmental factors are assessed within the environmental assessments. This is also in line with Fischer (2014b), observing that the consideration of social and behavioural determinants in SEAs highly depends on the context and the policy, plan or programme assessed. Furthermore, according to 34% of respondents environmental factors and their limit values are not usually linked to related health outcomes of the affected population (see Fig. 56, chapter 7.7). When looking into the sectors in which health determinants are analysed, again the main focus when assessing health impacts within environmental assessments is on environmental factors across all sectors (according to up to 33% of respondents), less so on behavioural factors (according to up to 11% of respondents) and social factors (according to up to 19% of respondents, in particular on employment and livelihood aspect). Sectors and areas in which more health determinants seem to be include in the assessment are infrastructure projects, waste management, the energy sector, and water management and extractive industry (see Table 34 and Table 35, chapter 7.7).

8.4 Inclusion of environmental health aspects in SEA guidelines

Besides Posas' (2011) review of the 'Draft Guidance for Health in SEA' of the United Kingdom, to the knowledge of the author, it is the first time that the content of SEA guideline documents has been empirically studied for its comprehensive coverage of health. In line with the international experience on the inclusion of health in environmental assessments, the findings show that health is only rarely explicitly considered (Ahmad, 2004; Ahmad et al., 2008; Birley, 2002; Breeze & Lock, 2001; Douglas, 2009; Fischer, Martuzzi & Nowacki, 2009; Harris et al., 2009; Kørnøv, 2009; Nowacki, Martuzzi & Fischer, 2010; Posas, 2011) (see chapter 5.1.2). Nevertheless, the analysis of the discussion of health determinant and health relevant sectors reveals a more complex picture of the consideration of health in SEA guidelines.

Indeed, health was at least mentioned in the majority of the SEA guidelines obtained, both in the 2010 and the 2015/16 research, but in the 2010 research only 13% of the 40 obtained SEA guideline documents included a comprehensive discussion on health, while in the 2015/16 research these were already 28% of the 43 newly obtained guideline documents (see Fig. 17 and Fig. 18, chapter 5.2.3). In the 2010 research the environmental health determinants mentioned in the vast majority of the guideline documents were the 'classic' natural environmental health determinants such as air (83%), water (80%), soil (78%), flora and fauna,

wildlife and biodiversity (73%), and noise or light pollution, vibrations and smell (60%), as described in the legal frameworks on SEA, the SEA Directive and the Protocol on SEA. Weather and climate, as aspects of the global ecosystem, were mentioned in more than half of the guidance documents (65%). Less than half of the documents mentioned landscape, open and green space (38%), or the built environment (35%). Out of the public or private services referring to human activities, waste was mentioned in more than half of the guidelines (53%), followed by access to health services (25%), and the education system (15%). Among the employment and livelihood aspects occupational health and safety issues, for example, avoiding accidents and injuries (35%), were mentioned more often than satisfying employment conditions (10%). Other health determinants of this category were considered in a minority of the guidelines through aspects such as un-/employment (15%), poverty (15%) and affordable housing (8%). Family and community structure determinants such as general equity aspects (13%), health inequalities in different neighbourhoods (15%), health status of minorities and vulnerable groups (20%), social exclusion (13%), or the consideration of crime rates (13%) were also only rarely discussed. While these aspects of the social environment were considered only in 20% or less of all guidelines, behavioural and lifestyle determinants were more often considered: healthy lifestyles, for example, cycling (23%) and opportunities for leisure activities (23%); only food (8%) was seldom mentioned (see Fig. 19, chapter 5.2.3).

These results are in line with the results of the online questionnaire research as well as on SEA guidelines based on the SEA Directive. Guidelines based on the implementation of the SEA Directive focus on the classic environmental health determinants, while guidelines of development agencies seem to include more often also socio-economic and equity related health determinants (see Fig. 20, chapter 5.2.3). Those guidelines mentioning the inclusion of health experts mainly recommend consultation already in the screening and scoping stages; which is also in line with recommendations from SEA reviews (Fischer, Martuzzi & Nowacki, 2009; Douglas, 2009; Kørnøv, 2009; Nowacki, Martuzzi & Fischer, 2010).

The SEA guideline research results show that the health sector is still not aware of the opportunities SEA provides for enhancing population health and for avoiding or minimizing negative implications of strategic actions, as only few health authorities provide material on SEA (Cave et al., 2017a; Douglas, Carver & Katikireddi, 2011; Fischer, Martuzzi & Nowacki, 2009; Harris et al., 2009; Nowacki, Martuzzi & Fischer, 2010). When looking into the restrained review of the 2015/16 guideline research, some advancement in the recognition of health could be observed, as a higher percentage than in the first 2010 review gives at least some indication on how to assess health impacts (19% of the 43 guidelines) and 28% included a more comprehensive discussion on health impacts (see Fig. 17 and Fig. 18, chapter 5.2.3). These findings are also in line with the findings of the literature review. For example, according to Fischer (2014b) health experts only rarely become involved in SEA or only at a late stage, as they are often not statutory consultees, and may feel uncomfortable with their involvement, due to a lack of knowledge of the SEA process (Fischer, 2014b). Also Bond, Cave and Ballantyne (2013) observed that while spatial planning experts were not well equipped to consider health, health experts were only rarely engaged in spatial planning processes, due to limited understanding of the process and hence no interest in influencing it (see chapter 5.1.2).

8.5 Main barriers and facilitators for the integration of health in environmental assessments

The main barriers and facilitators for the integration of health in environmental assessments which are described in the reviewed literature can be observed in the results of the online questionnaire as well as in the evaluation of the CBEH international training workshop, and in the discussions of the follow-up workshops of the CBEH project.

As described in chapter 5.1.2, already in 2001 Breeze and Lock (2001) identified six key issues for the integration of HIA into SEA, which can also be barriers or facilitators for an enhanced integration of health into environmental assessments in general. All of these key issues can be observed in the reviewed literature as well as in the results of the online questionnaire and of the CBEH project workshops:

1. generating common understanding of health
2. increasing awareness of HIA and what it can do
3. managing expectations
4. learning from experience
5. capacity building and involvement
6. increasing the evidence base (Breeze & Lock, 2001).

The identified barriers and facilitators for the integration of health in environmental assessments will be summarized along these key issues. In general, it is important to mention that facilitating factors can easily turn into barriers when they are lacking, just as barriers can turn into facilitators when taken into due consideration. For example, the lack of adequate funding is described as a barrier, but when adequate funding exists it can support the implementation of HIA and the integration of health in environmental assessments, as can be observed in the increase of HIAs conducted in the United States of America due to special funding availabilities (Ross & Rao, 2013).

8.5.1 Generating common understanding

Different actors and stakeholders in the environmental assessment arena have a different knowledge and conceptual understanding of health, and often only a narrow definition of health is used (Carmichael et al., 2012). A common understanding of the broader concept of health as well as health as a technical issue have been identified as key facilitators for a meaningful integration of health (Breeze and Lock, 2001) with the need to better define health (Harris and Haigh, 2015) and make it operational for environmental assessment. For Douglas, Carver and Katikreddi (2011) SEA-conducting authorities and/or consultancies would need further support in addressing the wider determinants in health, also to “ensure the quality to and consistency of these assessments” (Douglas, Carver & Katikireddi, 2011). Furthermore, Cave et al. (2017a) observe a clear need for updated EIA guidance that defines the relevant factors of population and human health for a proportionate EIA. This is in line with the findings of the online questionnaire, in which 20% of the respondents mention the broad recognition of health and well-being across other departments as important for supporting HIA implementation (see Fig. 41, chapter 7.4).

The lack of intersectoral cooperation – namely between the health and the environmental sectors – poses one of the main barriers. This is not only mentioned in the literature reviewed

(such as: Ahmad, 2004; Bhatia & Wernham, 2008; Carmichael et al., 2012; Davies & Sadler, 1997b; Douglas, 2009; Fischer, 2014b; Fischer, Martuzzi & Nowacki, 2009; Hilding-Rydevik et al., 2007; Morgan, 2011; Steinemann, 2000), but also by 22% of the respondents of the online questionnaire (see Fig. 44, chapter 7.4), and 16% of the respondents think that joint action/intersectoral collaboration would facilitate advanced integration of health in environmental assessments (see Fig. 43, chapter 7.4). Reasons for a lack of intersectoral collaboration can be seen, for example, in the cultural differences between the sectors and different languages used (Fischer, Martuzzi & Nowacki, 2009; Carmichael et al., 2012), in different governance arrangements (Carmichael et al., 2012), in a lack of expertise on how to further integrate health aspects into the environmental assessment and planning processes (Burns and Bond, 2008), or in a lack of trust between the different stakeholders (Carmichael et al., 2012). Therefore, to facilitate health inclusive environmental assessments, there is a need to further promote the assessment of human health in planning- and decision-making of EIAs of development projects (Hilding-Rydevik et al., 2007), to use a broader definition of health (Carmichael et al., 2012) and especially to develop a close partnership and a "shared vision between public health and planning sectors" (Carmichael et al., 2012) (see chapter 5.1.2).

8.5.2 Increasing awareness of HIA and health within environmental assessments

Further meaningful integration of health into environmental assessment needs not only a common understanding of health but also a common understanding of the different impact assessment processes and the opportunities they present for health promotion and avoiding negative long-term impacts on health. There is a clear need for enhanced awareness raising (Hilding-Rydevik et al., 2007) as HIA and a further integration of health can "contribute to improving policies and plans by way of better informed and transparent decision/making and greater integration of policies and actions across all sectors" (Breeze & Lock, 2001). Across different sectors and governmental authorities awareness on the relevance of HIA and health assessment needs to be increased as the broader determinants of health such as social, economic and environmental determinants, are usually dealt with outside of the health sector (Breeze and Lock, 2001). While there is, for example, a clear understanding that planning can affect human health, there is a lack of expertise on how to further integrate health aspects into the profession (Burns & Bond, 2008). This is also confirmed by Fischer (2014b), who observed that the consideration of social and behavioural determinants in SEAs highly depends on the context and the policy, plan or programme assessed, and that policy- and plan-makers regularly lack an understanding of the broader aspects of health and the interlinkages with the proposal under discussion. Additionally, health experts only rarely become involved in SEA or only at a late stage, as they are often not statutory consultees, and due to a lack of knowledge of the SEA process may feel uncomfortable with their involvement (Fischer, 2014) (see chapter 5.1.2).

Increased awareness on health in environmental assessments would also be supported through assigning responsibilities and developing an agreed process for health input into environmental assessments and/or standalone HIA starting at the screening stage – an option supported by the CBEH project participants of the follow-up workshop in Estonia and Slovakia (Gibson, Nowacki & Cave, 2013a,b). Participants also called for a review of existing laws to determine the legal drivers that can be used for HIA implementation or better integration of

health assessment in EIA and SEA (Gibson, Nowacki & Cave, 2013b). Furthermore, 27% of the respondents of the online questionnaire mentioned the need for political and intra-organizational support for further implementation of HIA (see Table 30, chapter 7.4), and 22% suggested legal instruments and legislation to facilitate the integration of health in environmental assessments (see Fig. 43, chapter 7.4). Likewise, among the participants in the CBEH training modules 3A on health in EIA and 3B on health in SEA, the most useful things mentioned specifically in their modules during the training week were how health could be integrated into the environmental assessments, the difference between the different impact assessment forms and the impact assessment procedures and steps (see chapter 6.2.2).

These findings are also in line with the observations of Carmichael et al. (2012) on the importance of the governance arrangements and political context, "a high level commitment and leadership" (Carmichael et al., 2012) and institutional support as well as engagement with community stakeholders through better participatory models (see chapter 5.1.2). In this regard, participants of the CBEH follow-up workshops also called for clarification of the ways of communication, not only within and between the ministries but also with the stakeholders outside of the ministries and the public (Gibson, Nowacki & Cave, 2013b,a) (see chapter 6.3). This demand is reinforced by Bhatia and Wernham (2008): more engagement by public health agencies with impacted/affected communities, to become familiar with their concerns and the engagement of public health agencies and academic institutions with local EIA and lead agencies, to become familiar with EIA processes and participate in them (see chapter 5.1.2).

Also respondents of the online questionnaire reported diverse activities or elements supporting HIA implementation such as collaborative partnership with other sectors (31% of respondents), the availability of legal requirements for HIA (28% of respondents), the political commitment by national, regional or local authorities to the strategy of HiAP (28% of respondents, n=18) (see Fig. 40, chapter 7.3).

Importantly, not only an increased awareness of HIA and of the importance of health assessments within environmental assessments would facilitate the integration of the broader determinants of health into environmental assessment but, as Lebret (2016) states, experts are needed with the ability to apply knowledge across different disciplines and situations (see chapter 5.1.1.2).

8.5.3 Managing expectations

In order to manage the expectations of HIA and the integration of broader health determinants into environmental assessments Breeze and Look (2001) emphasize the importance of producing highly qualified reports, based on current knowledge and best evidence available. It is therefore necessary to not only describe the potential but also the limitations of the health assessment (Posas, 2011).

This could be facilitated, for example, through formalized guidance for health analysis (Bhatia & Wernham, 2008) or the usage of screening checklists that include differential aspects (Douglas, Carver & Katikireddi, 2011). Use of such a screening checklist as early as the scoping stage would support the identification of the relevant health issues and the consideration of differential impacts at an early stage of the planning- and decision-making process, and therefore support the management of expectations through a transparent process. Also

Carmichael et al. (2012) describe the need for a timely, comprehensive and inclusive appraisal process (see chapter 5.1.2).

These findings are also in line with the findings of the online questionnaire, and of the CBEH project workshops. For example, the participants of the CBEH follow-up workshops declared that a licensing system for health and environmental experts would need to be maintained by a continuing professional development programme as well as a mentoring programme (Gibson, Nowacki & Cave, 2013b,a). In this regard a licensing system for HIA and health impact assessors with clear regulation could raise the awareness of what to expect from HIA and health assessments within environmental assessments (see chapter 6.3).

The research found a wealth of guidelines: for example on SEA 40 documents were identified in 2010 research and another 43 new or updated ones in the 2015/16 research (see chapter 5.2), and already in 2010 Nowacki, Mekel and Fehr (2010) identified 20 generic HIA guidelines from eight different countries. Nevertheless, participants of the CBEH project workshops (see chapter 6.3) as well as respondents of the online questionnaire called for the development of country or sector specific guideline documents (see chapter 7.4), for which already existing ones can and need to be adjusted to the specific context. Hence, the adjustment of guidelines to the specific context can also play an important role in managing the expectations of HIAs or health assessments within environmental assessments and in facilitating the implementation.

While, according to 58% of respondents, some kind of resources and activities are offered that support the implementation of HIA in the majority of countries (75%), most of these activities are ad hoc such as the development of specific guidelines (47% of respondents) and HIA tools (44% of respondents) (see Table 29, chapter 7.3). Adjusted guidelines for HIA and adjusted screening tools for health impacts were also among those activities or elements reported as relevant for supporting HIA implementation – by 34% of respondents for the guidelines and by 20% of respondents for the screening tools (see Fig. 40, chapter 7.3).

In regard to activities or tools that were seen as supporting the integration of health in EIA or SEA, 23% of respondents indicated that country-specific training, tools, and guidance are further needed, and 22% called for sector specific training, tools, and guidance (see Fig. 41, chapter 7.3).

Similarly, the participants of the CBEH follow-up workshop also called for the development of national guidelines and for the establishment of quality assurance criteria that recognize the country specific context (Gibson, Nowacki & Cave, 2013b,a). Quality assurance would also be facilitated through the development of evaluation criteria for HIA and health assessments in environmental assessments and their monitoring. According to Bhatia and Wernham (2008) important issues include “analytic validity, issue relevance, public involvement, and impacts on decisions as well as decision-makers and decision-making practices” (Bhatia & Wernham, 2008). Findings of Carmichael et al. (2012) further reveal the need for a transparent appraisal process and the development of monitoring plans. HIA can hereby serve as a participatory and awareness-raising tool to facilitate a health inclusive planning process (Carmichael et al., 2012) (see chapter 5.1.2).

8.5.4 Learning from experience

In order to develop the concepts for HIA and health assessments within environmental assessments further, learning from experience at national and international level is a prerequisite (Breeze & Lock, 2001). In this regard Bhatia and Wernham (2008) call for open collaboration and discussion between HIA and EIA proponents (see chapter 5.1.2). Participants of the CBEH follow-up workshops called for joint projects, as they offer good possibilities to learn from each other and strengthen the knowledge on health impacts and how to integrate them into environmental assessments (Gibson, Nowacki & Cave, 2013b,a) (see chapter 6.3).

Factors that have the potential to hinder these joint projects can be the same as Fischer, Martuzzi and Nowacki (2009) identified for the limited participation of health authorities in SEAs: “resource constraints and competing institutional tasks, with limited time to contribute to SEA” (Fischer, Martuzzi & Nowacki, 2009), as well as differences in the structural and strategic orientation of the departments involved (Carmichael et al., 2012) (see chapter 5.1.2).

These findings are also supported by the participants of the modules on health in EIA (Module 3A) and health in SEA (Module 3B) of the CBEH international training workshop, the most useful things mentioned was not only how to better integrate health into EIA or SEA but also to learn more about the difference between the different impact assessment forms (see chapter 6.2.2).

As described in chapter 6.3, a licensing system for HIA and health impact assessors was seen by the participants of the CBEH follow-up workshops as a facilitator for further integration of health in environmental assessments and HIA implementation. Experiences form countries in which such a system is already in place, as for example in Lithuania and Slovakia, could be taken into consideration by those countries who would like to implement a similar system. Also the experiences from the environmental sector could be most useful as in many countries a system for licensed environmental assessors is in place (Gibson, Nowacki & Cave, 2013b,a) (see chapter 6.3).

As already mentioned above in chapter 8.5.2, joint action and intersectoral collaboration were seen by 16% of the respondents of the online questionnaire as a facilitator for further integration of health into environmental assessments (see Fig. 43, chapter 7.4), while 11% of the respondents saw the lack of experience and/or knowledge as a barrier for further integration of health in environmental assessments (see Fig. 44, chapter 7.4). Hence, out of the activities or elements reported by the respondents as relevant for supporting HIA implementation, adjusted guidelines for HIA rated highest (34%), followed, among others, by collaborative partnership with other sectors (31%) (see Fig. 40, chapter 7.3).

In regard to activities or tools that are either already in place or are needed to support the integration of health in EIA or SEA, most respondents agreed that further support for the integration of health in environmental assessments is needed in their countries and only a few activities or tools exist. Among the items mentioned as needed further were joint trainings (according to 45% of respondents), an intersectoral working group (42%), and joint pilot projects (39%) (see Fig. 41, chapter 7.3).

8.5.5 Capacity building and involvement

Capacity building was mentioned in the literature reviewed as well as by the participants of the CBEH workshops and the respondents of the online questionnaire as a key facilitator for HIA implementation and the further integration of health in environmental assessments. In this regard Breeze and Lock (2001) declared that while knowledge and skills for HIA already exist across many organizations in Europe, often this knowledge is not yet applied in the form of HIA. Local, regional and national capacities would need to be further developed to facilitate the implementation of health inclusive environmental assessments, through sharing of experiences and multisector and multi-disciplinary collaboration (Breeze & Lock, 2001). Carmichael et al. (2012) identified as barriers the lack of understanding of the planning system by the public health sector, as well as planners' use of a narrow definition of health and focus on physical and environmental health. Burns and Bond (2008) revealed that even though there is a clear understanding that planning can affect human health, there is a lack of expertise on how to further integrate health aspects into the profession. Hence, capacity development on health in the planning community would facilitate and enhance the dialogue with health practitioners (Burns and Bond, 2008). This finding was reconfirmed by Bond, Cave and Ballantyne (2013): while spatial planning experts were not well equipped to consider health, health experts were only rarely engaged in spatial planning processes, due to limited understanding of the process and hence no interest in influencing it (see chapter 5.1.2).

The responses of the online questionnaire also support the importance of capacity building activities as a facilitator for further integration of health into environmental assessments. Capacity building was mentioned most often as a facilitating factor supporting the further implementation of HIA by 30% of respondents of the online questionnaire (see Table 30, chapter 7.4) as well as by 31% of respondents from 50% of all countries when asked about facilitating factors advancing the integration of health in environmental assessments (see Fig. 43, chapter 7.4). Meanwhile, a lack of experience and/or knowledge was considered by 11% of respondents as a barrier for further integration of health in environmental assessments (see Fig. 44, chapter 7.4). While in the majority of the countries of the respondents some kind of training activities are taking place to facilitate the implementation of HIA, such as HIA training for public health authorities (in 61% of all countries), for health experts (in 64% of all countries), for environmental assessors (in 50% of all countries) and for researchers (in 47% of all countries), these activities are usually taking place on an ad hoc basis and not regularly (see Table 29, chapter 7.3).

In regard to activities further needed to facilitate the integration of health in EIA or SEA, most respondents agreed that further support was needed. For example, training on health for environmental authorities and environmental consultants/assessors (47% of respondents), environmental assessment training for public health experts (47% of respondents) and joint trainings (45% of respondents) were mentioned most often (see Fig. 41, chapter 7.3).

According to participants of the CBEH follow-up workshops, further capacity building activities as well as the development of national networks and a further establishment of linkages to international networks would facilitate the further integration of health in environmental assessments (Gibson, Nowacki & Cave, 2013b,a) (see chapter 6.3).

8.5.6 Increasing the evidence base

One of the key barriers to adequate integration of human health aspects into EIA still seems to be a limited evidence base, often focusing on quantifiable impacts, and, according to Hilding-Rydevik et al. (2007), a lack of knowledge of the linkages between the overall impacts of the project and its impacts on the environment and on human health (see chapter 5.1.2). Addressing complex societal problems to support policy-making, requires not only specialized expertise and an "in-depth understanding of biological, chemical, and physical process in the causal chain from source to effect" (Lebret, 2016), but also experts with the ability to apply knowledge across different disciplines and situations (see chapter 5.1.1.2).

Importantly, not only negative aspects but also the positive would be needed to be further evidence based (Kwiatkowski & Ooi, 2003). According to Douglas, Carver and Katikreddi (2011) to facilitate health assessments in environmental assessments, such as SEA, also the health-related evidence and data would need to be further disseminated in a form that is useful for the SEA, for example, in form of compilations for different sectors and types of SEAs. Furthermore, through a better integration of public health authorities into the SEA, the appropriate health evidence could be better and more consistency in the health issues considered could be achieved (Douglas, Carver & Katikireddi, 2011) (see chapter 5.1.2).

Linzalone et al. (2014) identified shortcomings on addressing health in Italian SEAs, such as the lack of characterization of the environmental factors that directly and/or indirectly affect the health of exposed population, the lack of identification and characterization of the potential risks associated with the actions contained in the plan/program, the absence or poor evaluation of the effects on health deriving from the implementation of plan or program, and the lack of consideration for prevention and reduction of effects on health. An increase of the evidence base and dissemination in a useful form for environmental assessment would facilitate a meaningful integration of health into environmental assessments and have the potential to reduce such shortcomings. In this regard, Faith-Ell, Kalle and Lund-Iversen (2014) call not only for "more meaningful statistics and studies with both temporal and areal distribution patterns of health-related issues through various social groups" (Faith-Ell, Kalle & Lund-Iversen, 2014), which would involve both environment and health experts jointly in research as well as in capacity building activities. They also conclude that an "improvement of databases, surveys, methodologies and professional as well as institutional capacities" (ibid.) can facilitate the further integration of health assessments in environmental assessments (see chapter 5.1.2).

While the need to increase the evidence base plays a major role in the literature reviewed, neither the respondents of the online questionnaire nor the participants of the CBEH capacity building workshops particularly emphasized it. Out of the 64 respondents to the online questionnaire only 13% mentioned increased knowledge as a facilitator for HIA implementation but none mentioned it as a facilitator for better integration of health into environmental assessments. Instead 31% mentioned capacity building in general as important for further integration of health into environmental assessments (see Fig. 43, chapter 7.4). Meanwhile, a lack of information, data or databases was only considered by 8% of respondents to the online questionnaire as barrier to further integration of health in environmental assessments (see Fig. 44, chapter 7.4).

8.5.7 Availability of adequate resources

One of the key issues which was not mentioned by Breeze and Lock (2001) but which was not only referred to in the literature reviewed but also brought up by CBEH project participants and by respondents to the online questionnaire, was the need for adequate resources not only in regard to employing and qualifying personnel for HIA and health assessments but also in regard to funding HIAs and health assessments. For example, for Fischer, Martuzzi and Nowacki (2009) one of the barriers that contributes to limited participation of public health experts in SEAs is not only cultural differences but also "resource constraints and competing institutional tasks, with limited time to contribute to SEA" (Fischer, Martuzzi & Nowacki, 2009). This is reconfirmed by Carmichael et al. (2012) ascertaining limited capacities, skills and resources in planning authorities and health authorities, for example to develop partnerships (Carmichael et al., 2012). Bhatia and Wernham (2008) therefore call for explicit funding for HIA, for example, through direct payment by developers, funding from lead agencies, regulatory agency grant programmes, or private grants (Bhatia and Wernham, 2008) (see chapter 5.1.2).

The findings from the follow-up workshops of the CBEH project also support the importance of adequate resources for facilitating the integration of health in environmental assessments. Participants from Estonia, for example, reconfirmed the need to clarify who should pay for activities, such as analyses and assembling the reports, when dealing with health assessments, as well as the need to allocate resources not only for commissioning HIAs but also for trainings and guideline development to be able to get involved in environmental assessments (Gibson, Nowacki & Cave, 2013b) (see chapter 6.3). Economic factors, such as priorities given to economic benefits instead of health benefits, or the costs of the assessment, were also mentioned by 14% of respondents as barriers for further integration of health in environmental assessments (see Fig. 44, chapter 7.4).

8.6 Capacity building to support the integration of assessing health impacts into environmental assessments

As already discussed above, capacity building is seen in literature as well as by the participants of the CBEH project workshops and the respondents of the online questionnaire as one of the main facilitators for further integrating the assessment of broader environmental health factors into environmental assessments. One of the first workshops conducted by the WHO Regional Office for Europe (1987) on 'Health and Safety Components of EIA' requested that health professionals should always be involved in consultation. To achieve this, training initiatives were recommended with different formats and timescales for undergraduate, postgraduate and continuing education levels of higher education institutes, targeting especially medical personnel and health officials, but also senior members of government and industry, and representatives of mass media. These could be intensive training courses of 3–4 months, to seminars of 1–2 weeks or joint study tours. Bhatia and Wernham (2008) indicate that core capacities in HIA could be integrated into training of public health schools and continuing education courses, while Harris et al. (2009) call for capacity development "amongst EIA professionals, led by the health sector, to progress health related knowledge and tools" (Harris et al., 2009) (see chapter 2.4.4).

Participants of the CBEH project workshop confirmed these findings. For example, 71% of the participants of the international training week would like to see more training workshops with colleagues from the environment and health sectors, more networking with colleagues from other countries and similar training opportunities in their country (both items 67) (see Fig. 26, chapter 6.2.1). Furthermore, the training of trainers module was rated as relevant for their professional and vocational needs by 63% of the international training week participants, even though only 47% would consider training on environment and health in future in their country (see Fig. 26 and Fig. 27, chapter 6.2.1). Overall the CBEH international training week seemed to have been in a good format as participants rated most of the content as relevant for their vocational and professional needs and were satisfied with the knowledge provided to them (69%), the mixture of key lectures, case studies and more in-depth modules (64%), and the quality of the lectures and parallel modules (60%). Nonetheless, a full week of dedicated training only achieved 51% of agreement among the participants of the international training week (see Fig. 26, chapter 6.2.1).

The discussions at the CBEH follow-up workshops on health in environmental assessments also clearly revealed that there is a need for further capacity building, ranging from specific topics such as risk assessment in small scale areas to the broader frameworks of HIA and the integration of health into environmental assessments. Training needs were seen at different levels, from introductory courses at university level to advanced continuous training for practitioners. Ideally, these trainings should be conducted not only for health experts, such as epidemiologists, medical personnel, occupational health experts, or toxicologists, but also for environmental experts and planners to achieve a better understanding among these expert groups (Gibson, Nowacki & Cave, 2013a,b; WHO Regional Office for Europe, 1987) (see chapters 6.3 and 2.4.4.1). Fitzpatrick and Bonnefoy (1998) list a total of 38 disciplines in the field of environmental health, adding to the already mentioned groups areas such as agriculture, economics, human resource management, law, meteorology, political science, or statistics – for the full list of disciplines please refer to Fitzpatrick and Bonnefoy (1998) (Fitzpatrick & Bonnefoy, 1998). Considering the environmental side, Gazzola (2008) lists 12 different disciplines and ten groups of degree titles, such as environmental sciences, engineering, or environmental assessment and planning, which include at least some part of environmental assessment in their Masters programmes (Gazzola, 2008). Hence, these would comprise the environmental experts group (see chapter 2.3.3).

Importantly, training for environmental assessment experts should include at least some lectures on broader environmental health aspects, while training on HIA should include lectures on environmental assessments and how to become involved in these assessments. Topics as well as the time frame for capacity building on HIA and health in environmental assessments depend especially on the background of the target audience and the main objective of the training. As described in chapter 2.3.3, educational training can be developed for different levels as Fitzpatrick and Bonnefoy (1999) showed in their curricula for environmental health experts, but while these curricula are aimed at building up environmental health service staff and hence include a wide range of topics, Fischer (2014a) developed a curriculum for environmental assessment experts, and the CBEH project delivered a continuous training proposal for health in environmental assessment and standalone HIA (WHO Regional Office for Europe, 2013g) (see chapter 6.4.2).

Topics for further capacity building suggested by participants of the CBEH follow-up workshops range from specific topics such as risk assessment in small scale areas to the broader frameworks of HIA and the integration of health into environmental assessments. For Fitzpatrick and Bonnefoy (1999) training for environmental health experts does not only include knowledge in risk assessment in relevant core areas of environment and health, relating to natural environmental factors (biological, chemical, physical) but also includes specific risk assessment knowledge on, for example, agriculture, risk communication and management, quantitative and qualitative research, knowledge for intersectoral cooperation and consultation, and in education and training (Fitzpatrick & Bonnefoy, 1999) (see chapter 2.3.3).

While the curricula developed by Fitzpatrick and Bonnefoy (1999) include the topic of EHIA only among the optional modules for environmental health professionals and allied generalists or specialists, and as a holistic module for environmental health service managers and managers of other sectors, Fischer (2014a) developed a specific curriculum for EIA in higher education in Pakistan, and within the CBEH project WHO developed a first proposal for continuous training in environment and health around standalone HIA and health in environmental assessments. The proposal allows for the inclusion of basic environment and health knowledge, but also horizontal thematic areas such as concepts of policy analysis, quantitative risk assessment tools and techniques, working with stakeholders based on risk perception and risk communication principles (WHO Regional Office for Europe, 2013g) (see chapters 2.3.3 and 6.4.2).

The analysis of the online questionnaire revealed similar findings. For the respondents to the online questionnaire capacity building activities would facilitate the further implementation of HIA (30% of the respondents) as well as the integration of health in environmental assessments (31% of the respondents) (see Table 30 and Fig. 43, chapter 7.4). In 50% of the countries, capacity building activities on HIA for public health authorities are already conducted but mainly on an ad hoc basis (according to 42% of respondents), as well as in 43% of the countries for health experts (according to 36% of respondents), researchers (44% of respondents, n=21), and environmental assessors (28% of respondents) (see Table 29, chapter 7.3). Only in a few countries are there also regular capacity building activities for public health authorities, health experts and environmental assessors, with the majority of these activities taking place in Lithuania, which has a licensing system for environment and health assessors in place, and in the United Kingdom.

In regard to the integration of health in EIA or SEA, most respondents agreed that further support would be needed in their countries and only a few activities or tools exist. Activities most often mentioned here were further training on health for environmental authorities and environmental consultants/assessors (47% of respondents), environmental assessment training for public health experts (47% of respondents) and joint trainings (45% of respondents) (see Fig. 41, chapter 7.3).

The need to also integrate more so-called soft skills into capacity building activities was already recognized by Fitzpatrick and Bonnefoy (1999) integrating into their curricula communication, educative and organizational skills as subjects of interactive training, next to investigative, analytical and interpretative skills (see chapter 2.3.3). This need for soft skills was

reinforced by Lebret (2016), indicating that to assess complex societal problems requires not only specific knowledge and in-depth understanding of, for example, risk assessments, but also the ability to apply this knowledge across different disciplines and situations (Lebret, 2016) (see chapter 5.1.1.2). A similar need is also reflected in the evaluation of the more soft-skilled elements of the CBEH international training week, with the highest relevance for vocational and professional needs given to the key lecture on 'risk communication and communicating uncertainties' (60% of all participants) and to the 'train the trainer' module (63%) (see Fig. 27 and Fig. 29, chapter 6.2.1).

8.7 Summary and further discussion points

The findings of the research can be summarized as follows:

(1) In environmental assessments mainly the 'classic' factors of the natural and built environments are considered; other determinants are less often assessed, depending heavily on the proposals as well as on the experience of the assessor; out of these, behavioural factors such as physical activity are more often considered; additionally most of the health factors are only described but not further linked to possible health outcomes.

(2) In many countries the need for assessing health in environmental assessments is included in environmental laws, nevertheless there is a limited integration of public health experts or health authorities into the process, and if so, mainly at a later stage of the assessment.

(3) Health aspects are mentioned in SEA guidelines, but again the focus is on the 'classic' factors of the natural and built environment and further information on what is needed to do for a meaningful health assessment is limited if at all included.

(4) A vast variety of barriers and facilitators for HIA and the integration of health in environmental assessments have been identified, grouped as follows:

   (a) further awareness raising on the broader aspects of health outside the health sector;
   (b) increasing awareness on HIA and health assessment among all stakeholders through further intersectoral and interdepartmental cooperation, as well as political and institutional support;
   (c) managing what can be expected from the health assessment through clear responsibilities, guidance and legal regulations;
   (d) learning from experiences from other sectors assessments, and applications in other countries or regions, as well as through joint projects;
   (e) capacity building is regarded as main facilitator and should integrate the different groups of health experts as well as for environmental experts and planners;
   (f) increasing the evidence base through further joint research, better accessibility of already existing databases, open dissemination of assessment results and monitoring of the proposal implementation and long term outcomes; and
   (g) appropriate financing of personnel capacities as well as of the health assessment itself.

(5) Even though in many countries capacity building activities already exist, they are mainly done on an ad hoc basis, therefore further capacity building for the different groups of health experts as well as for environmental experts and planners is needed and should preferably be done regularly, jointly and integrated into the vocational training of health and environmental assessors.

Beyond the findings from the five research questions the literature review as well as the online questionnaire raised further topics that are regarded as important and will therefore be discussed in the following subchapters.

8.7.1 The effectiveness of HIA and health assessments in environmental assessments

Even though the literature review did not specifically look into the effectiveness of HIA, this topic touches on the question whether implementation of HIA and health assessment in environmental assessment should be further advanced. In this regard respondents to the online questionnaire gave a rather negative picture on the effectiveness of HIA with only one respondent considering HIA to be very effective in the country while 9% of respondents rated HIA as not effective at all in their country; 25% of respondents indicated that HIAs are more ineffective than effective in their country; and 36% of the respondents were undecided about HIA's effectiveness. Importantly respondents from countries with a higher experience in HIA, for example, Lithuania and the United Kingdom, rated more in favour of HIA effectiveness than respondents from countries with less experience in HIA (see Fig. 57, chapter 7.8). This confirms the need to further raise awareness on the potential of HIA and health in environmental assessments and to provide more good practice examples.

An analysis of the effectiveness is according to Wismar (2007) difficult, if not impossible, even though "some individual case studies and anecdotal evidence seem to suggest that HIA effectively supports the decision-making process" (Wismar, 2007). They differentiate between ineffectiveness, direct, general and opportunistic effectiveness, as well as between health, equity and community effectiveness. Their analysis of 17 European case studies showcased that except for one all HIA as well as the health assessments in other environmental assessments were in some way effective, but there was room for further improvement, especially in relation to realistic expectations of an HIA and health assessment, and the need for promotion and awareness raising of its values in other sectors (Wismar, Blau & Ernst, 2007).

Nevertheless, five years later Gray et al. (2011) revealed after analysing 135 different case studies that "there is little evidence that health issues were incorporated nor that health-related recommendations were incorporated into the adopted plan documents, and there is no information given about implementation" (Gray et al., 2011). Hence, they conclude that evidence on the effectiveness is still limited and further research is needed.

For this it could be useful to link the effectiveness types used by Wismar et al. (2007) – no effectiveness, direct, general and opportunistic effectiveness – with sustainability development criteria as, for example, developed by Bond, Morrison-Saunders and Stoeglehner (2013) for sustainability assessment processes. For more details please refer to chapter 2.4.6.2.

8.7.3 On the integration of HIA in environmental assessments or separate assessment approaches

The development of HIA as a separate process can be seen as one way to tackle the limitations of a broader assessment of health aspects within environmental assessments. Nonetheless, HIA has only developed in a limited number of countries as a standalone process with its own legal basis. According to the respondents to the online questionnaire, only in three countries (11%) do national laws exist and in seven countries (25%) subnational or locally binding norms exist that require HIAs. Meanwhile, in 17 of the countries (64%) HIA is either required in national environmental laws like EIA and/or SEA, or the assessment of health impacts is mandatory in the national environmental laws (see Table 27 and Table 28, chapter 7.3). Furthermore, according to 58% of respondents health assessment is included in environmental assessment and only 20% of the respondents claimed that the health assessments are done as separate HIAs (see Fig. 42, chapter 7.3).

In the literature reviewed, the question of whether to further integrate health assessments into environmental assessments or to keep them separate is controversial. For example, for Ahmad (2004) the integration "offers an ideal platform to assess the potential health impacts of development actions and thus achieve greater sustainability" (Ahmad, 2004) and the SEA Directive is particularly considered as "an important milestone for the mandatory integration" (Ahmad, 2004) of HIA in SEA, bringing the main values of HIA – equity, analysis of differential impacts on population subgroups, and transparent use of evidence – into the environmental assessment processes.

In the light of the discussion on integration of different impact assessment approaches into SEA, Tajima and Fischer (2013) reviewed 17 SEA-inclusive sustainability appraisals of the spatial planning system of England, which included at least three other forms of impact assessment, such as habitat regulation assessment, HIA, equality impact assessment, and transport impact assessment (TIA). Integration took place either through cross-referencing or through a single officer/team conducting the assessments. The aim was to evaluate how a more balanced integration of environmental, social and economic issues can be achieved through integration of different impact assessment approaches within the SEA-inclusive sustainability appraisals. The results of the analysis led to a call of caution when trying to integrate different impact assessment approaches as "integration does not necessarily lead to a balanced consideration of environmental, social, and economic aspects" (Tajima & Fischer, 2013). There is a tendency for economic and social issues to subordinate environmental ones. The extent of the integration approach can lead to either effective or ineffective integration, with the latter being explained through excessive complexity and loss of attention to specific issues. On the other hand, this tendency could be counteracted by constant communication between the officers and departments involved. Furthermore, more effective integration seems to be possible for impact assessment approaches with common features and shared values, such as integrating HIA and HEIA into the sustainability appraisal, while habitat regulation assessment might be better as a separate report due to different legal obligations (Tajima & Fischer, 2013).

Fischer (2014b) also calls for caution regarding integration when the power distribution between the different stakeholders in an SEA is uneven, and only in the absence of vested interests may integration of different impact assessment approaches be more balanced and

less problematic. Integration could be further supported through establishing formal trade-off rules and a transparent and open process, with participants open to different outcomes of the SEA. But integration is often limited by insufficient financial, human, and technical resources; additionally, health issues are usually not within the responsibilities of the authority preparing the proposal subject to the SEA for which effective coordination between the authorities involved is needed. Despite these difficulties, Fischer (2014b) concludes: “Whilst in current practice globally, it is mainly the biophysical determinants of health that are advanced through SEA, social and behavioural determinants may also be included. However, this is only likely to become more widespread in the presence of associated government policy, legal mandates or official guidance” (Fischer, 2014).

One form which can further support integration is ESHIA, which aims at close coordination of the three assessment forms EIA, SIA and HIA being conducted simultaneously. As described in chapter 2.4.4.1, this requires regular updating between the assessments. Most probably the HIA would need more time than the other two, as much of the data gathered by the EIA and the SIA can be used in the HIA. In a fully integrated assessment this would also lead to more cross-references from the HIA to the EIA and SIA than vice versa (Birley, 2003). Limitations of this process are possible resource constraints and limited engagement with the health community, as the participatory process most likely takes place within the SIA (Birley, 2003, 2011)

Looking into the opportunities and weaknesses of integration of health assessment in different types of impact assessments such as EIA, SEA, and sustainability assessment, Fehr et al. (2014) conclude that there is no single best way to go. The authors see three main options, which do not necessarily exclude each other, and may need to be looked into on a case by case basis:

- “better coverage of health within the range of existing impact assessments other than HIA;
- further development and practical implementation of HIA; and
- development of better and more use of integrated assessments” (Fehr et al., 2014).

Overall, the results of the online questionnaire and the CBEH project are consistent with the literature reviewed. The research approaches revealed that while progress can be observed in the implementation of HIA and the ‘official’ integration of health into environmental assessments, there is still room for further improvement.

9 Conclusions

The many determinants of health include biological and genetic factors, individual behavioural risk factors and lifestyle, family and community structures, employment and livelihood (including occupational risk factors), health and other public services, natural and built environmental factors, factors of the global ecosystem (including climate change and natural hazards) as well as general social, economic and political factors – see also Fig. 4, chapter 2.2.2. Hence, policies, plans, programmes and projects affect health whether planned and implemented within the health sector or in others. Not only does this give considerable scope for action outside the health sector to prevent ill health and promote good health, but by recognizing the EBoD, the return on investments in the environmental domain through interventions addressing the environmental root causes of disease can be considerable. Environmental assessments can serve as a vehicle to not only address these root causes but also to promote good health.

As stated in chapter 2, the overall objective of the research is to identify the main methods, tools, institutional and procedural factors that facilitate the integration of a broad range of environmental health aspects, determined by the natural (biological, chemical, physical), built, social and behavioural factors, into environmental assessments such as SEA.

Firstly, information on the integration of health in environmental assessment in the WHO European Region has been gathered through different research approaches. Secondly, the main tools and methods that support the integration of a broad range of environmental health aspects, determined by the natural (biological, chemical, and physical) built, social and behavioural factors, into environmental assessments have been further substantiated. Lastly, institutional and procedural factors supporting the integration of health in environmental assessments and HIA have been compiled and confirmed.

9.1 Answers to the research questions

To achieve the main objective five research questions were formulated, data collected and analyzed, and results discussed. The following subchapters present the conclusions of the five research questions.

9.1.1 Which environmental health aspects are mainly considered in environmental assessments and specifically in SEAs?

The data and information gathered through the iterative literature review, the SEA guideline document analysis, and the online questionnaire on HIA implementation and health in environmental assessments indicates that in general health aspects are considered in environmental assessment and specifically in SEAs. However, the results show that the focus is mainly on so-called classic factors of the natural (biological, chemical, physical) environment, to a lesser extent on factors of the built environment, and only rarely on those of the social and behavioural environment. Furthermore, when potential health impacts are defined and described, these are not usually linked to possible health outcomes. Likewise, health inequities

are rarely assessed within environmental assessments but more likely to be considered in standalone HIAs.

Even though, the social environment consisting of health determinants such as community structure, employment and livelihood, health, public and private services, and the behavioural environment, including lifestyle, physical activity and behavioural risk factors, are considered, it depends largely on the proposal to be assessed in the environmental assessment as well as on the experience of those responsible for, or conducting, the environmental assessment.

Importantly, the higher the administrative level of the proposal, the broader the scope of possible impacts and the lower the level of detail. Furthermore, potential impacts tend to be more indirect than direct. Hence, as stated by Partidário (2012), an SEA should consider and assess more economic, institutional, policy or social issues than an EIA, which assesses the direct environmental effects of a proposal. Likewise, the general social, economic and political factors need to be considered as health determinants in the health assessment within SEAs at the policy and plan level and accordingly at the national/federal or regional/state governmental level. While at the lower levels of programme SEAs and project EIAs at the subregional and local levels more direct impacts are determined by the natural and built environment, existing or lacking public and private services, employment and livelihood, community structures as well as lifestyle such as physical activity would be needed to be taken into consideration for the health assessment. On the different administrative levels and the linkages between SEA and EIA see also Fig. 10, chapter 2.4.2, and for an overview of the broader environmental and social determinants of health and well-being (see Table 2, chapter 2.2.2).

When considering the burden of disease as described in chapter 2.2.3, the so-called classic environmental health risk factors still contribute to a high proportion of the burden of disease: the majority of the total 36 diseases or disease groups are related to either ambient or household air pollution (28%) or to water, sanitation and hygiene practices, including the management of water systems and bodies of water (36%). Additionally, out of the global top six diseases with the highest burden of disease attributable to the environment (303.1 million DALYs; 51% of all environmental 596.4 million DALYs) five are linked to air pollution, making it one of the biggest modifiable risk factors and revealing a high potential for disease prevention (see also Table 5, chapter 2.2.3). A focus on the so-called classic environment factors is therefore very much needed, but also the broader health determinants, as described in chapter 2.2.2, need to be taken into account to address the complex and interlinked environmental and societal problems of today.

9.1.2 How are these environmental health aspects considered in environmental assessments in Member States within the WHO European Region?

Legislation for environmental assessments, both for EIA and SEA, build in general a basis for the integration of health in environmental assessments, as in these regulations health is at least mentioned as a main reason for issuing the legislation. Often it is explicitly mentioned that impacts on population and human health have to be assessed, as is the case in the Directives on EIA and SEA as well as in the Protocol on SEA, in some countries there are also

further regulations at the regional or local level. Nevertheless, consultation with health experts on possible health impacts in EIAs as well as in SEA is only mandatory in a few countries, therefore health experts are less involved as a matter of routine in environmental assessments, and if so, then mainly at the appraisal/risk assessment stage, far less at the scoping stage and at the screening stage only rarely. As a result, in many countries the health assessment is done by environmental experts rather than public health experts, leading, among other things, to environmental reports which often do not systematically incorporate information on health. Moreover, and as described above in chapter 9.1.1, this partly contributes to the result that mainly so-called classic environmental factors and their limit values are assessed, but most likely are not further linked to health outcomes.

When looking into the areas and sectors in which environmental assessments are implemented, again the main focus is on environmental factors across all sectors. Nevertheless, in some areas or sectors such as infrastructure, waste management, energy, water management and the extractive industry more health determinants seem to be included in the assessment. To further support this tendency, sector-specific guidance and checklists with defined criteria on the health determinants to be considered for proposals in this sector are needed. Even though there is a danger that such checklists become a pure tick-off exercise, they do have the potential to raise the awareness on possible health impacts beyond the so-called classic natural environmental factors.

This focus on the so-called classic environmental factors can be explained partly by the still limited awareness of the broader health determinants by environmental experts and planners. This is also reflected in the guidelines on SEA, focusing mainly on the so-called classic factors of the natural environment, if mentioning health impacts at all. Another limiting factor is that health experts are often only consulted at a later stage in the environmental assessment process. This lack of integration is further reinforced through limited awareness in the health sector of the environmental assessment and planning processes and the opportunities they can present for health promotion and health protection. For example, only a few guidelines on health assessment within environmental assessments are available, such as the ‘Resource Manual on SEA’ and the ‘Simplified Resource Manual to Support Application of the Protocol on Strategic Environmental Assessment’ of UNECE (2012). Furthermore, only a few health authorities have developed guidance on health in EIA (such as Cave et al., 2017b) or SEA (such as Douglas, Higgins & Beck, 2006) and HIA guidelines most often do not include any links to the environmental assessments (Nowacki, Mekel & Fehr, 2010).

Overall, while in many countries of the WHO European Region several legal instruments or voluntary mechanisms coexist which support the implementation of HIA and the integration of health in environmental assessments, HIA or health assessments within environmental assessments are by now only rarely if at all conducted in the NIS. Reasons can be language issues, as most of the relevant literature on HIA and health in environmental assessments is published in English, as well as the terminology, for example, the term HIA does not exist in the Russian language and is then often linked with HRA (Kustov, Xu & Nowacki). Therefore, further efforts are needed to raise awareness of HIA and the broader determinants of health,

for example through capacity building activities, the development of adjusted country specific guidance and best practice examples.

9.1.3 Do publicly available guidelines on SEA include guidance on the assessment of a broad spectrum of environmental health aspects?

The findings of the SEA guideline review clearly show that health and its broader determinants are only rarely considered explicitly within these guidelines. Even though health is at least mentioned in the majority of the SEA guidelines, the guidelines mainly deal with the so-called classic natural environmental health determinants, factors of the built environment and waste. Besides waste, other services such as access to health services and the education system were mentioned, albeit less frequently. Other categories of health determinants sometimes mentioned were employment and livelihood factors, including occupational health risks, un-/employment, poverty and affordable housing, and community structures, including factors such as neighbourhood structures, crime rates, social exclusion, health inequalities, and vulnerable groups. Behavioural risk factors and lifestyle determinants mainly referred to physical activities, such as cycling, and other leisure activities in general, and only rarely to alimentary aspects.

In general, environmental and social determinants of health and well-being were mentioned in the guidelines but not necessarily linked further to health impacts, let alone to health outcomes. Although the updated review of 2015/16 showed an increase in health being mentioned in the guidelines, there still is room for improvement. The inclusion of broader environmental health factors, determined by the natural (biological, chemical, physical), built, social and behavioural factors also depends on the type of sector or area the guideline is aiming at, for example, guidelines discussing transport and infrastructure, urban and spatial planning, would mention behavioural and lifestyle determinants and social/economic determinants on average more often than guidelines discussing other sectors such as tourism, telecommunication or other industries. Furthermore, SEA guidelines of multilateral organizations and development agencies do mention social factors such as employment and livelihood determinants, public and private services, and community factors more frequently than SEA guidelines of environmental authorities.

While there is a wealth of existing SEA guidelines available within environmental organizations, only few health organizations seem to pay attention to SEA (for example Douglas, Higgins & Beck, 2006). Despite a long history in scientific discussion on the opportunities for health protection through the inclusion in environmental assessment (Birley et al., 1998; Davies & Sadler, 1997b) the SEA guideline research results show that the health sector is still not aware of the opportunities SEA provides for enhancing population health and avoiding or minimizing negative impacts of strategic actions, as only few health authorities provide material on SEA (Bond, Cave & Ballantyne, 2013; Fischer, 2014b; Fischer, Martuzzi & Nowacki, 2009; Harris et al., 2009; Nowacki, Martuzzi & Fischer, 2010).

Overall, it is not surprising that in practice also the focus on SEA lies on the so-called classic natural environment factors, as this, according to existing guidelines, is what the environmental assessor should consider. Hence, there is still a need to develop sector specific

guidelines that include a comprehensive discussion on the broader environmental determinants of health and at least some kind of instructions on how to assess these.

9.1.4 What are the main barriers and facilitators for the integration of health in environmental assessments?

Various factors facilitating the integration of health in environmental assessments as well as the further implementation of HIA have been identified through the different research approaches, with the main facilitating factors being awareness raising and regular capacity building for all groups involved – health experts, environmental experts, planners, and decision-makers. Although many environmental assessors and planners seem to be well aware that health impacts often occur they still lack the capacities and tools to conduct meaningful health assessments. Meanwhile, many public health experts still lack the knowledge on environmental assessments, what is expected from them, how they could best contribute and how the environmental assessments could further contribute not only to health protection but also to health promotion.

Overall, the results of the research clearly show that the six key issues identified by Breeze and Lock (2001) are still relevant today and can be further subsumed under the institutional, methodological and procedural factors that facilitate or hinder the meaningful integration of health into environmental assessments as identified by Nowacki, Martuzzi and Fischer (2010). The barriers and facilitators will be summarized in the following three boxes. Importantly, facilitating factors can easily turn into barriers when they are lacking and vice versa.

Box 26 summarizes the institutional factors that are needed to generate a common understanding of health and increase the awareness on HIA and health assessments in environmental assessments. These build the overall basis on which methods and tools as well as procedural factors can be further developed. Importantly, the political context and governance arrangement need to be considered when dealing with possible barriers or implementing facilitators.

Box 26. Institutional barriers and facilitators for the integration of health in environmental assessments and HIA implementation

- Barriers generating a common understanding of health and increasing awareness on HIA and health in environmental assessments:
  - different knowledge and conceptual understanding of health;
  - usage of a narrow definition of health;
  - cultural differences between the sectors and different (technical/expert) languages used;
  - different governance arrangements;
  - differences in the structural and strategic orientation of the departments involved;
  - lack of intersectoral cooperation; and
  - lack of trust between units, departments, and/or ministries.

- Facilitators generating a common understanding of health and increasing awareness on HIA and health in environmental assessments:
  - high level commitment and leadership;
  - political support for the integration of health in environmental assessments and HIA;
  - institutional support by a dedicated body or commission;
  - shared vision between public health, environment, and planning sectors;
  - institutional links between plan, programme or policy proponents and health authorities;

Box 26. Facilitators contd.

- developing close and collaborative partnerships with the other sectors;
- establishing a working group or support unit;
- awareness on the relevance of HIA and health assessment across different sectors and governmental authorities;
- common understanding of the different impact assessment processes;
- common understanding of the opportunities they present for health promotion and avoiding negative long term impacts on health;
- legal instruments and legislation for HIA and the integration of health in environmental assessments;
- involvement of health professionals at an early stage of the assessment process; and
- meaningful engagement with community stakeholder through better participatory models.

(Source: own development, based on and adjusted from Bond, Cave & Ballantyne, 2013; Breeze & Lock, 2001; Carmichael et al., 2012; Douglas, Carver & Katikireddi, 2011; Faith-Ell, Kalle & Lund-Iversen, 2014; Fischer, 2010; Gibson, Nowacki & Cave, 2013a,b; Linzalone et al., 2014; and Nowacki, Martuzzi & Fischer, 2010)

Box 27 recapitulates the methodological barriers and facilitators for the integration of health in environmental assessments and HIA implementation aiming at increasing the evidence base for and knowledge on HIA and health assessments within environmental assessments. Capacity building was identified as the main facilitator for further integration of health assessments into environmental assessment. Through the development of local, regional and national capacities, sharing of experiences and multisector and multidisciplinary collaboration barriers such as a lack of understanding of the planning system by the public health sector can be minimized. The improvement of professional as well as institutional capacities should provide experts with the ability to apply knowledge across different disciplines and situations. Additionally, through increased involvement of public health authorities in environmental assessments, the appropriate health evidence could be better and more consistently presented for the health issues being considered. As the consideration of social and behavioural determinants in SEAs highly depends not only on the context but also the policy, plan or programme assessed, area- and sector-specific checklists could support the consideration of these determinants, as could a further increase in the evidence base and its dissemination in a form useful for environmental assessment.

Box 27. Methodological barriers and facilitators for the integration of health in environmental assessments and HIA implementation

- Knowledge barriers lead to a need for capacity building because of:
  - a lack of understanding of the planning system by the public health sector;
  - health experts only rarely engaged in spatial planning processes, due to limited understanding of the process and hence no interest in influencing it;
  - lack of knowledge on how to further integrate health aspects into the environmental assessment and planning processes;
  - a lack of expertise on how to further integrate health aspects into the profession;
  - the use of a narrow definition of health and the focus on physical and environmental health by the planners;
  - lack of experience in environmental assessment or HIA; and
  - activities only taking place on an ad hoc basis and not regularly.

Box 27. contd.

- Barriers for an increased evidence base on health in environmental assessments and HIA are:
  - broad definition of health not operational for environmental assessment;
  - limited evidence base due to lack in knowledge on the linkages between the overall impacts of the project and its impacts on the environment and on human health;
  - lack of characterization of environmental factors affecting the health of exposed population – directly and/or indirectly;
  - lack of identification and characterization of risks associated with the various actions of a proposal;
  - focusing only on quantifiable impacts;
  - absence or poor evaluation of the health effects resulting from the proposal implementation; and
  - lack of consideration for prevention and reduction of potential health effects.

- Facilitators for an increased evidence base on health in environmental assessments and HIA:
  - a clear distinction between those aspects that are significant for health and should always be considered in SEA, those that are more sector specific, and those that give additional useful information, for example, on equity issues;
  - definition and use of the operational aspect of the broader definition of health environmental assessment;
  - area and sector specific checklists supporting the consideration of social and behavioural determinants ;
  - improvement of databases, surveys, and methodologies;
  - availability and integration of data from the relevant departments, authorities and/or sectors involved for detailed analysis, for example, local health data, local data on socioeconomic status;
  - definition of meaningful indicators and existence of integrated monitoring systems; and
- more meaningful statistics and studies with both temporal and areal distribution patterns of health-related issues through various social groups.

(Source: own development, based on and adjusted from Bond, Cave & Ballantyne, 2013; Breeze & Lock, 2001; Carmichael et al., 2012; Douglas, Carver & Katikireddi, 2011; Faith-Ell, Kalle & Lund-Iversen, 2014; Fischer, 2010; Gibson, Nowacki & Cave, 2013a,b; Linzalone et al., 2014; and Nowacki, Martuzzi & Fischer, 2010)

Box 28 summarizes procedural barriers and facilitators grouped around managing expectations of health assessments in environmental assessments and HIA, learning from experience, and resources. Various procedural factors support the management of expectations, such as the consideration of the broader determinants of health at an early stage, to define and clearly assign responsibilities for the different tasks of the environmental assessment and health assessment. Learning from experience at national and international level is a prerequisite for further knowledge building and hence developing context adjusted procedures. Furthermore, limited capacities, skills and resources in planning authorities and health authorities hinder, for example, the development of partnerships between the authorities. In general, the 'polluter pays' principle seems to be in place for the majority of health assessments, as these are mainly funded by the proposal proponents. Nonetheless, it is questionable whether those payments are sufficient, as one of the barriers mentioned was a lack of funding for the health assessments.

Box 28. Procedural barriers and facilitators for the integration of health in environmental assessments and HIA implementation

- Management of expectations of health assessments in environmental assessments and HIA facilitated through:
  - using SEA as instrument for integration, aiming to achieve consistency of aims, objectives and proposed action of different decision tiers and sectors;
  - consideration of social and behavioural factors as well as physical and environmental factors at an early stage to define the critical factors to be considered for the specific SEA;
  - assigning responsibilities;
  - developing an agreed process for health input into environmental assessments and/or standalone HIA starting at the screening stage;
  - producing highly qualified reports, based on the current knowledge and best evidence available;
  - describing clearly the potential but also the limitations of the health assessment;
  - formalizing guidance for health analysis;
  - developing country and sector specific guideline documents; and
  - using screening checklists that include differential aspects.
- Learning from experience facilitated through:
  - coordination with other assessment tools if used;
  - application of assessment when no decision on preferred aspects has been made (pro-active approach);
  - taking data from different departments, authorities and/or sectors into account for an integrated assessment and joint reporting;
  - engagement of public health agencies and academic institutions with local EIA and lead agencies, to become familiar with EIA processes and participate in them;
  - joint projects; and
  - exemplary case studies which include the broader environmental health factors in the environmental assessments.

- Lacking resources hindering health assessments in environmental assessments and HIA:
  - general resource constraints;
  - priorities given to economic benefits instead of health benefits;
  - competing institutional tasks;
  - lack of staff trained in HIA and with knowledge of environmental assessments in health authorities;
  - lack of staff with advanced knowledge on health assessment in environmental authorities;
  - limited time to contribute to the environmental assessment; and
  - the costs of the assessment.

- Existing resources facilitating health assessments in environmental assessments and HIA:
  - explicit allocation of resources for training and guideline development to enable involvement in environmental assessments;
  - availability of dedicated resources, such as specific guidance and capacity building activities;
  - explicit allocation of resources for commissioning HIAs;
  - adequate resources for personnel;
  - explicit funding for HIA, for example, through direct payment by developers, funding from lead agencies, regulatory agency grant programmes, or private grants; and
  - clarification of who should pay for the health assessment activities, such as analyses and assembling the reports, when dealing with health assessments.

(Source: own development, based on and adjusted from Bond, Cave & Ballantyne, 2013; Breeze & Lock, 2001; Carmichael et al., 2012; Douglas, Carver & Katikireddi, 2011; Faith-Ell, Kalle & Lund-Iversen, 2014; Fischer, 2010; Gibson, Nowacki & Cave, 2013a,b; Linzalone et al., 2014; and Nowacki, Martuzzi & Fischer, 2010)

9.1.5 Which kind of capacity building activities would be needed to further support the integration of health in environmental assessments?

The results from the research clearly reveal that there is a need for generating a common understanding of health, for awareness raising on HIA and health assessments in environmental assessments, and for further capacity building in countries. For example, there is a clear understanding in the planning sector that planning can affect human health, but a lack of expertise on how to further integrate health aspects into the profession. Furthermore, the understanding of health is usually based on a narrow definition of health with the focus on so-called classic factors of the natural and built environment. Similarly, in the health sector there is inadequate understanding of the planning system, leading to a limited engagement and limited interest of health experts in influencing the planning process, as well as then also a narrow focus on the so-called classic natural environmental factors (see for example, Bond, Cave and Ballantyne, 2013; Fischer, 2014).

The limited awareness is also reflected in inadequate funding and training opportunities. Usually capacity building activities, as well as guidelines, are developed on an ad hoc basis and there seems to be only limited integration into continuous training for public health experts, for example, at universities (see chapter 7.3). In particular the still existing focus on the bio-medical paradigm instead of health prevention in professional education (see chapter 2.2.1) hinders further knowledge building on HIA and on other forms of impact assessments to be able to make use of the opportunities these assessments present not only for health protection but also for health promotion. A lack of training in and awareness of impact assessments also creates a missed opportunity to address health inequalities.

Hence, further capacity building on health among environmental assessors and planners, as well as among public health professionals, would facilitate an enhanced consideration of health impacts in the assessments and ultimately in the planning- and decision-making process. The three capacity building approaches described and discussed – for environmental health technicians, generalist, specialists and managers by Fitzpatrick and Bonnefoy (1998), CBEH continuous training in environment and health by the WHO Regional Office for Europe (2013g), and EIA for higher education by Fischer (2014a) – differ not only in the topics they suggest to be covered but also in the target audience and the level of education – see chapters 2.3.3, 6.4 and 8.6.

Training for environmental assessment can take place in the form of introductory courses at university level to advanced continuous training for practitioners or even as obligatory training for licensed assessors, which is, for example, the case in Lithuania (Zukiene, 2016). Hence, the duration of such training can range from in-depth workshops of a few days to weekly classes over a period of several months or comprehensive training weeks, depending highly on the target audience. Most important, capacity building activities should be offered on a regular basis. The CBEH framework on using impact assessment in environment and health developed by the WHO Regional Office for Europe (2013h) aims to support countries which seek to further implement HIA as standalone or integrate into environmental assessment. Step 6 of the framework lists 13 points that should be considered when developing and designing a capacity building programme, such as defining the training aim, identifying knowledge gaps,

defining the learning objectives and expected outcomes, depending on this defining the time frame for the training, and identifying required resources (WHO Regional Office for Europe, 2013h) – see also chapter 6.4.1.

Recognizing the competence model introduced in chapter 2.3.3, any capacity building activity needs to integrate the three main components of attitude, knowledge and skills in its programme (see also Fig. 9, chapter 2.3.3). In this regard, intersectoral collaboration and joint trainings support not only acknowledge the exchange between different expert groups but also provide for a holistic approach and can lead to further or better appreciation of the work done in other sectors.

The topics as well as the time frame for any capacity building activity on HIA and health in environmental assessments depend especially on the background of the target audience and the main objective of the training. Importantly, training for environmental assessment experts should include at least some lectures on the broader environmental health aspects, while training on HIA should include lectures on environmental assessments and how to get involved in these assessments. But joint capacity building activities would be preferable.

Hence, most importantly, capacity building activities need to bring together not only health experts, but also environmental experts and planners, to achieve a better understanding between the different expert groups (WHO Regional Office for Europe, 1987). As described and discussed in chapter 2.3.3 and 8.6, the groups of health experts on one hand, and environmental experts and planners on the other, represent a wide range of different disciplines, not to mention the important group of policy- and other decision-makers, with an even broader composition of professional backgrounds. A stakeholder analysis of supporters and opponents could help to decide which groups to integrate first in such a capacity building activity to further raise awareness, build up institutional and political support and develop a pilot project and champions in health integrated environmental assessments.

Based on identified knowledge gaps of the target audience, the topics for the capacity building activities need to be determined; for shorter capacity building activities at the postgraduate level the proposal for continuous training on environment and health of the CBEH project can give a first indication. If aiming at a more regular basic training at undergraduate level the EIA curriculum developed by Fischer (2014a) could give an indication but it would need to be complemented by health specific themes and soft skills such as intersectoral collaboration and risk communication. Preferably, the training should qualify new trainers and be supported by a mentoring system. Furthermore, joint projects and more networking opportunities between different sectors and different countries are important to further develop HIA and health in environmental assessments.

To be able to offer regular capacity building for a broad target group, stable funding is needed. Such an intense training for a very diverse target group also needs a multidisciplinary and intersectoral faculty, a challenge for universities or other institutes. Nonetheless, at least core capacities in HIA could be integrated into already existing training of public health schools and continuing education courses of environmental assessors.

9.2 Institutional and procedural factors for further integration of health in environmental assessments

To conclude, a variety of institutional and procedural factors were identified and confirmed by the research findings. A common understanding of the broader determinants of health, builds the basis for meaningful consideration and integration of broader environmental health factors into environmental assessments. To achieve this, further awareness raising within the environmental and the planning sector is needed. Likewise, further awareness raising is needed within the health sector on the opportunities that environmental assessments can present for health protection as well as for health promotion. Awareness raising can be supported through capacity building activities, as well as joint working groups and joint (pilot) projects.

The further integration of broader environmental health factors as well as the implementation of standalone HIAs needs high level political support. Legal requirements, such as health authorities becoming statutory consultants in environmental assessment, and official guidance documents can support this, as can a review of existing legislation to identify legal drivers, obstacles and gaps.

A working relationship built on trust and a joint vision among different departments and between different ministries as well as institutional and organizational support is indispensable for successful interministerial and intersectoral cooperation. Institutional and organizational support for HIA and the integration of health into environmental assessments can be reinforced either through a working group as, for example, in Slovakia (Halzlová, 2016), or by a specialized support unit as, for example, in Austria (Gruber, 2016), the Netherlands (Meeuwsen, 2016), and Wales, United Kingdom (Green, 2016). Preferably such a working group should be a joint working group composed of health experts, environmental experts and planners. Besides supporting further awareness raising on HIA, EIA, SEA and health within environmental assessments, such a joint working group can be tasked, for example, with developing guidance documents, supporting the assessment through advisory services, and ensuring the quality of the assessments and the reports through an obligatory quality control mechanism.

Importantly, responsibilities need to be clearly defined for the different tasks when commissioning or even conducting the assessment, as do clear communication channels, not only within departments and across ministries, but also with the public and the media in high profile cases.

Most importantly, adequate resources need to be allocated not only for qualified personnel but also in regard to the different activities and tasks such as capacity building, development of guidance documents, networking within and between the ministries and departments as well as internationally, quality control of the assessments, and commissioning an assessment.

While in many countries there is a formalized system in place for environmental assessments and environmental audits, in only a few countries is such a licensing scheme the case for HIA, for example in Lithuania (Zukiene, 2016) and Slovakia (Halzlová, 2016). Such a licensing scheme is often linked to obligatory capacity building activities (WHO Regional Office for Europe,

2013h). In general, capacity building activities would need to be offered on a regular basis, preferably jointly – see also chapter 9.1.5.

Higher awareness of the broader health determinants and the opportunities for meaningful health assessments within environmental assessments through capacity building could then lead to an earlier integration of health experts in the environmental assessment, such as at the scoping and screening stage. This could also be further supported through a legal requirement to consult with health experts at such a stage.

9.3 Supporting tools and activities for further integration of health in environmental assessments

Even though the main supporting tools and activities identified by this research project have been under discussion since the beginning of the debate on the inclusion of health into environmental assessments, they remain valid and important.

Capacity building is foremost among those supporting activities. Importantly, it should be implemented on a regular basis and support knowledge exchange through joint trainings and joint projects. As described in chapter 9.1.5, it can be implemented at different levels with different timeframes. Hence, an analysis of existing knowledge gaps and of possible training providers is needed, as well as the allocation of a regular budget.

Health authorities need support in conducting the health assessment themselves, and both health and environmental authorities need to be able to apply quality control on health assessments conducted by external experts. To further strengthen this day to day application, the authorities need country- and sector-specific guidance as well as checklists, such as one for screening procedures. Besides this, also criteria for good quality standards could support quality control. Care has to be taken here that this guidance does not turn into perfunctory tick-off exercises but lead to further awareness on possible positive and negative health impacts.

To further support the consideration of differential health impacts on vulnerable population groups in an assessment, a breakdown of the possible impacts down to the local level is needed. This can then be used to showcase through concrete local examples the possible positive and negative impacts. Therefore, exemplary case studies from different sectors and at different planning levels should be identified and made available to the public.

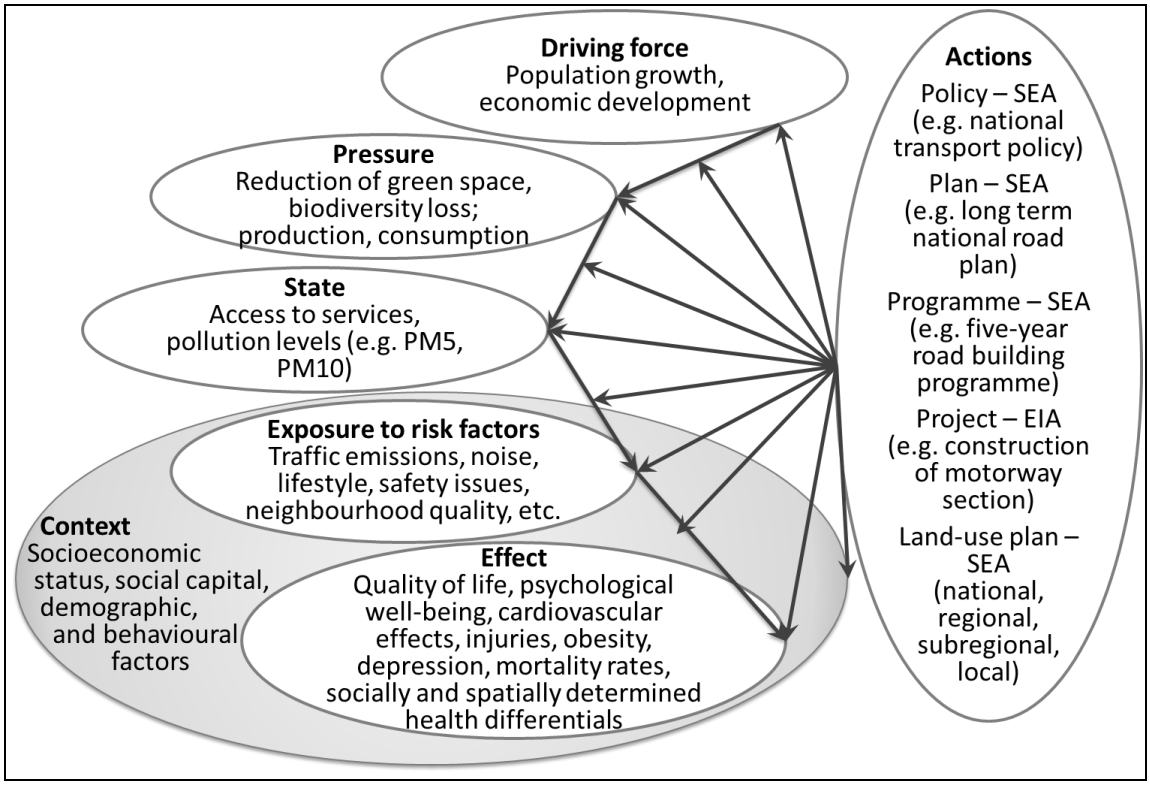
There is still a need to further strengthen the evidence base on health impacts, especially regarding cumulative effects and in relation to higher level proposals such as policies and programmes. Better integration of different databases and access to them, as well as the development and monitoring of meaningful indicators also supports the evidence basis. In general, further efforts in monitoring the impacts and long-term evaluation of the projected impacts is also needed to learn from experience.

One approach with great potential to further strengthen the evidence base can be seen in IEHIA. Unfortunately it is a very complex and most likely time consuming approach which up to now has led to only limited application. Nevertheless, the results that IEHIA can deliver can further strengthen the evidence database for ‘lighter’ applications of health assessments

within environmental assessments, which can be more easily integrated into a standard assessment for environment and health experts and authorities.

The modified DPSEEA framework – see chapter 2.3.2 – can be used in health-inclusive environmental assessments or HIA to further systematize the possible impacts of a proposal on health and further integrate sustainability aspects, as it has been used already for assessing the sustainability of proposals (Waheed, Khan & Veitch, 2009). Through a further combination of the framework with causal pathway diagrams, integrating further risk factors and health outcomes, as shown in an example in Fig. 58, a useful visual presentation of the possible impacts of a proposal can be generated.

Fig. 58. Using the modified DPSEEA framework for further systematizing health impacts of a proposal

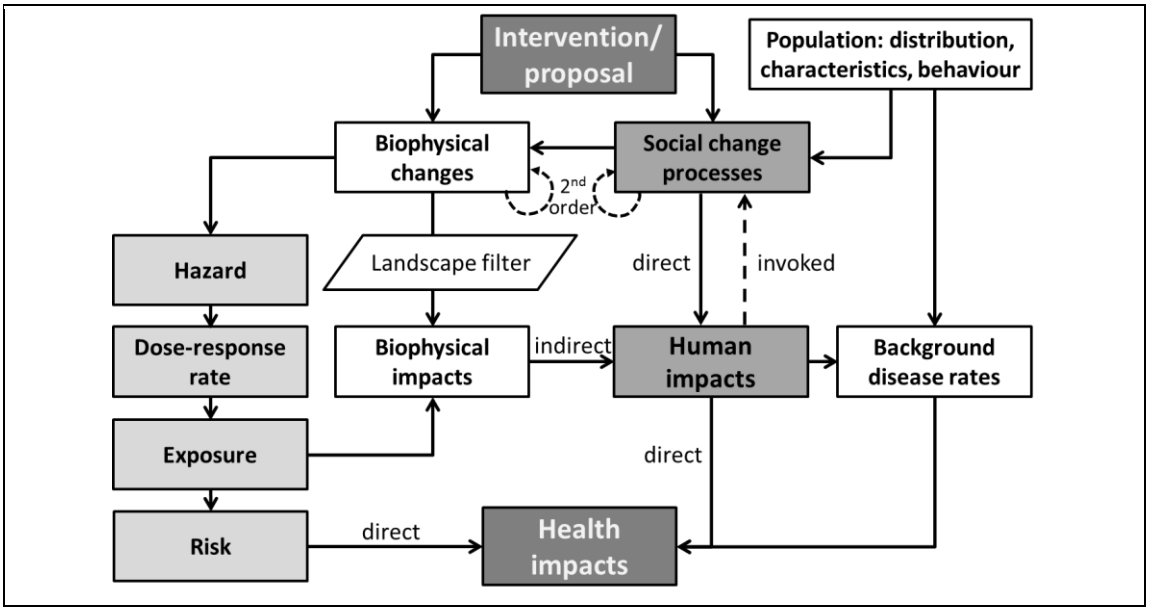


(Source: own development, based on Morris et al., 2006; Thérivel, 2010; WHO Regional Office for Europe, 2017b)

The application of SIA techniques can support the health assessment not only in stakeholder consultation but particularly in addressing the concerns and expectations of different population groups affected by the proposal under consideration, especially as some countries have institutionalized SIA and environmental justice, resulting in a routine consideration of social impacts in EIA (Bhatia & Wernham, 2008). However, the level of the proposal can present a challenge, as the higher the level (for example a national employment policy), the more abstract the impacts and the more difficult the integration of different population groups in the process. Nonetheless, the framework to integrate environmental assessments and SIA by Slootweg, Vanclay and van Schooten (2001), as presented in chapter 2.4.6.1, could be further enhanced through health assessment components such as HRA and background disease rates in the population. A first approach is presented in Fig. 59 below.

The two processes of change as defined by Slootweg, Vanclay and van Schooten (2001), the 'social changes' and the 'biophysical changes' can impact humans and lead further to impacts on health. For example, a planned project can cause biophysical changes such as changes in water quality, which can become a health hazard, while a social change process can be initiated, for example through changes in population groups or an influx of new workers to the community. Furthermore, changes in exposure levels and biophysical changes can lead to biophysical impacts which may also depend on a landscape filter, for example, different noise levels from aircrafts depending on the location of the residential area and the runways. These in turn can indirectly lead, according to Slootweg, Vanclay and van Schooten (2001), to human impacts. Importantly, human impacts "refer to quantifiable variables such as economic or demographic issues, as well as to changes in people's norms, values, beliefs and perceptions about the society in which they live, the gendered differentiation of impacts and all other facets of life" (Slootweg, Vanclay & van Schooten, 2001). The biophysical changes can further become a hazard, leading to health risks and to health impacts.

Fig. 59. Enhanced framework on integrated environmental, social and health impact assessment (IESHIA)



(Source: based on and adjusted from Slootweg, Vanclay & van Schooten, 2001; and Briggs, 2008)

Social change processes, have a direct influence on human impacts, and may also lead to biophysical changes, for example, the influx of workers leads to increased prices for houses or land for new residential areas. These social impacts can lead to new social change processes, for example, out-migration of residents due to the noise levels of a new runway, increased rents etc. (Slootweg, Vanclay & van Schooten, 2001). The social change processes have to be considered in relation to the current population – its distribution, characteristics as well as behavioural factors – and to the 'future' population. The human impacts can have a direct and indirect influence on health impacts, through the social determinants of health as well as changes in the background disease rates.

Importantly, such a broad framework will need to be adjusted to the proposal under consideration as there may not be the need to assess all social changes. Capacity building

activities as well as guidelines and sector specific checklists would support such an integrated approach, but are not yet developed, and experience from joint projects also seems to be limited (see for example, Birley, 2003; Esteves, Franks & Vanclay, 2012; Kwiatkowski & Ooi, 2003).

10 Outlook

The research project has shown that still a lot needs to be done for a meaningful assessment of the broader environmental health aspects in environmental assessments such as EIA and SEA. While the discussion of assessing health has taken place in different forms since the introduction of environmental assessment and some progress has been made, the overarching question – why is there still this a lack of integration – cannot be answered through this research. Instead, various barriers have been identified such as a lack of awareness and knowledge on the broader aspects of health and on different impact assessment approaches. Also, differences in priorities instead of a joint vision, and limited funding, contribute to the current situation.

A new push for further integration of the broader environmental health factors in environmental assessment and for standalone HIA could come through the 2030 Agenda for Sustainable Development with its SDGs. All of the 17 SDGs include health relevant targets (see chapter 2.3.1.3); additionally EIA and SEA can contribute to at least nine SDGs, such as SDG 7 on affordable and clean energy, SDG 9 on industry, innovation and infrastructure, or SDG 11 on sustainable cities and communities (UNECE, 2017b).

Considering the three main dimensions of sustainability – social, environmental and economic – as described in chapter 2.3.1.3, Fig. 6, a further integration into environmental assessments of the broader environmental health aspects, determined by the natural (biological, chemical, physical), built, social and behavioural factors, can contribute to sustainable development. Furthermore, the six imperatives of sustainability assessment defined by Gibson (2013) – described in chapter 2.4.6.2, Box 14 – should be reflected in any assessment approach to reverse unsustainable trends and contribute to the 2030 Agenda for Sustainable Development. Additionally, through such an integrated approach the ecological view of health as a “sustainable state of equilibrium or harmony between humans and their physical, biological, and social environments that enables them to coexist indefinitely” (Last, 2007) would be supported.

While these are good arguments for a full integration of HIA into environmental assessment under the overarching objective of sustainable development, the question on full integration or standalone but linked assessment approaches needs to be further dealt with. Most likely, the generic message of three options, as formulated by Fehr et al. (2014), is not satisfying for the competent authorities or the practitioner involved, having to decide if a standalone HIA or an integrated health assessment should be conducted. Hence, there is a need to define criteria that help decide the most suitable approach. Issues to be considered could be:

- Is there legal obligation for the health assessment?
- Does in-house knowledge of the other assessment process exist?
- Is there already collaboration between the departments involved? And of what quality is this collaboration?
- What is the timescale for the assessments?
- Which data inputs are available from other departments and by when?
- By when is the health input into the other assessment and/or the report needed?

- Which resources are available in regard to personnel, data and budget?

Closely linked to these questions is the need for good quality criteria for standalone HIA, EIA and SEA and especially for health assessments integrated into environmental assessments. Examples already exist, such as the 'Quality Assurance Review Framework for HIA' of the Wales HIA Support Unit (WHIASU) (Green, Parry-Williams & Edmonds, 2017) or the Institute of Environmental Management and Assessment (IEMA) EIA Quality Mark certification scheme (Bond, Fischer & Fothergill, 2017). Meanwhile, further discussion is ongoing and any such framework needs to be adjusted to the specific political, regulatory, and sectoral context.

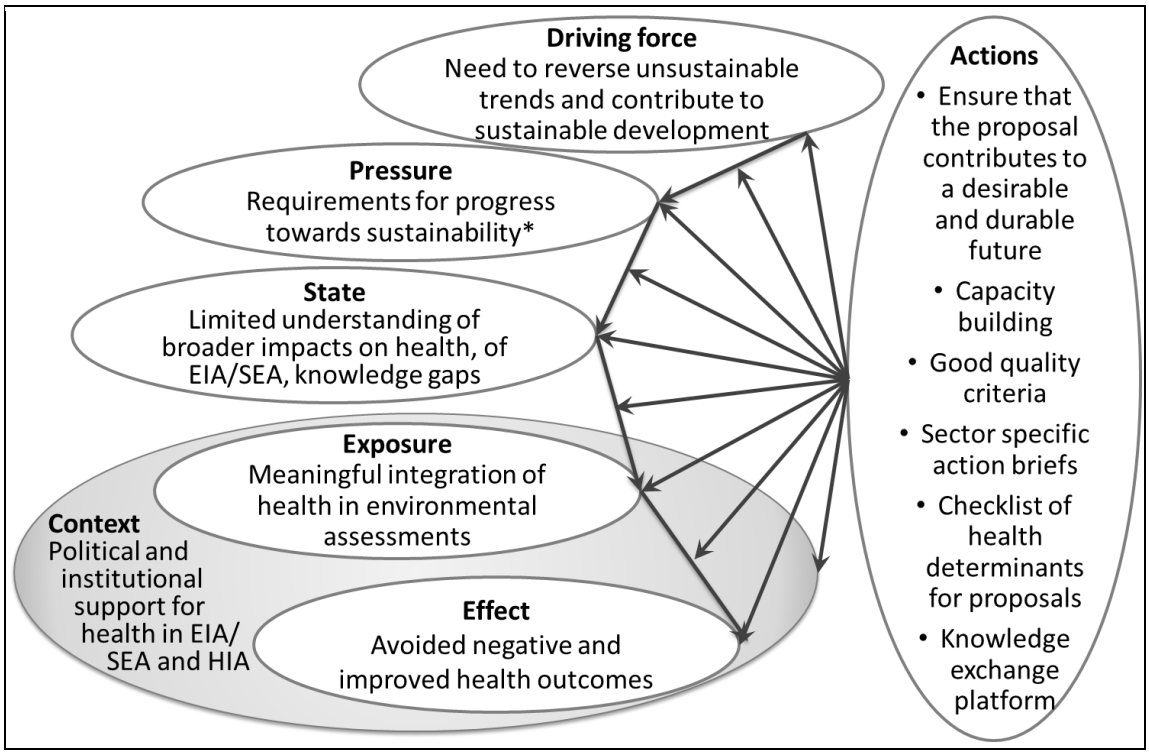
In light of the many tasks still to be accomplished, it seems desirable to:

- ensure that every policy, plan, programme and project contributes to a desirable and durable future through the consideration of environmental, social and health impacts in any impact assessment – EIA, SEA, HIA, SIA or sustainability assessments;
- further develop capacity building activities and training materials on HIA and the integration of health into environmental assessments, which also integrate sustainability assessment imperatives;
- further develop good quality criteria for health assessments within environmental assessments;
- develop action briefs on integrating health in environmental assessments of different sectors based on good practice examples;
- develop criteria and checklists which support to determine which health determinants need to be considered in which kind of environmental assessment; and
- develop an open access online knowledge exchange platform for environmental assessment and HIA.

The last activity is being led by the WHO European Centre for Environment and Health with the newly designated WHO Collaborating Center on Health in Impact Assessments, at the School of Environmental Sciences, Department of Geography and Planning, Unit on Environmental Assessment and Management, University of Liverpool. The platform will in particular support knowledge exchange and contribute to the above-described activities through development and dissemination of possible outcomes.

To conclude, the main messages of the research project are summarized in Fig. 60 below using the modified DPSEEA model:

Fig. 60. Summary of the research conclusions and recommendations



(Source: own development, based on research project conclusions, adjusted from Morris et al., 2006; Gibson, 2013)
Note: *for the eight requirements for progress toward sustainability see Gibson (2013) and chapter 2.3.1.3.

References

Abrahams D et al. (2004). *European Policy Health Impact Assessment (EPHIA). A Guide*. Liverpool, IMPACT, University of Liverpool.

Acheson D (1988). *Public Health in England: The Report of the Committee of Inquiry into the Future Development to the Public Health Function.* London, Her Majesty's Stationery Office.

Ahmad B (2004). Integrating health into impact assessment: challenges and opportunities. *Impact Assessment and Project Appraisal*.

Ahmad B et al. (2008). Enabling factors and barriers for the use of health impact assessment in decision-making processes. *Public Health*, 122:452–457.

Antonovsky A (1987). *Unraveling the mystery of health: how people manage stress and stay well.* San Francisco, Jossey-Bass.

Antonovsky A (1997). *Salutogenese: zur Entmystifizierung der Gesundheit*, Alexa Franke, German extended. (Franke A, editor). Tübingen, Dgvt-Verlag.

Arts J, Tomlinson P, Voogd H (2005). EIA and SEA tiering: the missing link? Position Paper. *Conference on "International experience and perspectives in SEA". A special thematic meeting of the International Association for Impact Assessment (IAIA), 26-30 September 2005*. Prague, Czech Republic, IAIA - International Association of Impact Assessment.

Banken R (1998). Public health in environmental assessment. Chapter 29. In: Porter AL, Fittipaldi JJ, editors. *Environmental methods review: retooling impact assessment for the New Century*. Fargo, ND, USA, Army Environmental Policy Institute / IAIA, 1998:247–253.

Banken R (1999). From Concept to Practice: Including the Social Determinants of Health in Environmental Assessments. *Canadian Journal of Public Health / Revue Canadienne de Sante'e Publique*, 90:S27–S30.

Barton H, Grant M (2006). A health map for the local human habitat. *J R Soc Promot Health*, 126:252–3.

Beywl W, Schepp-Winter E (2000). *Zielgeführte Evaluation von Programmen - ein Leitfaden*. Berlin, Bundesministerium für Familie, Senioren, Frauen und Jugend (BMFSFJ) (Materialien zur Qualitätssicherung in der Kinder- und Jugendhilfe).

Beywl W, Widmer T (2012). *Die Standards für Programmevaluation: des Joint Committee on Standards for Educational Evaluation*. Aarau/Zurich, Fachhochschule Nordwestschweiz/Universität Zürich. Institut für Politikwissenschaft.

Bhatia R (2011). *Health Impact Assessment. A guide for practice*. Oakland, CA, Human Impact Partners.

Bhatia R, Wernham A (2008). Integrating human health into environmental impact assessment: An unrealized opportunity for environmental health and justice. *Environmental Health Perspectives*, 116(8):991–1000.

Birley M (1991). *Guidelines for forecasting the vector-borne disease implications of water resource development.*, 2nd edition. Geneva, Switzerland, WHO - World Health Organization (Joint WHO/FAO/UNEP/UNCHS Panel of Experts on Environmental Management for Vector Control, No. WHO/CWS/91.3).

Birley M (1995). *The health impact assessment of development projects.* London, HMSO.

Birley M et al. (1998). *Health and environmental impact assessment, an integrated approach*. London, Earthscan, British Medical Association.

Birley M (2002). A review of trends in health-impact assessment and the nature of the evidence used. *Environmental Management and Health*, 13(1):21–39.

Birley M (2003). Health impact assessment, integration and critical appraisal. *Impact Assessment and Project Appraisal*, 21(4):313–321.

Birley M (2011). *Health impact assessment: principles and practice*. London, New York, Earthscan.

Birley M, Peralta G (1992). *Guidelines for the Health Impact Assessment of Development Projects*. Manila, Philippines, ADB - Asian Development Bank.

Boerma T et al. (2015). *Health in 2015: from MDGs, millennium development goals, to SDGs, sustainable development goals*. Geneva, WHO - World Health Organization.

Bogner A, Littig B, Menz W (2014). *Interviews mit Experten: eine praxisorientierte Einführung*. Wiesbaden, Springer VS (Qualitative Sozialforschung).

Bond A (2004). Lessons from EIA. In: Kemm J, Parry J, Palmer S, editors. *Health impact assessment - concepts, techniques and applications*. Oxford, United Kingdom, Oxford University Press, 2004:131–142.

Bond A, Cave B, Ballantyne R (2013). Who plans for health improvement? SEA, HIA and the separation of spatial planning and health planning. *Environmental Impact Assessment Review*, 42(1):67–73.

Bond A, Fischer TB, Fothergill J (2017). Progressing quality control in environmental impact assessment beyond legislative compliance: An evaluation of the IEMA EIA Quality Mark certification scheme. *Environmental Impact Assessment Review*, 63:160–171.

Bond A, Morrison-Saunders A, Pope J (2012). Sustainability assessment: the state of the art. *Impact Assessment and Project Appraisal*, 30(1):53–62.

Bond A, Morrison-Saunders A, Stoeglehner G (2013). Designing an effective sustainability assessment process. In: Bond A, Morrison-Saunders A, Howitt R, editors. *Sustainability assessment: pluralism, practice and progress*. The natural and built environment series. New York, Routledge, 2013:231–244. (The natural and built environment series).

Bond A, Pope J (2012). The state of the art of impact assessment in 2012. *Impact Assessment and Project Appraisal*, 30(1):1–4.

Bond A, Pope J (2014). Sustainability assessment and health. In: Fehr R et al., editors. *Health in Impact Assessments: Opportunities not to be missed*. Copenhagen, WHO Regional Office for Europe, 2014:47–68.

Bowen GA (2013). Document Analysis as a Qualitative Research Method. *Qualitative Research Journal*.

Breeze CE, Lock K (2001). *Health impact assessment as part of strategic environmental assessment. A review of Health Impact Assessment concepts, methods and practice to support the development of a protocol on Strategic Environmental Assessment to the Espoo Convention, which adequately covers health impacts*. Copenhagen, WHO Regional Office for Europe.

Briggs D, Mason K, Borman B (2016). Rapid Assessment of Environmental Health Impacts for Policy Support: The Example of Road Transport in New Zealand. *International Journal of Environmental Research and Public Health*, 13(1).

Briggs DJ (2008). A framework for integrated environmental health impact assessment of systemic risks. *Environmental Health*, 7:61.

den Broeder L, Vanclay F (2014). Health in SIA. In: Fehr R et al., editors. *Health in Impact Assessments: Opportunities not to be missed*. Copenhagen, WHO Regional Office for Europe, 2014:69–88.

Burdge RJ (2003). The practice of social impact assessment background. *Impact Assessment and Project Appraisal*, 21(2):84–88.

Burns J, Bond A (2008). The consideration of health in land use planning: Barriers and opportunities. *Environmental Impact Assessment Review*, 28(2–3):184–197.

Carmichael L et al. (2012). Integration of health into urban spatial planning through impact assessment: Identifying governance and policy barriers and facilitators. *Environmental Impact Assessment Review*, 32(1):187–194.

Cave B et al. (2017a). *Health in Environmental Impact Assessment: A Primer for a Proportionate Approach*. Lincoln, England, Ben Cave Associates Ltd, IEMA and the Faculty of Public Health.

Cave B et al. (2017b). *Health in Environmental Impact Assessment: A Briefing for Public Health Teams in England*. London, England, Public Health England.

Chen C-J (2015). Environmental health issues in public health. In: Detels R et al., editors. *Oxford textbook of public health*.Vol1.,6th edition. Oxford medical publications. Oxford, Oxford University Press, 2015:823–839. (Oxford medical publications).

Congress of the U.S.A. (1970). *National Environmental Policy Act*. (https://www.epa.gov/laws-regulations/summary-national-environmental-policy-act, accessed 14 March 2017).

Corvalán CF, Briggs D, Kjellström T (1996). Development of Environmental Health Indicators. In: Briggs D, Corvalán CF, Nurminen M, editors. *Linkage methods for environment and health analysis: general guidelines. A report of the Health and Environment Analysis for Decision-making (HEADLAMP) project*. Geneva, World Health Organization, 1996:19–53.

Creswell JW, Plano Clark VL (2011). *Designing and Conducting Mixed Methods Research*, 2nd edition. Thousand Oaks, CA, SAGE Publications, Inc.

CSDH (2008). *Closing the gap in a generation: health equity through action on the social determinants of health. Final Report of the Commission on Social Determinants of Health*. Geneva, WHO - World Health Organization.

Dahlgren G, Whitehead M (1991). Policies and strategies to promote social equity in health. Background document to WHO – Strategy paper for Europe.

Dalal-Clayton B, Sadler B (2005). *Strategic Environmental Assessment - A Sourcebook and Reference Guide to International Experience*. London, Sterling VA, Earthscan.

Davies K, Sadler B (1997a). *Environmental assessment and human health: perspectives, approaches and future directions. A Background Report for the International Study of the Effectiveness of Environmental Assessment*. Minister of Supply and Services Canada.

Davies, Sadler B (1997b). *Environmental assessment and human health: perspectives, approaches and future directions: a background report for the International study of the effectiveness of environmental assessment*. Ottawa, Minister of Supply and Services Canada.

Davies SC et al. (2014). For debate: a new wave in public health improvement. *The Lancet*, 384(9957):1889–1895.

Detels R, Tan CC (2015). The scope and concerns of public health. In: Detels R et al., editors. *Oxford textbook of public health*. Vol1., 6th edition. Oxford medical publications. Oxford, Oxford University Press, 2015:3–18. (Oxford medical publications).

DGPH (2012). *Situation und Perspektiven von Public Health in Deutschland - Forschung und Lehre*. DGPH - Deutsche Gesellschaft für Public Health e.V.,:8.

Dora C (2011). Appendix A. Experiences with Health Impact Assessment. In: National Research Council et al., editors. *Improving Health in the United States: The Role of Health Impact Assessment*. Washington, DC, National Academies Press, 2011:130–177.

Douglas M (2009). Do Strategic Environmental Assessments (SEAs) in Scotland consider health impacts? Presentation at the international conference HIA'09 on the move, 14.-16. October 2009, Rotterdam, Session 33.

Douglas M, Carver H, Katikireddi SV (2011). How well do strategic environmental assessments in Scotland consider human health? *Public Health*, 125:585–591.

Douglas M, Higgins M, Beck S (2006). *Strategic Environmental Assessment and health. Briefing paper for the Scottish HIA Network*. Edinburgh, Scotland, Scottish HIA Network.

Douglas M, Scott-Samuel A (2001). Addressing health inequalities in health impact assessment. *Journal of Epidemiology & Community Health*, 55(7):450–451.

EC (2017). Review of the Environmental Impact Assessment (EIA) Directive [web site]. (http://ec.europa.eu/environment/eia/review.htm, accessed 20 June 2017).

Equator Principles Financial Institutions (2013). *The Equator Principles III. A financial industry benchmark for determining, assessing and managing environmental and social risk in projects*. London, United Kingdom, The Equator Principles Association (http://www.equator-principles.com/index.php/about-ep/about-ep, accessed 14 April 2017).

Esteves AM, Franks D, Vanclay F (2012). Social impact assessment: the state of the art. *Impact Assessment and Project Appraisal*, 30(1):34–42.

EU (1985). Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment. *Official Journal of the European Union*, (L175):40–48.

EU (1997). Council Directive 97/11/EC of 3 March 1997 amending Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment. *Official Journal of the European Union*, (L73):5–15.

EU (2001). Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment. *Official Journal of the European Union*, (L197):30–37.

EU (2003). Directive 2003/35/EC of the European Parliament and of the Council of 26 May 2003 providing for public participation in respect of the drawing up of certain plans and programmes relating to the environment and amending with regard to public participation and access to justice Council Directives 85/337/EEC and 96/61/EC. *Official Journal of the European Union*, (L156):17–25.

EU (2007). Treaty of Lisbon amending the Treaty on European Union and the Treaty establishing the European Community, signed at Lisbon, 13 December 2007. *Official Journal of the European Union*, (C306):1–271.

EU (2009). Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006 (Text with EEA relevance). *Official Journal of the European Union*, (L140):114–135.

EU (2012). Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment. *Official Journal of the European Union*, (L26):1–21.

EU (2013a). *Environmental Impact Assessment of Projects. Rulings of the Court of Justice*. Luxembourg, EC - European Commission.

EU (2013b). Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora. Last amended by Council Directive 2013/17/EU of 13 May 2013. *Official Journal of the European Union*, (L158):193–229.

EU (2014). Directive 2014/52/EU of the European Parliament and of the Council - of 16 April 2014 - amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. *Official Journal of the European Union*, (L124):1–18.

Evans RG, Stoddart GL (1990). Producing health, consuming health care. *Social Science & Medicine*, 31(12):1347–1363.

Ewans CE et al. (1994). *National Framework for Environmental and Health Impact Assessment* (National Health and Medical Research Council (Australia), editor). Canberra, ACT, Commonwealth of Australia.

Faith-Ell C, Kalle H, Lund-Iversen M (2014). Health in EIA in Estonia, Norway and Sweden. In: Fehr R et al., editors. *Health in Impact Assessments: Opportunities not to be missed*. Copenhagen, WHO Regional Office for Europe, 2014:11–22.

Fanelli D, Costas R, Ioannidis JPA (2017). Meta-assessment of bias in science. *Proceedings of the National Academy of Sciences*, 114(14):3714–3719.

Fehr R et al. (2014). *Health in Impact Assessments: Opportunities not to be missed*. Copenhagen, WHO Regional Office for Europe.

Fehr R, Hornberg C, Wichmann H-E (2016). Umwelt und Gesundheit. In: Hurrelmann K, Razum O, editors. *Handbuch Gesundheitswissenschaften*.,6., durchgesehene Auflage. Weinheim Basel, Beltz Juventa,2016:573–608.

Fehr R, Neus H (2005). System- und Strukturmodelle; Lebensbereiche. In: Fehr R, Neus H, Heudorf U, editors. *Gesundheit und Umwelt: ökologische Prävention und Gesundheitsförderung*.,1. Aufl. Bern, Verlag Hans Huber,2005:76–94.

Fischer TB (2007a). *The Theory and Practice of Strategic Environmental Assessment: Towards a More Systematic Approach*. London, Sterling VA, Earthscan.

Fischer TB (2007b). *The theory and practice of strategic environmental assessment: towards a more systematic approach*. London, Earthscan.

Fischer TB (2010). The consideration of health in SEA – a report for the World Health Organization. In: Nowacki J, Martuzzi M, Fischer TB, editors. *Health and strategic environmental assessment. Background information and report of the WHO consultation meeting, Rome 08./09. June 2009*. Copenhagen, WHO Regional Office for Europe, 2010:20–42.

Fischer TB (2014a). *EIA curriculum for Higher Education Institutions in Pakistan*. Islamabad, IUCN (https://livrepository.liverpool.ac.uk/3003256/, accessed 2 April 2017).

Fischer TB (2014b). Health in SEA. In: Fehr R et al., editors. *Health in Impact Assessments: Opportunities not to be missed*. Copenhagen, WHO Regional Office for Europe, 2014:23–46.

Fischer TB, Martuzzi M, Nowacki J (2009). The consideration of health in strategic environmental assessment (SEA). *Environmental Impact Assessment Review*, 30:200–210.

Fitzpatrick M, Bonnefoy X (1998). *Environmental Health Services in Europe 3: Professional profiles*. Copenhagen, WHO Regional Office for Europe (WHO Regional Publications, European Series, No. 82).

Fitzpatrick M, Bonnefoy X (1999). *Environmental Health Services in Europe 4: Guidance on the development of educational and training curricula*. Copenhagen, WHO Regional Office for Europe (WHO Regional Publications, European Series, No. 84).

Franke A (2012). *Modelle von Gesundheit und Krankheit*, 3., überarbeitete Auflage. Bern, Verlag Hans Huber (Programmbereich Gesundheit).

Frankish CJ et al. (1996). *Health impact assessment as a tool for population health promotion and public policy. A Report Submitted to the Health Promotion Development Division of Health Canada*. Institute of Health Promotion Research, University of British Columbia.

Friis RH (2012). *Essentials of environmental health*, 2nd edition. Sudbury, MA, Jones & Bartlett Learning (Essential public health).

Fundingsland Tetlow M, Hanusch M (2012). Strategic environmental assessment: the state of the art. *Impact Assessment and Project Appraisal*, 30(1):15–24.

Gazzola DP (2008). Trends in education in environmental assessment: a comparative analysis of European EA-related Master programmes. *Impact Assessment and Project Appraisal*, 26(2):148–158.

Gibson G, Nowacki J, Cave B (2013a). *Strengthening health in environmental assessments in Slovenia. Gap analysis and way forward*. Copenhagen, WHO Regional Office for Europe (Capacity Building in Environment and Health (CBEH) Project).

Gibson G, Nowacki J, Cave B (2013b). *Strengthening health in environmental assessments in Estonia. Gap analysis and way forward*. Copenhagen, WHO Regional Office for Europe (Capacity Building in Environment and Health (CBEH) Project).

Gibson RB et al. (2005). *Sustainability Assessment: Criteria and Processes*. London, New York, Earthscan.

Gibson RB (2013). Why sustainability assessment? In: Bond A, Morrison-Saunders A, Howitt R, editors. *Sustainability assessment: pluralism, practice and progress*. The natural and built environment series. New York, Routledge, 2013:3–17. (The natural and built environment series).

Gray S et al. (2011). The effectiveness of health appraisal processes currently in addressing health and wellbeing during spatial plan appraisal: a systematic review. *BMC Public Health*, 11:889–898.

Green L (2016). The Wales HIA Support Unit. In: Vohra S, Nowacki J, Martuzzi M, editors. *Health Impact Assessments and Health in Environmental Assessments – developing further implementation strategies. Report of the expert meeting Bonn, Germany, 24-25 September 2015*. Copenhagen, WHO Regional Office for Europe, 2016:31–32.

Green L, Parry-Williams L, Edmonds N (2017). *Quality Assurance Review Framework for Health Impact Assessment (HIA)*. Cardiff, Wales, WHIASU - Wales Health Impact Assessment Support Unit, Public Health Wales (http://www.wales.nhs.uk/sites3/news.cfm?orgid=522&contentid=45777, accessed 17 August 2017).

Greenment (2017). Environmental Social and Health Impact Assessment Project in one Coal Bed Methane Exploit Region. Shanghai [web site]. (http://www.greenment.net/en/project/page/480, accessed 15 April 2017).

Gruber G (2016). HIA in Austria. In: Vohra S, Nowacki J, Martuzzi M, editors. *Health Impact Assessments and Health in Environmental Assessments – developing further implementation strategies. Report of the expert meeting Bonn, Germany, 24-25 September 2015*. Copenhagen, WHO Regional Office for Europe,2016:36–37.

Guliš G et al. (2012). *Strengthening the Implementation of Health Impact Assessment in Latvia*. Copenhagen, WHO Regional Office for Europe.

Guliš G et al. editors (2014). *Assessment of population health risks of policies*. New York, NY, Springer.

Hacking T, Guthrie P (2008). A framework for clarifying the meaning of Triple Bottom-Line, Integrated, and Sustainability Assessment. *Environmental Impact Assessment Review*, 28:73–89.

Haigh F et al. (2015). What makes health impact assessments successful? Factors contributing to effectiveness in Australia and New Zealand. *BMC Public Health*, 15.

Halzlová K (2016). HIA in the National Public Health Act of Slovakia. In: Vohra S, Nowacki J, Martuzzi M, editors. *Health Impact Assessments and Health in Environmental Assessments – developing further implementation strategies. Report of the expert meeting Bonn, Germany, 24-25 September 2015*. Copenhagen, WHO Regional Office for Europe, 2016:33–34.

Hamlin C (2015). The history and development of public health in developed countries. In: Detels R et al., editors. *Oxford textbook of public health*. Vol1., 6th edition. Oxford medical publications. Oxford, Oxford University Press, 2015:19–36. (Oxford medical publications).

Hanlon P et al. (2011). Making the case for a 'fifth wave' in public Health. *Public Health*, 125(1):30–36.

Harris PJ et al. (2009). Human health and wellbeing in environmental impact assessment in New South Wales, Australia: Auditing health impacts within environmental assessments of major projects. *Environmental Impact Assessment Review*, 29(5):310–318.

Harris PJ, Haigh F (2015). Including health in environmental impact assessments: is an institutional approach useful for practice? *Impact Assessment and Project Appraisal*, 33(2):135–141.

Harris PJ, Sainsbury P, Kemp L (2014). The fit between health impact assessment and public policy: Practice meets theory. *Social Science & Medicine*, 108:46–53.

Harris PJ, Viliani F, Spickett J (2015). Assessing Health Impacts within Environmental Impact Assessments: An Opportunity for Public Health Globally Which Must Not Remain Missed. *International Journal of Environmental Research and Public Health*, 12(1):1044–1049.

Harris-Roxas BF et al. (2011). A rapid equity focused health impact assessment of a policy implementation plan: An Australian case study and impact evaluation. *International Journal for Equity in Health*, 10:6.

Harris-Roxas BF et al. (2012). Health impact assessment: the state of the art. *Impact Assessment and Project Appraisal*, 30(1):43–52.

Harris-Roxas BF et al. (2014). Evaluating the impact of equity focused health impact assessment on health service planning: three case studies. *BMC Health Services Research*, 14.

Harris-Roxas BF, Harris E (2011). Differing forms, differing purposes: A typology of health impact assessment. *Environmental Impact Assessment Review*, 31(4):396–403. (Health Impact Assessment in the Asia Pacific).

Hilding-Rydevik T et al. (2007). *(IMP)3 - Health Aspects in EIA. D 2.2 Report WP 2*. Vienna, Austria, ÖIR, Österreichisches Institut für Raumplanung (Austrian Institute for Regional Studies and Spatial Planning).

Human Impact Partners (2011). *A health impact assessment toolkit: a handbook to conducting HIA*, 3rd edition. Oakland, CA, Human Impact Partners.

Hurrelmann K (1994). *Sozialisation und Gesundheit. Somatische, psychische und soziale Risikofaktoren im Lebenslauf*, 3rd edition. Weinheim, München, Juventa Verlag.

Hurrelmann K (2006). *Gesundheitssoziologie: eine Einführung in sozialwissenschaftliche Theorien von Krankheitsprävention und Gesundheitsförderung*, 6th edition. Weinheim, Juventa-Verl (Grundlagentexte Soziologie).

Hurrelmann K, Laaser U, Razum O (2016). Entwicklung und Perspektiven der Gesundheitswissenschaften in Deutschland. In: Hurrelmann K, Razum O, editors. *Handbuch Gesundheitswissenschaften*, 6th edition. Weinheim Basel, Beltz Juventa, 2016:15–51.

IFC (2012). *Performance Standards on Environmental and Social Sustainability*. Washington, DC, IFC International Finance Corporation.

IFC (2017). Environmental, Health, and Safety Guidelines [web site]. (http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/our+approach/risk+management/ehsguidelines, accessed 15 April 2017).

IFC, World Bank Group (2007). *Environmental, Health, and Safety. General Guidelines*. Washington, DC, IFC International Finance Corporation, World Bank Group.

IPCS (2004). *International Programme on Chemical Safety (IPCS) risk assessment terminology. Part 1: IPCS/OECD key generic terms used in chemical hazard/risk assessment. Part 2: IPCS glossary of key exposure assessment terminology*. Geneva, WHO - World Health Organization, IOMC - Inter-Organization Programme for the Sound Management of Chemicals (Harmonization project document, No. 1).

JCSEE, Sanders JR, editors. (1994). *The program evaluation standards: how to assess evaluations of educational programs*, 2nd edition. Thousand Oaks, CA, SAGE Publications, Inc.

João E (2005). Key Principles of SEA. In: Schmidt M, João E, Albrecht E, editors. *Implementing Strategic Environmental Assessment*. Berlin, Heidelberg, New York, Springer, 2005:3–14.

Kemm J, Parry J, Palmer S, editors (2004). *Health impact assessment - concepts, techniques and applications*. Oxford, United Kingdom, Oxford University Press.

Kemm JR, editor (2013a). *Health impact assessment: past achievement, current understanding, and future progress*, 1st edition. Oxford, Oxford University Press.

Kemm JR (2013b). Origins and outline of health impact assessment. In: Kemm JR, edirors. *Health impact assessment: past achievement, current understanding, and future progress*. 1st edition. Oxford, Oxford University Press,2013:3–14.

Kemm JR (2013c). Screening and Scoping. In: Kemm JR, editor. *Health impact assessment: past achievement, current understanding, and future progress*., 1st edition. Oxford, Oxford University Press, 2013:15–24.

Kickbusch I, Behrendt T (2013). *Implementing a Health 2020 vision: governance for health in the 21st century. Making it happen.* Copenhagen, WHO Regional Office for Europe.

Kjellström T, Corvalán CF (1995). Framework for the development of environmental health indicators. *World health statistics quarterly*, 48(2):144–154. (Environment and Public Health).

Knol AB et al. (2010). The use of expert elicitation in environmental health impact assessment: a seven step procedure. *Environmental Health*, 9:19.

Kørnøv L (2009). Strategic Environmental Assessment as catalyst of healthier spatial planning: The Danish guidance and practice. *Environmental Impact Assessment Review*, 29:60–65.

Krieger G, Balge M (2005). *A Guide to Health Impact Assessments in the oil and gas industry*. London, IPIECA/OPG.

Krieger GR et al. (2010). Barbarians at the gate: storming the Gothenburg consensus. *The Lancet*, 375(9732):2129–2131.

Kristensen FB (2008). Transnational collaboration on health technology assessment – a political priority in Europe. In: Garrido MV et al., editors. *Health technology assessment and health policy-making in Europe: current status, challenges and potential*. Observatory studies series. Copenhagen, WHO Regional Office for Europe, 2008:5–18. (Observatory studies series, No. 14).

Kustov I, Xu T, Nowacki J. PART III – Online research on HIA and health in EAs in the NIS. In: Nowacki J, Martín-Olmedo P, Martuzzi M, editors. *Health impact assessment implementation and the integration of health in environmental assessments. A literature review and online survey across the WHO European Region*. Copenhagen, WHO Regional Office for Europe (forthcoming),:77–88.

Kwiatkowski RE, Ooi M (2003). Integrated environmental impact assessment: a Canadian example. *Bulletin of the World Health Organization*, 81(6):434–438.

Labisch A, Woelk W (2016). Geschichte der Gesundheitswissenschaften. In: Hurrelmann K, Razum O, editors. *Handbuch Gesundheitswissenschaften*.,6th edition. Weinheim Basel, Beltz Juventa,2016:55–98.

Labuschagne C, Brent AC, van Erck RPG (2005). Assessing the sustainability performances of industries. *Journal of Cleaner Production*, 13(4):373–385.

Lalonde M (1974). *A new perspective on the health of Canadians: A working document = Nouvelle perspective de la santé des canadiens*. Ottawa, Government of Canada (http://nccdh.ca/resources/entry/new-perspective-on-the-health-of-canadians, accessed 10 February 2017).

Last JMed (2007). *A dictionary of public health*, online. New York, Oxford University Press (http://www.oxfordreference.com/view/10.1093/acref/9780195160901.001.0001/acref-9780195160901, accessed 2 February 2017).

Lebret E (2016). Integrated Environmental Health Impact Assessment for Risk Governance Purposes; Across What Do We Integrate? *International Journal of Environmental Research and Public Health*, 13(1).

Lebret E, Hurley F, Briggs D (2008). HEIMTSA-INTARESE: Bridging science and environmental policy through integrated environmental impact assessments. *ISEE 20th Annual Conference*. Pasadena, California, Epidemiology (6; http://journals.lww.com/epidem/Fulltext/2008/11001/HEIMTSA_INTARESE_Bridging_Science_and.194.aspx, accessed 12 May 2017).

Lee JH, Röbbel N, Dora C (2013). *Cross-country analysis of the institutionalization of health impact assessment*. Geneva, World Health Organization (Social Determinants of Health Discussion Paper Series (Policy & Practice), No. 8).

Linzalone N et al. (2014). Health Impact Assessment Practice and Potential for Integration within Environmental Impact and Strategic Environmental Assessments in Italy. *International Journal of Environmental Research and Public Health*, 11(12):12683–12699.

Mackenbach JP et al. (2004). Health inequalities and HIA. In: Kemm J, Parry J, Palmer S, editors. *Health impact assessment - concepts, techniques and applications*. Oxford, United Kingdom, Oxford University Press, 2004:25–37.

Mahoney M, Potter J-L (2004). Integrating health impact assessment into the triple bottom line concept. *Environmental Impact Assessment Review*, 24:151–160.

Marks L, Hunter DJ, Alderslade R (2011). *Strengthening Public Health Capacity and Services in Europe. A Concept Paper*. Copenhagen, WHO Regional Office for Europe, Durham University.

Martuzzi M, Tickner JA, editors. (2004). *The precautionary principle: protecting public health, the environment and the future of our children*. Copenhagen, WHO Regional Office for Europe.

McCaig K (2005). Canadian insights: The challenges of an integrated environmental assessment framework. *Environmental Impact Assessment Review*, 25(7–8):737–746.

McCarthy M et al. (2002). A health impact assessment model for environmental changes attributable to development projects. *Journal of Epidemiology and Community Health*, 56(8):611–616.

McHugh S et al. (2006). Environmental, Social, and Health Impact Assessment (ESHIA) Process. *SPE International Health, Safety & Environment Conference*. Society of Petroleum Engineers.

McKeown T (1979). *The role of medicine: dream, mirage, or nemesis?*, 2nd edition. New Jersey, USA, Princeton University Press (http://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&db=nlabk&AN=791804, accessed 29 January 2017).

Meeuwsen R (2016). The Netherlands Commission for Environmental Assessment. In: Vohra S, Nowacki J, Martuzzi M, editors. *Health Impact Assessments and Health in Environmental Assessments – developing further implementation strategies. Report of the expert meeting Bonn, Germany, 24-25 September 2015*. Copenhagen, WHO Regional Office for Europe, 2016:38–39.

Merriam-Webster (2017). Definition of Expert [web site]. (https://www.merriam-webster.com/dictionary/expert, accessed 10 January 2017).

Mindell J, Joffe M, Ison E (2004). Planning an HIA. In: Kemm J, Parry J, Palmer S, editors. *Health impact assessment - concepts, techniques and applications*. Oxford, United Kingdom, Oxford University Press, 2004:91–102.

Morgan RK (2011). Health and impact assessment: Are we seeing closer integration? *Environmental Impact Assessment Review*, 31(4):404–411. (Health Impact Assessment in the Asia Pacific).

Morgan RK (2012). Environmental impact assessment: the state of the art. *Impact Assessment and Project Appraisal*, 30(1):5–14.

Morris GP et al. (2006). Getting strategic about the environment and health. *Public Health*, 120(10):889–903.

Morrison-Saunders A et al. (2014a). Strengthening impact assessment: a call for integration and focus. *Impact Assessment and Project Appraisal*, 32(1):2–8.

Morrison-Saunders A et al. (2014b). Towards sustainability assessment follow-up. *Environmental Impact Assessment Review*, 45:38–45.

Murray CJ et al. (2003). Comparative quantification of health risks: Conceptual framework and methodological issues. *Population Health Metrics*, 1:1.

Nowacki J (2007). *Wirtschaftlichkeitsanalysen im Rahmen von Health Impact Assessments am Beispiel der finanziellen Bewertungen von Gesundheitsfolgen. Masterarbeit 2006*. Bielefeld, lögd NRW, :xii+140 (Materialien Umwelt und Gesundheit).

Nowacki J, Martín-Olmedo P, Martuzzi M, editors. *Health impact assessment implementation and the integration of health in environmental assessments. A literature review and online survey across the European Region of WHO*. Copenhagen, WHO Regional Office for Europe (forthcoming).

Nowacki J, Martuzzi M, Fischer TB (2010). *Health and strategic environmental assessment. Background information and report of the WHO consultation meeting, Rome 08./09. June 2009*. Copenhagen, WHO Regional Office for Europe.

Nowacki J, Mekel O, Fehr R (2010). Generic Health Impact Assessment (HIA) guidelines – Comparative study. *Das Gesundheitswesen*, 72(08/09):P39. (Poster presentation at the joint Congress: Dt. Gesellschaft für Sozialmedizin und Prävention, Dt. Gesellschaft für Epidemiologie, European Union of Medicine in Assurance and Social Security (EUMASS) on Individualized Prevention and Epidemiology: Modern Medicine, Berlin, Germany, 23-25 September 2010).

Nowacki J, Vohra S (2014). HIA and health in environmental assessments (EIA/SEA). *WHO Capacity Building Workshop on HIA and Health in Environmental Assessments, 1-2 October 2014, Chisinau, Republic of Moldova*. Copenhagen (unpublished), WHO Regional Office for Europe.

OECD (1993). *Core set of indicators for environmental performance review*. Paris, OECD.

O'Mullane M (2013a). Health Impact Assessment: the conceptual roots. In: O'Mullane M, editor. *Integrating health impact assessment with the policy process: lessons and experiences from around the world*. Oxford, Oxford Univ. Press, 2013:8–24.

O'Mullane M, editor. (2013b). *Integrating health impact assessment with the policy process: lessons and experiences from around the world*. Oxford, Oxford Univ. Press.

O'Mullane M, Guliš G (2014). Health impact assessment. In: Fehr R et al., editors. *Health in Impact Assessments: Opportunities not to be missed*. Copenhagen, WHO Regional Office for Europe, 2014:89–110.

Oregon Health Authority (2015). *Health Impact Assessment: Oregon's Practitioner Toolkit A Handbook for Conducting Rapid HIAs*, 2nd edition. Portland, OR, USA, Oregon Health Authority Public Health Division.

Oxford English Dictionary (2017a). Definition of 'framework', noun. *Oxford English Dictionary Online*. (http://www.oed.com/view/Entry/74161, accessed 10 February 2017).

Oxford English Dictionary (2017b). Definition of 'model'. *Oxford English Dictionary Online*. (http://www.oed.com/view/Entry/120577?rskey=ODjCdE&result=1#eid, accessed 1 March 2017).

Partidário MR (2012). *Strategic Environmental Assessment Better Practice Guide. Methodological guidance for strategic thinking in SEA*. Lisbon, Portugal, Portuguese Environment Agency & REN - Redes Energéticas Nacionais.

Partidário MR et al. (2012). *Impact Assessment*. Fargo, ND, USA, IAIA - International Association for Impact Assessment,:2.

Partidário MR (2013). Annex 3.2 What is Impact Assessment? Connecting the Health in EIA and SEA modules. In: WHO Regional Office for Europe, editor. *An intersectoral training package for environment and health experts*. Capacity Building in Environment and Health (CBEH) Project. Copenhagen, WHO Regional Office for Europe, 2013.

Partidário MR, Fischer TB (2006). Follow-up in Current SEA Understanding. In: Morrison-Saunders A, Arts J, editors. *Assessing Impact. Handbook of EIA and SEA Follow-up*, paperback. London, Earthscan, 2006:224–247.

Patz J et al., editors. (2011). *Our Planet, Our Health, Our Future. Human health and the Rio Conventions: biological diversity, climate change and desertification. Discussion Paper*. Geneva, WHO - World Health Organization.

Peters MDJ et al. (2015). *The Joanna Briggs Institute Reviewers' Manual 2015. Methodology for JBI Scoping Reviews*. Adelaide, Australia, The Joanna Briggs Institute, University of Adelaide.

Pope J et al. (2017). Reconceptualising sustainability assessment. *Environmental Impact Assessment Review*, 62:205–215.

Porta M et al., editors. (2014). *A dictionary of epidemiology*, Sixth edition. Oxford, Oxford University Press.

Posas PJ (2011). The UK's Draft Guidance for Health in SEA in light of HIA community priorities and the UNECE SEA Protocol. *Environmental Impact Assessment Review*, 31(3):320–327.

Povall SL et al. (2014). Health equity impact assessment. *Health Promotion International*, 29(4):621–633.

Prüss-Üstün A et al. (2016). *Preventing disease through healthy environments: A global assessment of the burden of disease from environmental risks*, Second edition. Geneva, Switzerland, WHO - World Health Organization.

Prüss-Üstün A, Corvalán CF (2006). *Preventing disease through healthy environments. Towards an estimate of the environmental burden of disease*. Geneva, WHO - World Health Organization (http://apps.who.int/iris/bitstream/10665/43457/1/9241593822_eng.pdf?ua=1, accessed 17 February 2017).

Public Health Advisory Committee (2005). *A Guide to Health Impact Assessment. A Policy Tool for New Zealand*. Wellington, New Zealand, Public Health Advisory Committee.

Quigley R et al. (2006). *HIA International Best Practice Principles*. Fargo, ND, USA, IAIA - International Association for Impact Assessment (Special Publication Series).

Rockenschaub G (2012). *Health Needs Assessment, Malta. Mission of 16-18 March 2012.* Copenhagen, WHO Regional Office for Europe.

Rosen G (1993). *A history of public health*, Expanded. Baltimore, Johns Hopkins Univ. Press, (Johns Hopkins Paperbacks History of Medicine).

Ross CL, Rao A (2013). Health Impact Assessment in the USA: practice, policy, and legal underpinnings. In: O'Mullane M, editor. *Integrating health impact assessment with the policy process: lessons and experiences from around the world*. Oxford, Oxford Univ. Press, 2013:88–98.

Rowe A, McClelland A, Billingham K (2001). Part I. A pack for practitioners. In: *Community health needs assessment an introductory guide for the family health nurse in Europe.* Copenhagen, WHO, 2001.

Sadler B, Dalal-Clayton B (2012). *Strategic Environmental Assessment: A Sourcebook and Reference Guide to International Experience*. London, Earthscan.

Schnabel P-E (2015). *Einladung zur Theoriearbeit in den Gesundheitswissenschaften. Wege, Anschlussstellen, Kompatibilitaeten*. Weinheim und Basel, Beltz Juventa.

van Schooten M, Vanclay F, Slootweg R (2003). Conceptualizing social change processes and social impacts. In: Becker HA, Vanclay F, editors. *The International Handbook of Social Impact Assessment. Conceptual and Methodological Advances*. Cheltenham, Northampton, Edward Elgar Publishing,2003:74–91.

Scott-Samuel A (1996). Health impact assessment - An idea whose time has come. *BMJ*, 313(7051):183–184.

Sedgwick P (2014). Non-response bias versus response bias. *BMJ*, 348:g2573.

Senécal P et al. (1999). *Principles of Environmental Impact Assessment best practice*. Fargo, ND, USA, IAIA - International Association for Impact Assessment in cooperation with IEA - Institute of Environmental Assessment, UK,:1 (IAIA Principles).

Sihto M, Ollila E, Koivusalo M (2006). Principles and challenges of Health in All Policies. In: Ståhl T et al., editors. *Health in All Policies – Prospects and potentials*. Helsinki, Ministry of Social Affairs and Health, 2006:3–20.

Simpson S et al. (2005). Equity-focused health impact assessment: A tool to assist policy makers in addressing health inequalities. *Environmental Impact Assessment Review*, 25(7–8):772–782. (Health Impact Assessment).

Singh RK et al. (2009). An overview of sustainability assessment methodologies. *Ecological Indicators*, 9(2):189–212.

Slootweg R, Vanclay F, van Schooten M (2001). Function evaluation as a framework for the integration of social and environmental impact assessment. *Impact Assessment and Project Appraisal*, 19(1):19–28.

Smith KR, Corvalán CF, Kjellström T (1999). How much ill health is attributable to environmental factors? *Epidemiology*, 10:573–584.

St Leger L (2007). Declarations, Charters and Statements – Their role in health promotion. *Health Promotion International*, 22(3):179–181.

Ståhl T et al. (2006). *Health in All Policies. Prospects and potentials*. Helsinki, Ministry of Social Affairs and Health.

Steinemann A (2000). Rethinking human health impact assessment. *Environmental Impact Assessment Review*, 20(6):627–645.

Stokes J, Noren J, Shindell S (1982). Definition of terms and concepts applicable to clinical preventive medicine. *Journal of Community Health*, 8(1):33–41.

Szreter S (2002). Rethinking McKeown: The Relationship Between Public Health and Social Change. *American Journal of Public Health*, 92(5):722–725.

Tajima R, Fischer TB (2013). Should different impact assessment instruments be integrated? Evidence from English spatial planning. *Environmental Impact Assessment Review*, 41:29–37.

Tanguay GA et al. (2010). Measuring the sustainability of cities: An analysis of the use of local indicators. *Ecological Indicators*, 10(2):407–418.

Theakstone Fed (2006). *Environment and health - An international concordance on selected concepts*. Copenhagen, WHO Regional Office for Europe (http://www.euro.who.int/__data/assets/pdf_file/0019/130177/E88308.pdf, accessed 13 December 2016).

Thérivel R (2004). *Strategic Environmental Assessment in Action*. London, Washington DC, Earthscan.

Thérivel R (2010). *Strategic environmental assessment in action*, 2nd edition. London, Washington, Earthscan.

Thérivel R, Partidário MR (1996). *The practice of strategic environmental assessment*. London, Earthscan.

UN (1973). *Report of the United Nations Conference on the Human Environment. 5-16 June 1972, Stockholm, Sweden*. New York, NY, United Nations.

UN (1987). *Report of the World Commission on Environment and Development: Our Common Future*. New York, NY, United Nations (General Assembly, 42nd Session).

UN (1992a). *Rio Declaration on Environment and Development*. Rio de Janeiro, Brazil, United Nations (UNCED - United Nations Conference on Environment and Development).

UN (1992b). *Agenda 21*. Rio de Janeiro, Brazil, United Nations (UNCED - United Nations Conference on Environment and Development).

UN (2000). *United Nations Millennium Declaration*. New York, NY, United Nations (General Assembly, 55th Session).

UN (2001). *Road map towards the implementation of the United Nations Millennium Declaration. Follow-up to the outcome of the Millennium Summit*. New York, NY, United Nations (General Assembly, 56th session).

UN, editor (2002). *Report of the World Summit on Sustainable Development: Johannesburg, South Africa, 26 August - 4 September 2002*. New York, United Nations (No. A/CONF.199/20).

UN (2012). *The Future We Want. Resolution adopted by the General Assembly on 27 July 2012*. New York, NY, United Nations (General Assembly, 66th session).

UN (2015). *Transforming our World: The 2030 Agenda for Sustainable Development. United Nations Sustainable Development Summit 2015, 25 - 27 September 2015, New York*. New York, NY, United Nations (General Assembly, 70th session).

UN (2017). United Nations Treaty Collection [web site]. (https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-4-b&chapter=27&clang=_en#1, accessed 25 August 2017).

UNECE (1991). *Convention on Environmental Impact Assessment in a Transboundary Context. Espoo Convention*. Geneva, UNECE - United Nations Economic Commission for Europe.

UNECE (1998). *Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters. Fourth Ministerial Conference Environment for Europe. Århus, Denmark 23 - 25 June 1998*. Geneva, UNECE - United Nations Economic Commission for Europe.

UNECE (2003). *Protocol on Strategic Environmental Assessment of the Convention on Environmental Impact Assessment in a Transboundary Context*. Geneva, UNECE - United Nations Economic Commission for Europe.

UNECE (2007a). *Resource Manual to Support Application of the UNECE Protocol on SEA, Draft Final, April 2007*. Geneva, UNECE - United Nations Economic Commission for Europe.

UNECE (2007b). *Resource Manual to Support Application of the UNECE Protocol on SEA, Annex/Chapter A7: Health*. Geneva, UNECE - United Nations Economic Commission for Europe.

UNECE (2012). *Resource Manual to Support Application of the UNECE Protocol on SEA*. Geneva, UNECE - United Nations Economic Commission for Europe.

UNECE (2017a). *Second review of implementation of the Protocol on Strategic Environmental Assessment. Advanced Copy. Note by the secretariat. Prepared for the Meeting of the Parties to the Convention on Environmental Impact Assessment in a Transboundary Context serving as the Meeting of the Parties to the Protocol on Strategic Environmental Assessment. Minsk, 13–16 June 2017.* Geneva, Switzerland, UNECE - United Nations Economic Commission for Europe.

UNECE (2017b). *UNECE Espoo Convention, the Protocol on SEA and SDGs*. Geneva, Switzerland, UNECE - United Nations Economic Commission for Europe (https://www.unece.org/index.php?id=45871, accessed 21 August 2017).

United Kingdom Department of Health and Social Security (1982). *Inequalities in health: Black report*. London, Penguin Books.

U.S. Department of Health and Human Services (2000). *Healthy People 2010: Understanding and Improving Health*, 2nd edition. Washington, DC, U.S. Government Printing Office.

U.S. EPA (2017). Risk Assessment [web site]. (https://www.epa.gov/risk, accessed 14 April 2017).

Vanclay F (2003). Conceptual and methodological advances in social impact assessment. In: Becker HA, Vanclay F, editors. *The International Handbook of Social Impact Assessment. Conceptual and Methodological Advances*. Cheltenham, Northampton, Edward Elgar Publishing, 2003:1–9.

Velasco-Garrido M, Busse R (2005). *Policy brief. Health technology assessment. An introduction to objectives, role of evidence, and structure in Europe*. WHO on behalf of the European Observatory on Health Systems and Policies.

Verheem R, IAIA SEA Section (2002). *Strategic Environmental Assessment Performance Criteria*. Fargo, ND, USA, IAIA - International Association for Impact Assessment.

Vohra S et al. (2010). New international consensus on health impact assessment. *The Lancet*, 376(9751):1464–1465.

Vohra S, Birley M, Ball J (2010). *Good Practice Guidance on Health Impact Assessment*. London, ICMM - International Council on Mining & Metals.

Waheed B, Khan F, Veitch B (2009). Linkage-Based Frameworks for Sustainability Assessment: Making a Case for Driving Force-Pressure-State-Exposure-Effect-Action (DPSEEA) Frameworks. *Sustainability*, 1(3):441–463.

Welteke R, Machtolf M (2005). Gesundheitsverträglichkeit von Projekten und Planungen. In: Fehr R, Neus H, Heudorf U, editors. *Gesundheit und Umwelt: ökologische Prävention und Gesundheitsförderung*.,1. Aufl. Bern, Verlag Hans Huber, 2005:210–219.

WHA (2007). *Health promotion in a globalized world*. Geneva, World Health Organization (Sixtieth World Health Assembly).

White F, Stallones L, Last JM (2013). *Global public health: ecological foundations*. Oxford, Oxford Univ. Press.

Whitehead M (1991). The concepts and principles of equity and health. *Health Promotion International*, 6(3):217–228.

WHO (1946). *Constitution of the World Health Organisation. With amendments adopted by the Fifty-first World Health Assembly, September 2005*. New York, WHO - World Health Organization.

WHO (1978). *Declaration of Alma-Ata. International Conference on Primary Health Care, Alma-Ata, Union of Soviet Socialist Republics (USSR), 6-12 September 1978*. Geneva, Switzerland, WHO - World Health Organization.

WHO (1981). *Global Strategy for Health for All by the Year 2000*. Geneva, WHO - World Health Organization.

WHO (1986). *Ottawa Charter for Health Promotion. First International Conference on Health Promotion, Ottawa, 21 November 1986*. Ottawa, Canada, WHO Global Conference on Health Promotion.

WHO (1988). *Adelaide Recommendations on Healthy Public Policy. 2nd International Conference on Health Promotion, Adelaide, South Australia, 5-9 April 1988*. Adelaide, Australia, WHO Global Conference on Health Promotion.

WHO (1991). *Sundsvall Statement on Supportive Environments for Health. Third International Conference on Health Promotion, Sundsvall, Sweden, 9-15 June 1991*. Sundsvall, Sweden, WHO Global Conference on Health Promotion.

WHO (1997). *Jakarta Declaration on Leading Health Promotion into the 21st Century. Fourth International Conference on Health Promotion, Jakarta, Indonesia, 21-25 July 1997*. Jakarta, Indonesia, WHO Global Conference on Health Promotion.

WHO (2004). *The World Health Report 2004. Changing history*. Geneva, World Health Organization (The world health report, No. 2004).

WHO (2011). *Rio Political Declaration on Social Determinants of Health. Adopted during the World Conference on Social Determinants of Health on 21 October 2011, Rio de Janeiro, Brazil*. Geneva, Switzerland, WHO - World Health Organization.

WHO (2013). *Helsinki Statement. 8th Global Conference on Health Promotion, Helsinki, Finland, 10-14 June 2013*. Helsinki, WHO Global Conference on Health Promotion.

WHO (2014). *WHO guidelines for indoor air quality: household fuel combustion*. Geneva, WHO - World Health Organization.

WHO (2016a). *Global Health Estimates 2015: Disease burden by Cause, Age, Sex, by Country and by Region, 2000-2015*. Geneva, WHO - World Health Organization.

WHO (2016b). *Shanghai Declaration on promoting health in the 2030 Agenda for Sustainable Development. 9th Global Conference on Health Promotion. Shanghai, 21-24 November 2016*. Shanghai, WHO Global Conference on Health Promotion.

WHO (2017). WHO Global Health Promotion Conferences [web site]. (http://www.who.int/healthpromotion/conferences/en/, accessed 9 February 2017).

WHO Commission on Health and Environment (1992). *Our planet, our health : report of the WHO Commission on Health and Environment*. Geneva, Switzerland, WHO - World Health Organization.

WHO Commission on Health and Environment (1993). *WHO Global Strategy for Health and Environment*. Geneva, WHO - World Health Organization.

WHO, IPCS, IOMC, editors. (2010). *WHO human health risk assessment toolkit: chemical hazards*. Geneva, World Health Organization (Harmonization project document, No. 8).

WHO Regional Committee for Europe (2012). *Resolution on Health 2020 – The European policy framework for health and well-being*. Malta, WHO Regional Office for Europe (Regional Committee for Europe, 62nd session).

WHO Regional Committee for Europe (2013). *Resolution on Indicators for Health 2020 targets*. Çeşme Izmir, Turkey, WHO Regional Office for Europe (Regional Committee for Europe, 63rd session).

WHO Regional Committee for Europe, Environmental Resources Ltd (1983). *Environmental health impact assessment of irrigated agricultural development projects*. Copenhagen, WHO Regional Office for Europe.

WHO Regional Office for Africa, UNEP, Republique Gabonaise, editors. (2009). *Health Security through Healthy Environments. First Interministerial Conference on Health and Environment, Libreville, Gabon, 28-29 August 2008. Proceedings*. Brazzaville, Republic of Congo, WHO, WHO Regional Office for Africa.

WHO Regional Office for Europe (1979). *Environmental Health Impact Assessment. Report on a WHO Seminar. Argostoli, Kefalonia, Greece, 2-6 October 1978*. Copenhagen, WHO Regional Office for Europe.

WHO Regional Office for Europe (1985). *Environmental Health Impact Assessment of Urban Development Projects. Guidelines and Recommendations*. Copenhagen, WHO Regional Office for Europe.

WHO Regional Office for Europe (1987). *Health and Safety Component of Environmental Impact Assessment. Report on a WHO meeting, Copenhagen 24-28 February 1986*. Copenhagen, WHO Regional Office for Europe.

WHO Regional Office for Europe (1989). *European Charta on Environment and Health. First Ministerial Conference on Environment and Health, Frankfurt/Main, Germany, 07-08 December 1989*. Copenhagen, WHO Regional Office for Europe.

WHO Regional Office for Europe (1994). *Educational programmes for health professionals*. Copenhagen, WHO Regional Office for Europe.

WHO Regional Office for Europe (1999a). *Declaration. Third Ministerial Conference on Environment and Health, London, United Kingdom, 16-18 June 1999*. Copenhagen, WHO Regional Office for Europe.

WHO Regional Office for Europe (1999b). *Health Impact Assessment. Main concepts and suggested approach. Gothenburg consensus paper*. Brussels, WHO Regional Office for Europe, European Centre for Health Policy (http://www.apho.org.uk/resource/item.aspx?RID=44163, accessed 9 January 2017).

WHO Regional Office for Europe (2004). *Declaration. Fourth Ministerial Conference on Environment and Health, Budapest, Hungary, 23–25 June 2004*. Copenhagen, WHO Regional Office for Europe.

WHO Regional Office for Europe (2005). *Health Impact Assessment Toolkit for Cities. Document 1. Background document: concepts, process, methods. Vision to Action*. Copenhagen, WHO Regional Office for Europe.

WHO Regional Office for Europe (2010). *Declaration and Commitment to Act. Fifth Ministerial Conference on Environment and Health "Protecting children's health in a changing environment", Parma, Italy, 10–12 March 2010*. Copenhagen, WHO Regional Office for Europe.

WHO Regional Office for Europe (2011). *Report of the Preparatory Workshops with participating countries. Tallinn, Estonia, 12-13 October 2010 and Budapest, Hungary, 28-29 October 2010*. Copenhagen, WHO Regional Office for Europe (Capacity Building in Environment and Health (CBEH) Project).

WHO Regional Office for Europe (2012). *European Action Plan for Strengthening Public Health Capacities and Services*. Malta, WHO Regional Office for Europe (Regional Committee for Europe, 62nd session).

WHO Regional Office for Europe (2013a). *Health 2020 A European policy framework and strategy for the 21st century*. Copenhagen, WHO Regional Office for Europe.

WHO Regional Office for Europe (2013b). *Review of social determinants and the health divide in the WHO European Region: final report*, updated reprint 2014. Copenhagen, WHO Regional Office for Europe.

WHO Regional Office for Europe (2013c). *Health 2020 targets, indicators and monitoring framework*. Çeşme Izmir, Turkey, WHO Regional Office For Europe.

WHO Regional Office for Europe (2013d). *Health and Environment in the WHO European Region: Creating resilient communities and supportive environments*. Copenhagen, WHO Regional Office for Europe.

WHO Regional Office for Europe (2013e). *Report of the international training workshop on CBEH.19–23 March 2012 Riga, Latvia*. Copenhagen, WHO Regional Office for Europe (Capacity Building in Environment and Health (CBEH) Project).

WHO Regional Office for Europe (2013f). *An intersectoral training package for environment and health experts*. Copenhagen, WHO Regional Office for Europe (Capacity Building in Environment and Health (CBEH) Project).

WHO Regional Office for Europe (2013g). *Continuous training in environment and health*. Copenhagen, WHO Regional Office for Europe (Capacity Building in Environment and Health (CBEH) Project).

WHO Regional Office for Europe (2013h). *Using impact assessment in environment and health: a framework*. Copenhagen, WHO Regional Office for Europe (Capacity Building in Environment and Health (CBEH) Project).

WHO Regional Office for Europe (2016). *Midterm progress report on Health 2020 implementation 2012–2016*. Copenhagen, WHO Regional Office for Europe (Regional Committee for Europe, 66th Session).

WHO Regional Office for Europe (2017a). *Annex II. Institutional arrangement for the European Environment and Health Process. Sixth Ministerial Conference on Environment and Health, Ostrava, Czech Republic, 13-15 June 2017*. Copenhagen, WHO Regional Office for Europe.

WHO Regional Office for Europe (2017b). *Declaration. Sixth Ministerial Conference on Environment and Health, Ostrava, Czech Republic, 13-15 June 2017*. Copenhagen, WHO Regional Office for Europe.

WHO Regional Office for Europe (2017c). *Urban green spaces: a brief for action*. Copenhagen, WHO Regional Office for Europe,:22.

Wilkinson R, Marmot M, editors. (1998). *Social determinants of health: the solid facts*. Copenhagen, WHO Regional Office for Europe.

Wilkinson R, Marmot Meds (2003). *Social determinants of health: the solid facts*, 2nd edition Copenhagen, WHO Regional Office for Europe.

Winkler MS et al. (2013). Untapped potential of health impact assessment. *Bulletin of the World Health Organization*, 91(4):298–305.

Wismar M et al., editors. (2007). *The effectiveness of health impact assessment: scope and limitations of supporting decision-making in Europe*. Copenhagen, WHO Regional Office for Europe on behalf of the European Observatory on Health Systems and Policies.

Wismar M (2007). Why research HIA? An introduction to the volume. In: Wismar M et al., editors. *The effectiveness of health impact assessment: scope and limitations of supporting decision-making in Europe*. Copenhagen, WHO Regional Office for Europe on behalf of the European Observatory on Health Systems and Policies, 2007:ix–xxvii.

Wismar M, Blau J, Ernst K (2007). Is HIA effective? A synthesis of concepts, methodologies and results. In: Wismar M et al., editors. *The effectiveness of health impact assessment: scope and limitations of supporting decision-making in Europe*. Copenhagen, WHO Regional Office for Europe on behalf of the European Observatory on Health Systems and Policies,2007:15–33.

Wood C, Dejeddour M (1992). Strategic Environmental Assessment: EA of Policies, Plans and Programmes. *Impact Assessment*, 10(1):3–22.

World Bank (2013). *Environmental Assessment*. Washington, DC, The World Bank (https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=1565&ver=current, accessed 12 March 2017).

World Bank TW (2015). *Environmental and social impact assessment (ESHIA) for Ghana OCTP block phase two*. The World Bank.

Xu T, Nowacki J. PART II – Literature review on HIA implementation. In: Nowacki J, Martín-Olmedo P, Martuzzi M, editors. *Health impact assessment implementation and the integration of health in environmental assessments. A literature review and online survey across the European Region of WHO*. Copenhagen, WHO Regional Office for Europe (forthcoming),:43–76.

Yarbrough DB et al., editors. (2011). *The program evaluation standards: a guide for evaluators and evaluation users*, 3rd edition. Thousand Oaks, CA, SAGE Publications, Inc.

Zukiene D (2016). Public HIA (PHIA) in Lithuania. In: Vohra S, Nowacki J, Martuzzi M, editors. *Health Impact Assessments and Health in Environmental Assessments – developing further implementation strategies. Report of the expert meeting Bonn, Germany, 24-25 September 2015*. Copenhagen, WHO Regional Office for Europe, 2016:34–36.

Annex 1 Disease and injury groups and possible areas for intervention

Disease and injury groups and possible areas for intervention, including population attributable fractions, total global DALYs and total number of global deaths by disease groups:

Disease or injury by group	Main intervention areas	Population attributable fraction (% of DALYs)	World - Total DALYs (000s)	World - Total Deaths (000s)
Noncommunicable diseases		**18** [T]	**276,224**	**8,170.7**
Cancers, global	Household and ambient air pollution, second-hand tobacco smoke, ionizing radiation, UV radiation, chemicals, worker protection.	20 (95% CI:9-43)	44,950	1,665.8
Mental, behavioural and neurological disorders, global	Occupational stress; disasters such as floods, earthquakes and fires (linked to housing, flood management, climate change); forced resettlements in the context of development projects; occupations in the entertainment or alcohol industry; head trauma (for epilepsy); chemicals (for certain neurological diseases); noise (for insomnia); bright lights, poor air quality and odours (for headaches). Physical activity fostered by supportive environments can reduce certain disorders.	12 (95% CI:3-30)	32,703	154.2
Cataracts	UV radiation, household air pollution.	24 (95% CI:14-33)	1,669	-
Hearing loss	Occupational exposure to high noise levels.	22 (95% CI:19-25)	4,787	-
Cardiovascular diseases	Household and ambient air pollution, second-hand tobacco smoke, exposure to lead, stressful working conditions, shift work.	31 (95% CI:20-40)	121,268	4,900.2
Chronic obstructive pulmonary disease, global	Household air pollution, ambient air pollution, exposure to dusts in the workplace.	35 (95% CI:20-48)	32,280	1,193.6
Asthma	Air pollution, second-hand tobacco smoke, indoor exposure to mould and dampness, occupational exposure to allergens.	44 (95% CI:26-53)	11,055	169.5
Musculoskeletal diseases, global	Occupational stressors, prolonged sitting at work and poor work postures; need to carry large quantities of water over significant distances for domestic use.	22 (95% CI:12-33)	24,130	32.6
Congenital anomalies	Mothers' exposure to second-hand tobacco smoke, chemicals.	5 (95% CI:1-10)	2,622	27.8
Infectious, parasitic, maternal, neonatal an nutritional causes [e]		**22**[T]	**201,722**	**2,503.7**
Infectious and parasitic diseases [e]			**173,068**	**2,206.3**
Lower respiratory infections, global [a]	Household and ambient air pollution, second-hand tobacco smoke, housing improvements.	35 (95% CI:27-41)	51,753	566.4
Upper respiratory infections and otitis, global		14 (95% CI:5-22)	990	1.2
Diarrhoeal diseases	Water, sanitation and hygiene, agricultural practices, climate change.	57 (95% CI:34-72)	56,607	845.8
Intestinal nematode infections	Water, sanitation and hygiene, management of wastewater for irrigation.	100	5,230	3.3

Disease or injury by group	Main intervention areas	Population attributable fraction (% of DALYs)	World - Total DALYs (000s)	World - Total Deaths (000s)
Malaria, global	Environmental modification and environmental manipulation to reduce vector breeding sites and reduce contact between humans and disease vector, contextually mosquito-proof drinking-water storage, livestock distribution.	42 (95% CI:28-55)	23,074	258.7
Trachoma	Access to domestic water supplies, latrines, fly control, personal hygiene.	100	299	-
Schistosomiasis	Excreta management, safe water supply, safe agricultural practices, worker protection.	82 (95% CI:71-92)	3,301	17.9
Chagas disease	Management of peridomestic areas.	56 (95% CI:28-80)	295	4.4
Lymphatic filariasis, global	Modification of drainage and wastewater ponds, freshwater collection and irrigation schemes.	67 (95% CI:39-89)	1,894	0.001
Onchocerciasis	Water resource management projects (particularly dams).	10 (95% CI:7-13)	60	-
Leishmaniasis, global	Housing, cleanliness of the peridomestic environment, worker protection.	27 (95% CI:9-40)	903	12.9
Dengue	Management of water bodies around the house, removing standing water.	95 (95% CI:98-100)	1,370	27.3
HIV/AIDS [b,c], global	Occupational transmission in sex workers and migrant workers.	10 (95% CI:8-13)	7,780	138.0
Sexually transmitted diseases (not HIV)		8 (95% CI:4-17)	255	0.8
Hepatitis B[c], global	Occupational transmission in sex workers and migrant workers for hepatitis B; accidental needle stick injuries in health-care workers for hepatitis B (and Hepatitis C).	2 (95% CI:1-4)	111	2.8
Tuberculosis, global	Exposure of miners and other occupational groups to airborne particles such as silica or coal dust; possibly exposure to household fuel combustion smoke and second-hand tobacco smoke; exposure in settings such as prisons, hospitals and overcrowded housing conditions.	18 (95% CI:5-40)	7,689	166.7
Neonatal and nutritional conditions [e]			**28,654**	**297,4**
Neonatal conditions, global	Household air pollution, mothers' exposure to second-hand tobacco smoke, poor water and sanitation in birth settings.	11 (95% CI:2-27)	25,820	270.1
Protein-energy malnutrition [d]	Water, sanitation and hygiene, climate change acting on food insecurity.	15 (95% CI:10-19)	2,834	27.3
Injuries		**39** [f]	**118,466**	**1,950.1**
Unintentional injuries [e]			**105,245**	**1,704.0**
Road traffic injuries, global	Design of roads, land-use planning; traffic intensification in development areas with big infrastructure projects.	39 (95% CI:23-64)	31,001	497.1
Unintentional poisonings, global	Safe handling and storage of chemicals, adequate product information, adequate choice of chemicals, worker protection.	73 (95% CI:53-90)	7,825	137.3
Falls, global	Safety of housing and work environment.	30 (95% CI:15-58)	12,672	208.5

Disease or injury by group	Main intervention areas	Population attributable fraction (% of DALYs)	World - Total DALYs (000s)	World - Total Deaths (000s)
Fires, heat, hot substances	Safety of cooking, lighting and heating equipment, building fire codes, use of flammable materials in the home, safety of occupational environments and practices, climate change.	76 (95% CI:58-90)	13,665	199.8
Drownings, global	Safety of water environments, public awareness, regulations, worker safety, climate change.	73 (95% CI:46-90)	16,948	268.2
Other unintentional injuries, global	Protection from animal bites and contact with venomous plants, safety of mechanical equipment, ionizing radiation and currents.	43 (95% CI:20-74)	23,134	393.1
Intentional injuries [e]			**13,222**	**246.1**
Self-harm, global	Access to toxic chemicals such as pesticides, access to firearms.	21 (95% CI:13-30)	8,120	164.4
Interpersonal violence, global	Access to firearms, urban design (for example, mobility, visibility), worker protection.	16 (95% CI:3-28)	5,102	81.7

(Source: based on Prüss-Üstün et al., 2016, see Tables ES2, A2.1, A2.3 & A2.4)

Notes: a Lower respiratory infections in adults were not estimated;
b HIV/AIDS: human immunodeficiency virus/acquired immunodeficiency syndrome;
c Data for adult populations only;
d Data for children under 5 years only;
e Population attributable fraction not available;
f 95% CI not available.

Annex 2 WHO Member States by region and income grouping

WHO Region	High income countries (HIC) – OECD members
Americas	Canada, Chile, Trinidad and Tobago, United States of America
Europe	Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom
Western Pacific	Australia, Brunei Darussalam, Japan, New Zealand, Republic of Korea, Singapore

WHO Region	Low and middle income countries (LMIC) – non-OECD members
Africa, sub-Saharan	Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, South Africa, South Sudan, Swaziland, Togo, Uganda, United Republic of Tanzania, Zambia, Zimbabwe
Americas	Antigua and Barbuda, Argentina, Bahamas, Barbados, Belize, Bolivia (Plurinational State of), Brazil, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Uruguay, Venezuela (Bolivarian Republic of)
Eastern Mediterranean	Afghanistan, Bahrain, Djibouti, Egypt, Iran (Islamic Republic of), Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Pakistan, Saudi Arabia, Somalia, Sudan, Syrian Arab Republic, Tunisia, United Arab Emirates, Yemen
Europe	Andorra, Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Malta, Monaco, Montenegro, Republic of Moldova, Romania, Russian Federation, San Marino, Serbia, Tajikistan, The former Yugoslav Republic of Macedonia, Turkey, Turkmenistan, Ukraine, Uzbekistan
South-East Asia	Bangladesh, Bhutan, Democratic People's Republic of Korea, India, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka, Thailand, Timor-Leste
Western Pacific	Cambodia, China, Cook Islands, Fiji, Kiribati, Lao People's Democratic Republic, Malaysia, Marshall Islands, Micronesia (Federated States of), Mongolia, Nauru, Niue, Palau, Papua New Guinea, Philippines, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu, Viet Nam

(Source: Prüss-Üstün et al., 2016)

Annex 3 Linking main sectors to primary prevention opportunities

Sector	Selected risks/intervention area
Agriculture	Risk of infection by parasitic diseases: domestic and peri-domestic management of vectors.
	Occupational exposure to chemicals: regulation, personal equipment.
	Consumers' exposure to chemicals: regulations.
Industry/commercial	Air pollution: industrial emission control; improved energy options; indoor tobacco smoke-free legislation.
	Occupational exposure to chemicals, air pollutants, UV exposure, noise: workers' personal protection; education on protective behaviour; engineering approaches to reduce exposure, such as ventilation, dust suppression techniques, enclosure of pollution sources etc.; removal from sources of pollutants or other relevant exposures, regulations.
	Exposure to industrial chemicals (worker consumers): legislation, treaties.
	Water pollution: industrial emission control.
	Noise: noise control regulations.
Transport	Air pollution; decreased physical activity: improved urban planning, improved and increased use of public transport; reduction of traffic congestion; replacement of older diesel vehicles, etc.
	Risk of injury: traffic-calming measures and other traffic control solutions; separation of pedestrians from motorized traffic etc.
Housing/community	Household air pollution: use of clean fuels; strategies to reduce exposure to smoke from solid fuels – implementation of WHO Indoor Air Quality Guidelines (2014).
	Contact with infected excreta: safe disposal of excreta.
	Contact with malaria and other vectors: environmental manipulation and modification of human habitations.
	Contact with Chagas vectors: wall plastering and improved household hygiene.
	Contact with dengue vectors: management of water containers around the house.
	Low physical activity, obesity: better urban planning, access to sports facilities, school and workplace based programmes.
	Unsafe drinking-water: safe household water treatment.
	Exposure to allergens: interventions to reduce house dust and moulds/ dampness.
	Exposure to radon: regulations, for example, remediation measures.
	Exposure to UV: community-based sun safety education.
	Exposure to chemicals: safe management of chemicals in the home and community.
	Risk of falls: improvement of home safety.
	Risk of drownings: improve access and safety of water environments.
	Risk of fire injuries: use of safe cooking and heating equipment and modern energy/fuels; building safety standards.
Water	Inadequate water, sanitation and hygiene: provision of adequate drinking-water and sanitation facilities
	Inadequate implementation water and sanitation management: sanitation and water safety plans, drinking-water guidelines

(Source: Prüss-Üstün et al., 2016)

Annex 4 Selected UN Conferences, major agreements and reports on sustainability and development

Conferences	Major agreements & reports
UN Conference on the Human Environment, Stockholm Conference, 5-16 June 1972	• Declaration of the United Nations Conference on the Human Environment: founding of the United Nations Environmental Program (UNEP)
World Commission on Environment and Development (WCED), 1987	• Report of the WCED: Our Common Future (Brundtland Report)
UN Conference on Environment and Development (UNCED), Earth Summit, 3-14 June 1992	• The Rio Declaration on Environment and Development • Agenda 21 – Global Programme of Action on Sustainable Development • also opened for signature o UN Framework Convention on Climate Change (UNFCCC) o UN Convention on Biological Diversity (UNCBD) o UN Convention to Combat Desertification (UNCCD)
Millennium Summit, 2000	• The Millennium Declaration, leading to the • Millennium Development Goals (MDGs), defined in the road map towards the implementation of the Millennium Declaration, 2001
World Summit on Sustainable Development (WSSD), 26 August - 4 September 2002	• Johannesburg Declaration • Johannesburg Plan of Implementation
United Nations Conference on Sustainable Development (UNCSD), Rio+20, 20-22 June 2012	• Outcome Document: The Future We Want (Resolution A/Res/66/288) • Our Planet, Our Health, Our Future. Human health and the Rio Conventions: biological diversity, climate change and desertification. Discussion Paper in preparation of the Conference by WHO, UNCSD, UNCBD, UNFCCC and UNCCD
United Nations Sustainable Development Summit (UN Summit), 25-27 September 2015	• Transforming our World: The 2030 Agenda for Sustainable Development formulating the Sustainable Development Goals (SDGs)

Source: own compilation based on UN webpages on sustainable development (see, for example, http://www.un.org/en/sections/what-we-do/promote-sustainable-development/index.html)

Annex 5 MDGs and their targets

Goal	Target
1 Eradicate Extreme Hunger and Poverty	1 Halve, between 1990 and 2015, the proportion of people whose income is less than $1 a day
	2 Halve, between 1990 and 2015, the proportion of people who suffer from hunger
2 Achieve Universal Primary Education	3 Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling
3 Promote Gender Equality and Empower Women	4 Eliminate gender disparity in primary and secondary education, preferably by 2005, and in all levels of education no later than 2015
4 Reduce Child Mortality	5 Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate
5 Improve Maternal Health	6 Reduce by three-quarters, between 1990 and 2015, the maternal mortality ratio
6 Combat HIV/AIDS, Malaria and other diseases	7 Have halted by 2015 and begun to reverse the spread of HIV/AIDS
	8 Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases
7 Ensure Environmental Sustainability	9 Integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources
	10 Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation
	11 Have achieved by 2020 a significant improvement in the lives of at least 100 million slum dwellers
8 Develop a Global Partnership for Development	12 Develop further an open, rule-based, predictable, nondiscriminatory trading and financial system (includes a commitment to good governance, development, and poverty reduction (both nationally and internationally)
	13 Address the special needs of the Least Developed Countries (includes tariff- and quota-free access for Least Developed Countries) exports, enhanced program of debt relief for heavily indebted poor countries [HIPCs] and cancellation of official bilateral debt, and more generous official development assistance for countries committed to poverty reduction)
	14 Address the special needs of landlocked developing countries and small island developing states (through the Program of Action for the Sustainable Development of Small Island Developing States and 22nd General Assembly provisions)
	15 Deal comprehensively with the debt problems of developing countries through national and international measures in order to make debt sustainable in the long term
	16 In cooperation with developing countries, develop and implement strategies for decent and productive work for youth
	17 In cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries
	18 In cooperation with the private sector, make available the benefits of new technologies, especially information and communications technology

(Source: UN, 2001)

Annex 6 Comparison EIA, SEA and HIA process

Stage	HIA	EIA	SEA (EIA-based approach)
Screening	▪ to determine, if a (separate) HIA should be conducted.	▪ to determine whether or not a proposal should be subject to EIA; and ▪ if so, at what level of detail.	▪ determining whether the proposal will have any significant environmental effects and deciding if SEA is needed (e.g., based on a legal requirement); ▪ first characterization of a) economic, b) social and c) environmental baseline; and ▪ identification of objectives of the strategic action (for example, linking the proposal to existing strategies like sustainable development targets).
Scoping	▪ establish terms of reference; ▪ Establish boundaries of the HIA; ▪ identification of health problems, methods and techniques for the assessment, potential stakeholders; ▪ composition of the HIA team; ▪ define timeline; and ▪ define what will happen with the HIA results.	▪ establish terms of reference; and ▪ identify issues and impacts likely to be important.	▪ setting the terms of reference, including the geographic, temporal and thematic extent, the level of detail of the assessment and necessary information to be included in the assessment; ▪ identification of environmental problems, methods and techniques for the assessment, potential stakeholders and 'affected parties'; ▪ establishing consultation and participation procedure, and management arrangements; ▪ setting clear thresholds or targets for a), b) and c) ▪ developing PPP ideas; and ▪ identifying potential impacts on objectives and targets.
Alternatives	▪ not explicitly mentioned.	▪ examination of alternatives.	▪ identification of PPP alternatives for meeting objectives and targets of a), b) and c).
Assessment/ appraisal	▪ policy/proposal analysis; ▪ community profiling and baseline, including, e.g., demographic information, prevalence and rates of infectious and chronic disease, health knowledge, practices and attitudes, existing levels of environmental pollution, housing conditions, health	▪ impact analysis; ▪ mitigation and impact management/environmental management plan or system; and ▪ evaluation of significance.	▪ conduct analysis to establish the significant environmental impacts; ▪ ensure state-of the-art results and as reliability; and ▪ using different methods and techniques.

Stage	HIA	EIA	SEA (EIA-based approach)
	and social care services, literacy rates and level of education, employment and unemployment rates, existing community concerns and aspiration; ▪ health impact evidence gathering – quantitative and qualitative data collection, for example, through systematic reviews; ▪ health impacts analysis and assessing public health significance to determine the range of potential impacts, likelihood, magnitude, and relative importance; as well as analysing distributional, health equity and inequality impacts, for example, through determining who benefits, is negatively affected and who is not affected by the project and its potential impacts; ▪ mitigation and enhancement measures; and ▪ establishing priorities.		
Reporting	▪ reporting and development of the final recommendations.	▪ preparation EIS/report; and ▪ to document clearly and impartially impacts of the proposal, the proposed measures for mitigation, the significance of effects, and the concerns of the interested public and the communities affected by the proposal.	▪ documentation of the assessment in an environmental report including alternatives and recommendations.
Stakeholder engagement	▪ stakeholder engagement ideally throughout the HIA.	▪ review of the EIS; and ▪ to determine whether the report meets its terms of reference, provides a satisfactory assessment of the proposal(s) and contains the information required for decision-making.	▪ consultation and participation; ▪ testing the completeness, validity and reliability of the relevant information; ▪ identifying and mitigating conflicts; ▪ taking into account the needs to the concerned public; ▪ facilitating a better understanding between different players; ▪ enhancing the acceptance of the policy, plan and programme; and ▪ enhancing transparency.

Stage	HIA	EIA	SEA (EIA-based approach)
Decision-making	▪ not explicitly mentioned.	▪ to approve or reject the proposal, and ▪ to establish the terms and conditions for its implementation.	▪ weighing the findings against each other; and ▪ justification how a decision was reached and what information was used.
Monitoring/ Follow-up	▪ health management plan.	▪ to ensure that the terms and condition of approval are met; ▪ to monitor the impacts of development and the effectiveness of mitigation measures; and ▪ to strengthen future EIA applications and mitigation measures.	▪ follow-up of the SEA regarding the observation and measurement of predefined environmental indicators and effects.
Evaluation	▪ process evaluation; and ▪ outcome evaluation.	▪ environmental audit; and ▪ process evaluation.	▪ SEA process itself.

(Source: based on Abrahams et al., 2004; Birley, 2011; Fischer, 2007a; Kemm, 2013c,b; Mindell, Joffe & Ison, 2004; Nowacki, Martuzzi & Fischer, 2010; Senécal et al., 1999; Vohra, Birley & Ball, 2010)

Annex 7 References included in the generic literature review on health in environmental assessments

A. Journal articles and book chapters

1. Ahmad B (2004). Integrating health into impact assessment: challenges and opportunities. *Impact Assessment and Project Appraisal*.
2. Banken R (1998). Public health in environmental assessment. Chapter 29. In: Porter AL, Fittipaldi JJ, editors. *Environmental methods review: retooling impact assessment for the New Century*. Fargo, ND, USA, Army Environmental Policy Institute / IAIA, 1998:247–253.
3. Banken R (1999). From Concept to Practice: Including the Social Determinants of Health in Environmental Assessments. *Canadian Journal of Public Health / Revue Canadienne de Sante'e Publique*, 90:S27–S30.
4. Bhatia R, Wernham A (2008). Integrating human health into environmental impact assessment: An unrealized opportunity for environmental health and justice. *Environmental Health Perspectives*, 116(8):991–1000.
5. Bond A, Cave B, Ballantyne R (2013). Who plans for health improvement? SEA, HIA and the separation of spatial planning and health planning. *Environmental Impact Assessment Review*, 42(1):67–73.
6. Briggs D, Mason K, Borman B (2016). Rapid Assessment of Environmental Health Impacts for Policy Support: The Example of Road Transport in New Zealand. *International Journal of Environmental Research and Public Health*, 13(1). (http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4730452/, accessed 6 October 2016).
7. Briggs DJ (2008). A framework for integrated environmental health impact assessment of systemic risks. *Environmental Health*, 7:61.
8. Burns J, Bond A (2008). The consideration of health in land use planning: Barriers and opportunities. *Environmental Impact Assessment Review*, 28(2–3):184–197.
9. Carmichael L et al. (2012). Integration of health into urban spatial planning through impact assessment: Identifying governance and policy barriers and facilitators. *Environmental Impact Assessment Review*, 32(1):187–194.
10. Douglas M, Carver H, Katikireddi SV (2011). How well do strategic environmental assessments in Scotland consider human health? *Public Health*, 125:585–591.
11. Fischer TB, Martuzzi M, Nowacki J (2009). The consideration of health in strategic environmental assessment (SEA). *Environmental Impact Assessment Review*, 30:200–210.
12. Harris PJ et al. (2009). Human health and wellbeing in environmental impact assessment in New South Wales, Australia: Auditing health impacts within environmental assessments of major projects. *Environmental Impact Assessment Review*, 29(5):310–318.
13. Harris PJ, Haigh F (2015). Including health in environmental impact assessments: is an institutional approach useful for practice? *Impact Assessment and Project Appraisal*, 33(2):135–141.
14. Harris PJ, Viliani F, Spickett J (2015). Assessing Health Impacts within Environmental Impact Assessments: An Opportunity for Public Health Globally Which Must Not Remain Missed. *International Journal of Environmental Research and Public Health*, 12(1):1044–1049.
15. Kågström M, Hilding-Rydevik T, Sjöberg I (2013). Human health frames in EIA – the case of Swedish road planning. *Impact Assessment and Project Appraisal*, 31(3):198–207.

16. Kørnøv L (2009). Strategic Environmental Assessment as catalyst of healthier spatial planning: The Danish guidance and practice. *Environmental Impact Assessment Review*, 29:60–65.
17. Kwiatkowski RE, Ooi M (2003). Integrated environmental impact assessment: a Canadian example. *Bulletin of the World Health Organization*, 81(6):434–438.
18. Lebret E (2016). Integrated Environmental Health Impact Assessment for Risk Governance Purposes; Across What Do We Integrate? *International Journal of Environmental Research and Public Health*, 13(1).
19. Lebret E, Hurley F, Briggs D (2008). HEIMTSA-INTARESE: Bridging science and environmental policy through integrated environmental impact assessments. *ISEE 20th Annual Conference*. Pasadena, California, Epidemiology (6; http://journals.lww.com/epidem/Fulltext/2008/11001/HEIMTSA_INTARESE_Bridging_Science_and.194.aspx, accessed 12 May 2017).
20. Linzalone N et al. (2014). Health Impact Assessment Practice and Potential for Integration within Environmental Impact and Strategic Environmental Assessments in Italy. *International Journal of Environmental Research and Public Health*, 11(12):12683–12699.
21. McCaig K (2005). Canadian insights: The challenges of an integrated environmental assessment framework. *Environmental Impact Assessment Review*, 25(7–8):737–746.
22. Morgan RK (2011). Health and impact assessment: Are we seeing closer integration? *Environmental Impact Assessment Review*, 31(4):404–411. (Health Impact Assessment in the Asia Pacific).
23. Murray CJ et al. (2003). Comparative quantification of health risks: Conceptual framework and methodological issues. *Population Health Metrics*, 1:1.
24. Posas PJ (2011). The UK's Draft Guidance for Health in SEA in light of HIA community priorities and the UNECE SEA Protocol. *Environmental Impact Assessment Review*, 31(3):320–327.
25. Riley E et al. (2017). Including Health in Environmental Assessments of Major Transport Infrastructure Projects: A Documentary Analysis. *International Journal of Health Policy and Management*, 6(x):1–11.
26. Steinemann A (2000). Rethinking human health impact assessment. *Environmental Impact Assessment Review*, 20(6):627–645.
27. Tajima R, Fischer TB (2013). Should different impact assessment instruments be integrated? Evidence from English spatial planning. *Environmental Impact Assessment Review*, 41:29–37.

B. Reports

1. Alenius K (2001). *Consideration of health aspects in environmental impact assessments for roads*. Stockholm, National Institute of Public Health (http://www.bvsde.paho.org/bvsacd/cd20/consider.pdf, accessed 26 May 2017).
2. Birley M (1991). *Guidelines for forecasting the vector-borne disease implications of water resource development.*, 2nd edition. Geneva, Switzerland, WHO - World Health Organization (Joint WHO/FAO/UNEP/UNCHS Panel of Experts on Environmental Management for Vector Control, No. WHO/CWS/91.3).
3. Breeze CE, Lock K (2001). *Health impact assessment as part of strategic environmental assessment. A review of Health Impact Assessment concepts, methods and practice to support the development of a protocol on Strategic Environmental Assessment to the*

Espoo Convention, which adequately covers health impacts. Copenhagen, WHO Regional Office for Europe.

4. Cave B et al. (2017a). *Health in Environmental Impact Assessment: A Primer for a Proportionate Approach*. Lincoln, England, Ben Cave Associates Ltd, IEMA and the Faculty of Public Health (http://bcahealth.eu/resources/, accessed 16 May 2017).
5. Cave B et al. (2017b). *Health in Environmental Impact Assessment: A Briefing for Public Health Teams in England*. London, England, Public Health England (http://bcahealth.eu/resources/, accessed 16 May 2017).
6. Davies, Sadler B (1997). *Environmental assessment and human health: perspectives, approaches and future directions: a background report for the International study of the effectiveness of environmental assessment*. Ottawa, Minister of Supply and Services Canada.
7. EC (2009a). *On the application and effectiveness of the EIA Directive (Directive 85/337/EEC, as amended by Directives 97/11/EC and 2003/35/EC)*. Brussels, European Commission (http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52009DC0378, accessed 26 March 2017).
8. EC (2009b). *Report from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions on the application and effectiveness of the Directive on Strategic Environmental Assessment (Directive 2001/42/EC)*. Brussels, EC - European Commission (EUR-Lex - 52009DC0469; http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52009DC0469, accessed 25 May 2017).
9. EC (2017). *Report from the Commission to the Council and the European Parliament under Article 12(3) of Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment*. Brussels, EC - European Commission (EUR-Lex - 52017DC0234; http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2017:234:FIN, accessed 18 May 2017).
10. Equator Principles Financial Institutions (2013). *The Equator Principles III. A financial industry benchmark for determining, assessing and managing environmental and social risk in projects*. London, United Kingdom, The Equator Principles Association (http://www.equator-principles.com/index.php/about-ep/about-ep, accessed 14 April 2017).
11. Ewans CE et al. (1994). *National Framework for Environmental and Health Impact Assessment* (National Health and Medical Research Council (Australia), editors). Canberra, ACT, Commonwealth of Australia (https://www.nhmrc.gov.au/guidelines-publications/eh10, accessed 19 March 2017).
12. Faith-Ell C, Kalle H, Lund-Iversen M (2014). Health in EIA in Estonia, Norway and Sweden. In: Fehr R et al., editors. *Health in Impact Assessments: Opportunities not to be missed*. Copenhagen, WHO Regional Office for Europe, 2014:11–22. (http://www.euro.who.int/en/health-topics/environment-and-health/health-impact-assessment/publications/2014/health-in-impact-assessments-opportunities-not-to-be-missed, accessed 18 December 2016).
13. Fehr R et al. (2014). *Health in Impact Assessments: Opportunities not to be missed*. Copenhagen, WHO Regional Office for Europe (http://www.euro.who.int/en/health-topics/environment-and-health/health-impact-assessment/publications/2014/health-in-impact-assessments-opportunities-not-to-be-missed, accessed 18 December 2016).
14. Fischer TB (2010). The consideration of health in SEA – a report for the World Health Organization. In: Nowacki J, Martuzzi M, Fischer TB, editors. *Health and strategic*

environmental assessment. Background information and report of the WHO consultation meeting, Rome 08./09. June 2009. Copenhagen, WHO Regional Office for Europe,2010:20–42.

15. Fischer TB (2014). Health in SEA. In: Fehr R et al., editors. *Health in Impact Assessments: Opportunities not to be missed*. Copenhagen, WHO Regional Office for Europe, 2014:23–46. (http://www.euro.who.int/en/health-topics/environment-and-health/health-impact-assessment/publications/2014/health-in-impact-assessments-opportunities-not-to-be-missed, accessed 18 December 2016).
16. Frankish CJ et al. (1996). *Health impact assessment as a tool for population health promotion and public policy. A Report Submitted to the Health Promotion Development Division of Health Canada*. Institute of Health Promotion Research, University of British Columbia.
17. Hilding-Rydevik T et al. (2007). *(IMP)3 - Health Aspects in EIA. D 2.2 Report WP 2*. Vienna, Austria, ÖIR, Österreichisches Institut für Raumplanung (Austrian Institute for Regional Studies and Spatial Planning).
18. IFC (2012). *Performance Standards on Environmental and Social Sustainability*. Washington, DC, IFC International Finance Corporation (http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/our+approach/risk+management/performance+standards/environmental+and+social+performance+standards+and+guidance+notes, accessed 15 April 2017).
19. IFC (2017). Environmental, Health, and Safety Guidelines [web site]. (http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/our+approach/risk+management/ehsguidelines, accessed 15 April 2017).
20. IFC, World Bank Group (2007). *Environmental, Health, and Safety. General Guidelines*. Washington, DC, IFC International Finance Corporation, World Bank Group (www.ifc.org/ehsguidelines, accessed 15 April 2017).
21. Nowacki J, Martuzzi M, Fischer TB (2010). *Health and strategic environmental assessment. Background information and report of the WHO consultation meeting, Rome 08./09. June 2009*. Copenhagen, WHO Regional Office for Europe (http://www.euro.who.int/en/health-topics/environment-and-health/health-impact-assessment/publications/2010/health-and-strategic-environmental-assessment, accessed 5 February 2017).
22. UN (1992). *Rio Declaration on Environment and Development*. Rio de Janeiro, Brazil, United Nations (United Nations Conference on Environment and Development (UNCED); https://sustainabledevelopment.un.org/milestones/unced, accessed 12 February 2017).
23. UNECE (2007a). *Resource Manual to Support Application of the UNECE Protocol on SEA, Draft Final, April 2007*. Geneva, UNECE - United Nations Economic Commission for Europe.
24. UNECE (2007b). *Resource Manual to Support Application of the UNECE Protocol on SEA, Annex/Chapter A7: Health*. Geneva, UNECE - United Nations Economic Commission for Europe.
25. UNECE (2012a). *Resource Manual to Support Application of the UNECE Protocol on SEA*. Geneva, UNECE - United Nations Economic Commission for Europe.
26. UNECE (2012b). *Simplified Resource Manual to Support Application of the Protocol on Strategic Environmental Assessment*. Geneva, Switzerland, UNECE - United Nations Economic Commission for Europe (http://www.unece.org/index.php?id=30823, accessed 21 November 2017).
27. UNECE (2017). *Second review of implementation of the Protocol on Strategic Environmental Assessment. Advanced Copy. Note by the secretariat. Prepared for the Meeting of the Parties to the Convention on Environmental Impact Assessment in a*

Transboundary Context serving as the Meeting of the Parties to the Protocol on Strategic Environmental Assessment. Minsk, 13–16 June 2017. Geneva, Switzerland, UNECE - United Nations Economic Commission for Europe (http://www.unece.org/env/eia/meetings/mop_7.html#/, accessed 24 April 2017).

28. WHO Regional Committee for Europe, Environmental Resources Ltd (1983). *Environmental health impact assessment of irrigated agricultural development projects*. Copenhagen, WHO Regional Office for Europe (www.ircwash.org/sites/default/files/272.2-83EN-4044.pdf).
29. WHO Regional Office for Europe (1979). *Environmental Health Impact Assessment. Report on a WHO Seminar. Argostoli, Kefalonia, Greece, 2-6 October 1978*. Copenhagen, WHO Regional Office for Europe.
30. WHO Regional Office for Europe (1985). *Environmental Health Impact Assessment of Urban Development Projects. Guidelines and Recommendations*. Copenhagen, WHO Regional Office for Europe.
31. WHO Regional Office for Europe (1987). *Health and Safety Component of Environmental Impact Assessment. Report on a WHO meeting, Copenhagen 24-28 February 1986*. Copenhagen, WHO Regional Office for Europe.

C. Legal documents

1. EU (1985). Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment. *Official Journal of the European Union*, (L175):40–48.
2. EU (1997). Council Directive 97/11/EC of 3 March 1997 amending Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment. *Official Journal of the European Union*, (L73):5–15.
3. EU (2001). Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment. *Official Journal of the European Union*, (L197):30–37.
4. EU (2003). Directive 2003/35/EC of the European Parliament and of the Council of 26 May 2003 providing for public participation in respect of the drawing up of certain plans and programmes relating to the environment and amending with regard to public participation and access to justice Council Directives 85/337/EEC and 96/61/EC. *Official Journal of the European Union*, (L156):17–25.
5. EU (2009). Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006 (Text with EEA relevance). *Official Journal of the European Union*, (L140):114–135.
6. EU (2012). Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment. *Official Journal of the European Union*, (L26):1–21.
7. EU (2014). Directive 2014/52/EU of the European Parliament and of the Council - of 16 April 2014 - amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment. *Official Journal of the European Union*, (L124):1–18.

8. UNECE (1991). Convention on Environmental Impact Assessment in a Transboundary Context. Espoo Convention. Geneva, UNECE - United Nations Economic Commission for Europe.
9. UNECE (1998). Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters. Fourth Ministerial Conference Environment for Europe. Århus, Denmark 23 - 25 June 1998. Geneva, UNECE - United Nations Economic Commission for Europe.
10. UNECE (2003). Protocol on Strategic Environmental Assessment of the Convention on Environmental Impact Assessment in a Transboundary Context. Geneva, UNECE - United Nations Economic Commission for Europe.

Annex 8 List of organizations, institutions and authorities included in Internet research and guidelines obtained

Organization/ Agency	Reference 2010	ID	SEA Guidance	Organization Type
			1-yes/ 2-no	1 - Multilateral Organization/ 2 - International associations/ 3 - Development agencies/ 4 - health authorities/ 5 - environmental authorities/ 6 - National/regional/local government/ 7 - Others)
Multilateral Organizations				
AFDB - African Development Bank	(AFDB, 2003, 2001)	09, 10	**1**	1
AFDB - African Development Bank	(Buydens, 2003)	11	**1**	1
ADB – Asian Development Bank	(ADB, 2003)	15	**1**	1
EC - DG Environment	(EC, 2003)	01	**1**	1
EC - DG for Energy and Transport (DG TREN)	(EC & DG TREN, 2005)	02	**1**	1
EC - DG Health and Consumer (DG SANCO)			**0**	1
EEA			**0**	1
OECD and European Observatory on Health Systems and Policies			**0**	1
OECD	(OECD, 2006)	3	**1**	1
UNDP			**0**	1
UNECE	(UNECE, 2007a,b)	04a, 04b	**1**	1
UNEP			**0**	1
UNU - United Nations University	(UNU, Oxford Brookes University & global virtual university, 2005a–c)	12, 13, 14	**1**	1
WHO			**0**	1
WHO Regional Office for Europe			**0**	1
WHO Regional Office for the Eastern Mediterranean - Centre for Environmental Health Activities (CEHA)	(Hassan et al., 2005)	08	**1**	1
The World Bank – Environment & Social Development	(World Bank, 2007, 2003, 2010)	05, 06, 07	**1**	1
International associations				
IAIA	(Sadler et al., 2012; Verheem & IAIA SEA Section, 2002; Partidário, 2003)	21, 22, 23	1	2
IIED, OECD and UNDP	(Dalal-Clayton & Bass, 2002)	24	**1**	2
HELI - Health and Environment Linkages Initiative, WHO & UNEP	(WHO & UNEP, 2008)	25	**1**	2
Development agencies				
CIDA - Canadian International Development Agency, Canada	(CIDA, 2004)	16	**1**	3
DANIDA - Danish International Development Cooperation, Denmark	(DANIDA, 2007, 2009)	18, 19	**1**	3
DFID - Department for International			**0**	3

Organization/ Agency	Reference 2010	ID	SEA Guidance	Organization Type
Development, United Kingdom				
gtz - German Society for Technical Cooperation, Germany			**0**	3
NORAD - Norwegian Agency for Development Cooperation, Norway	(NORAD, 2010)	20	**1**	3
SIDA - Swedish International Development Cooperation Agency, Sweden	(SIDA, 2002)	17	**1**	3
SNV - Netherland Development Organisation, Netherlands			**0**	3
USAID - United States Agency for International Development, United States of America			**0**	3
National environmental and health ministries and governmental agencies				
Australia				
Department of Sustainability, Environment, Water, Population and Communities	(Australian Government, 2010)	26	**1**	5
Department of Health and Aging			**0**	4
Austria				
Lebensministerium - Federal Ministry of Agriculture, Forestry, Environment and Water Management	(Lebensministerium Österreich, 2010)	27	**1**	5
Umweltbundesamt - Environmental Protection Agency	(UBA Österreich, 2010)	28	**1**	5
Ministerium für Gesundheit - Ministry of Health			**0**	4
Canada				
Canadian Environmental Assessment Agency	(Canadian Environmental Assessment Agency, 2010)	29	**1**	5
Health Canada	(Health Canada, 2010)	30	**1**	4
Denmark				
Danish Ministry of Environment - Environmental Protection Agency	no English documents		**0**	5
Danish National Board of Health - Danish Ministry for the Interior and Health	no English documents		**0**	4
Finland				
Ministry of Environment	(Ministry of Environment of Finland, 1999)	31	**1**	5
Ministry of Social Affairs and Health - National Supervisory Authority of Welfare and Health	no English documents		**0**	4
France				
Ministère de l'écologie, de l'énergie, du développement durable et de la mer	no English documents		**0**	
Ministère de la sanité et des sports	no English documents		**0**	
Germany				
Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (BMU) - Federal Ministry for the Environment, Nature Conservation and Nuclear Saftey	(Balla, Peters & Wulfert, 2010)	32	**1**	5
Umweltbundesamt (UBA) – Environmental Protection Agency	(Balla, Peters & Wulfert, 2010)	32	**1**	5

Organization/ Agency	Reference 2010	ID	SEA Guidance	Organization Type
Bundesministerium für Gesundheit (BMG) - Federal Ministry of Health			**0**	4
Hong Kong				
Environmental Protection Department - The Government of Hong Kong Special Administrative Region	(Environment Transport and Works Bureau, Hong Kong, 2003)	33	**1**	5
Department of Health - The Government of Hong Kong Special Administrative Region	no English documents		**0**	4
Ireland				
Department of the Environment, Heritage and Local Government	(Department of the Environment, Heritage and Local Government, 2004)	34	**1**	5
Environmental Protection Agency	(Scott & Marsden, 2003; Prendergast et al., 2008; CAAS Environmental Services Ltd, 2002)	35, 36, 38	**1**	5
Department of Health and Children // Health Service Executive // Institute for Public Health			**0**	4
Italy				
Ministry of Environment	(Ministry of Environment of Italy, 1999)	39	**1**	5
Ministry of Health			**0**	4
Netherlands				
VROM - Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer - Ministry of Spatial Planning, Housing and the Environment (VROM) - now Ministry for Infrastructure and Environment (Ministerie van Infrastructuur en Milieu)	no English documents		**0**	5
PBL - Netherland Environmental Assessment Agency	no English documents		**0**	5
NCEA - Netherlands Commission for Environmental Assessment	no English documents		**0**	5
Ministerie van Volksgezondheid, Welzijn en Sport (Ministry of Health, Welfare and Sports)	no English documents		**0**	4
RIVM -National Institute for Public Health and the Environment	(Dreijerink, Kruize & Kamp, 2008)	40	**1**	4
New Zealand				
Ministry of the Environment	(Ministry for the Environment of New Zealand, 2009; Mullan et al., 2008; Ministry for the Environment - New Zealand, 2010a,b)	41, 42, 43, 44	**1**	5
Ministry of Health	(Ball et al., 2009)	45	**1**	4
Public Health Advisory Committee	(Public Health Advisory Committee, 2005)	46	**1**	4
Christchurch City Council	(Billante, 2008)	47	**1**	5
Norway				
Ministry of Environment	no English documents		**0**	5
Ministry of Petroleum and Energy	no English documents		**0**	5
Ministry of Health and Care	no English documents		**0**	4

Organization/ Agency	Reference 2010	ID	SEA Guidance	Organization Type
Services				
Portugal				
Ministry of Environment			**0**	5
Ministry of Health			**0**	4
Portuguese Environment Agency	(Partidário, 2007a,b)	48a,b	**1**	5
Slovakia				
Ministry of Environment of the Slovak Republic	(Ministry of Environment of the Slovak Republic & Slovak Environmental Agency, 2010)	49	**1**	5
Ministry of Health			**0**	4
Spain				
Ministry of Environment			**0**	
Ministry of Health			**0**	
Switzerland				
BAFU - Bundesamt für Umwelt, Department für Umwelt, Verkehr, Energie und Kommunikation - Ministry of the Environment	(UVEK & BAFU, 2009)	50	**1**	5
Republic et Cantone de Geneve	(République et Canton de Genève, Département du territoire & Service d'étude de l'impact sur l'environnement, 2008)	51	**1**	6
BAG - Bundesamt für Gesundheit, EDI - Eidgenössisches Departement des Innern, - Ministry of Health			**0**	4
United Kingdom				
DEFRA - Department of Environment, Food and Rural Affairs	(DEFRA, 2008, 2002)	52, 53	**1**	5
Department of Environment	(Department of the Environment of Northern Ireland, 2004)	68	**1**	5
Department of Transport	(Levett-Therivel sustainability consultants, 2004; Department of Transport & Communities and Local Government, 2007; Goddard & Bennett, 2008; Department for Transport & TAG Unit 2.11D, 2009)	60, 61, 62, 63	**1**	5
English Heritage	(English Heritage, 2010)	65	**1**	5
English Nature	(South West Ecological Surveys, Levett-Therivel sustainability consultants & Oxford Brookes University, 2004)	64	**1**	5
Environment Agency	(Environment Agency of the United Kingdom, 2010)	55	**1**	5
Environmental Protection Agency	(Environmental Protection Agency et al., 2004)	37	**1**	5
Natural England	(The Countryside Agency et al., 2004)	66	**1**	5
NIEA - Northern Ireland Environment Agency	(Northern Ireland Environment Agency, n.d.)	67	**1**	5
SNIFFER - Scotland and Northern Ireland Forum of Environmental	(Natural Scotland Scottish Executive, 2006)	72	**1**	5

Organization/ Agency	Reference 2010	ID	SEA Guidance	Organization Type
Research				
APHO - Association of Public Health Observatories	(HIA Gateway, 2010)	74	**1**	4
Department of Health, Social Services and Public Safety			**0**	4
DH - Department of Health	(Williams & Fisher, 2007)		**1**	4
Health Scotland	(Health Scotland et al., 2008; Douglas, Higgins & Beck, 2006)	75, 73	**1**	4
Public Health England	(see APHO)		**0**	4
WHIASU - Welsh HIA Support Unit			**0**	4
Communities and Local Government	(Smith, Richardson & McNab, 2010)	56	**1**	6
Scottish Executive	(ODPM et al., 2005)	58	**1**	6
Scottish Government	(The Scottish Government, 2009, 2010; Environmental Assessment Team, 2010)	69, 71, 70	**1**	6
Welsh Assembly Government	(Cadw et al., 2005)	76	**1**	6
WMPHO - West Midlands Public Health Observatory	(WMPHO & Department of Health, 2010a,b)	59a,b	**1**	6
Ministry of Defence	(Whitehead, 2003)	54	**1**	7
United States of America				
U.S. Department of the Interior			**0**	5
CEQ – Council on Environmental Quality	(CEQ, 2007)	77	**1**	5
EPA – Environmental Protection Agency			**0**	5
EPA – Environmental Protection Agency, NCEA - National Centre for Environmental Assessment			**0**	5
DOE – U.S. Department of Energy	(DOE, 2010)	79	**1**	5
U.S. Department of Health & Human Services			**0**	4
CDC – Centers for Disease Control and Prevention	(CDC, 2011)	78	**1**	4

Annex 9 SEA guidelines

A. 2010 research SEA guidelines documents included in the review

1. ADB (2003). *Environmental Assessment Guidelines*. Manila, Philippines, ADB - Asian Development Bank.
2. Balla S, Peters H-J, Wulfert K (2010). *Leitfaden zur Strategischen Umweltprüfung (Langfassung). Forschungsvorhaben 206 13 100 im Auftrag des Umweltbundesamtes*. Berlin, UBA - Umweltbundesamt und BMU - Bundesministerium für Umwelt Naturschutz und Reaktorsicherheit.
3. Buydens W (2003). *Strategic Impact Assessment Guidelines. Final Report*. Brussels, AFDB - African Development Bank, ERM -Environmental Resources Management.
4. CAAS Environmental Services Ltd (2002). *Guidelines on the information to be contained in Environmental Impact Statements*. Dublin, EPA - Environmental Protection Agency of Ireland.
5. CDC (2011). *NEPA Frequently Asked Questions*. Atlanta, GA, CDC - Centers for Disease Control and Prevention.
6. CEQ (2007). *A Citizen's Guide to the NEPA . Having Your Voice Heard*. Washington, DC, CEQ - Council on Environmental Quality - Executive Office of the President.
7. CIDA (2004). *Strategic Environmental Assessment of Policy, Plan, and Program Proposals: CIDA Handbook*. Quebec, Canada, CIDA - Canadian International Development Agency.
8. DANIDA (2007). *An introduction to Strategic Environmental Assessment (SEA) for Danish International Development Cooperation*. Copenhagen, DANIDA - Danish International Development Cooperation.
9. DANIDA (2009). *Danida Environment Guide. Environmental Assessment for Sustainable Development*. Copenhagen, Ministry of Foreign Affairs of Denmark.
10. Department for Transport, TAG Unit 2.11D (2009). *Strategic Environmental Assessment for Transport Plans and Programmes. "In draft" Guidance*. London, Department for Transport.
11. Department of the Environment, Heritage and Local Government (2004). *Implementation of SEA Directive (2001/42/EC): Assessment of the Effects of Certain Plans and Programmes on the Environment. Guidelines for Regional Authorities and Planning Authorities*. Dublin, Government of Ireland.
12. Department of the Environment of Northern Ireland (2004). *Environmental Protection. The Environmental Assessment of Plans and Programmes Regulations (Northern Ireland)*. Belfast, Department of the Environment Northern Ireland.
13. Douglas M, Higgins M, Beck S (2006). *Strategic Environmental Assessment and health. Briefing paper for the Scottish HIA Network*. Edinburgh, Scotland, Scottish HIA Network.
14. EC (2003). *Implementation of Directive 2001/42 on the assessment of the effects of certain plans and programmes on the environment.* Luxembourg, European Commission.
15. EC, DG TREN (2005). *The SEA Manual. A Sourcebook on Strategic Environmental Assessment of Transport Infrastructure Plans and Programmes*. Brussels, Belgium, European Commission - DG TREN (BACON - Building Environmental Assessment Consensus).
16. English Heritage (2010). *Strategic Environmental Assessment, Sustainability Appraisal and The Historic Environment*. Swindon, English Heritage.
17. Environment Transport and Works Bureau, Hong Kong (2003). *Guidelines and Procedures for Environmental Impact Assessment of Government Projects and Proposals*. Hong Kong, The Government of the Hong Kong Special Administrative Region.

18. Environmental Assessment Team (2010). *Consideration of Climatic Factors within Strategic Environmental Assessment (SEA)*. Glasgow, The Scottish Government.
19. Environmental Protection Agency et al. (2004). *Strategic Environmental Assessment and Climate Change: Guidance for Practitioners*. London, Environmental Protection Agency.
20. Hassan AA et al. (2005). *Environmental Health Impact Assessment of Development Projects: A Practical Guide for the WHO Eastern Mediterranean Region*. Amman, WHO Regional Office for the Eastern Mediterranean Regional Centre for Environmental Health Activities (CEHA), Liverpool School of Tropical Medicine (LSTM), Arab Gulf Programme for United Nations Development Organizations (AGFUND), Islamic Development Bank (IDB).
21. Levett-Therivel sustainability consultants (2004). *Strategic Environmental Assessment Guidance for Transport Plans and Programmes. West Midlands Local Transport Plan SEA Pilot: Dealing with uncertainty. Report to the Department for Transport and CEPOG*. London, Department for Transport.
22. Ministry of Environment of Finland (1999). *Guidelines for the environmental assessment of plans, programmes and policies in Finland*. Helsinki, Ministry of the Environment - Land Use Department.
23. Ministry of Environment of Italy (1999). *Linee guida per la valutazione ambientale strategica (VAS)*. Rome, Ministry of Environment (Supplemento al mensile del Ministero dell'Ambiente l'ambiente informa).
24. Natural Scotland Scottish Executive (2006). *Strategic Environmental Assessment Tool Kit*. Edinburgh, Scotland, The Scottish Government.
25. ODPM et al. (2005). *A Practical Guide to the Strategic Environmental Assessment Directive. Practical guidance on applying European Directive 2001/42/EC "on the assessment of the effects of certain plans and programmes on the environment"*. London, ODPM - Office of the Deputy Prime Minister.
26. OECD (2006). *Applying Strategic Environmental Assessment. Good Practice Guidance for Development Co-operation*. Paris, OECD.
27. Partidário MR (2003). *Strategic Environmental Assessment (SEA) current practices, future demands and capacity-building needs. Course Manual*. Fargo, USA, IAIA - International Association for Impact Assessment.
28. Partidário MR (2007a). *Strategic Environmental Assessment Good Practices Guide. Methodological Guidance*. Amadora, Portuguese Environment Agency.
    a. Partidário MR (2007b). *Guia de boas práticas para Avaliação Ambiental Estratégica - orientações metodológicas*. Amadora, Agência Portuguesa do Ambiente.
29. Prendergast T et al. (2008). *Strategic Environmental Assessment (SEA) SEA Process Checklist. Consultation Draft 18th January 2008. Consultation Period: 18th January to February 29, 2008*. Dublin, EPA - Environmental Protection Agency of Ireland.
30. République et Canton de Genève, Département du territoire, Service d'étude de l'impact sur l'environnement (2008). *Le processus d'Evaluation environnementale stratégique (EES) dans le cadre d'un projet d'aménagement du territoire*. Geneve, Département du territoire, Service d'étude de l'impact sur l'environnement.
31. Scott P, Marsden P (2003). *Development of Strategic Environmental Assessment (SEA) Methodologies for Plans and Programmes in Ireland (2001-DS-EEP-2/5). Synthesis Report*. Dublin, EPA - Environmental Protection Agency of Ireland.
32. SIDA (2002). *The Country Strategies – Guidelines for Strategic Environmental and Sustainability Analysis*. Stockholm, SIDA - Swedish International Development Cooperation Agency.

33. Smith S, Richardson J, McNab A (2010). *Towards a more efficient and effective use of Strategic Environmental Assessment and Sustainability Appraisal in spatial planning. Final report*. London, Department for Communities and Local Government.
34. South West Ecological Surveys, Levett-Therivel sustainability consultants, Oxford Brookes University (2004). *Strategic Environmental Assessment and Biodiversity: Guidance for Practitioners*. Countryside Council for Wales, English Nature, Environment Agency, Royal Society for the Protection of Birds.
35. The Scottish Government (2009). *A basic introduction to Strategic Environmental Assessment (SEA)*. Edinburgh, Scotland, The Scottish Government.
36. The Scottish Government (2010). *Strategic Environmental Assessment of Development Plans*. Edinburgh, Scotland, The Scottish Government (Planning Advice Note - PAN 1/2010).
37. UNECE (2007a). *Resource Manual to Support Application of the UNECE Protocol on SEA, Draft Final, April 2007*. Geneva, UNECE - United Nations Economic Commission for Europe.
    a. UNECE (2007b). *Resource Manual to Support Application of the UNECE Protocol on SEA, Annex/Chapter A7: Health*. Geneva, UNECE - United Nations Economic Commission for Europe.
38. UVEK, BAFU (2009). *Strategische Umweltprüfung (SUP) für Pläne und Programme. Grundlagenpapier (Stand August 2009)*. Bern, Switzerland, UVEK - Eidgenössisches Department für Umwelt Verkehr Energie und Kommunikation, BAFU - Bundesamt für Umwelt, Sektion UVP und Raumordnung.
39. Whitehead L (2003). *The Sustainability Appraisal Handbook for the Ministry of Defence Estate*. Bath, Ministry of Defence.
40. Williams C, Fisher P (2007). *Draft guidance on health in strategic environmental assessment. Consultation document*. London, Department of Health.

B. 2010 research – webpages not included

1. 1. Australian Government (2010). Environment assessments [web site]. (http://www.environment.gov.au/protection/environment-assessments, accessed 1 August 2011).
2. Canadian Environmental Assessment Agency (2010). The Cabinet Directive on the Environmental Assessment of Policy, Plan and Program Proposals [web site]. (https://www.canada.ca/en/environmental-assessment-agency/programs/strategic-environmental-assessment/cabinet-directive-environmental-assessment-policy-plan-program-proposals.html, accessed 14 August 2011).
3. DEFRA (2002). Guidelines for Environmental Risk Assessment and Management [web site]. (http://webarchive.nationalarchives.gov.uk/20081023145831/http://www.defra.gov.uk/environment/risk/eramguide/index.htm, accessed 19 April 2016).
4. DOE (2010). NEPA Compliance Guide [web site]. (https://www.energy.gov/nepa/selected-guidance-0, accessed 1 August 2011).
5. Health Canada (2010). A Guide To The Canadian Environmental Assessment Act - For Health Canada Project Managers [web site]. (http://www.hc-sc.gc.ca/ewh-semt/pubs/eval/assess-eval/index-eng.php, accessed 1 August 2011).
6. HIA Gateway (2010). What is Strategic Environmental Assessment (SEA)? [web site]. (http://webarchive.nationalarchives.gov.uk/20170106081246/http://www.apho.org.uk/resource/view.aspx?RID=74603, accessed 19 April 2016).

7. Lebensministerium Österreich (2010). Was ist die strategische Umweltprüfung [web site]. (https://www.bmlfuw.gv.at/umwelt/betriebl_umweltschutz_uvp/uvp/sup.html, accessed 29 August 2017).
8. Ministry of Environment of the Slovak Republic, Slovak Environmental Agency (2010). Environmental Impact Assessment [web site]. (https://www.seas.sk/environmental-impact-assessment, accessed 1 August 2011).
9. UBA Österreich (2010). Strategische Umweltprüfung [web site]. (www.strategischeumweltpruefung.at, accessed 1 August 2011).
10. UNU, Oxford Brookes University, global virtual university (2005a). SEA Distance Learning Course: Instructional Guide [web site]. (http://sea.unu.edu/ins_guide.html, accessed 1 September 2011).
    a. UNU, Oxford Brookes University, global virtual university (2005b). SEA WIKI [web site]. (http://sea.unu.edu/wiki/index.php/United_Nations_University.html, accessed 1 September 2011).
    b. UNU, Oxford Brookes University, global virtual university (2005c). SEA course module [web site]. (sea.unu.edu/course/?page_id=92, accessed 1 September 2011).
11. WMPHO, Department of Health (2010). Health in SEA. A Short Course on Health in SEA [web site]. (http://webarchive.nationalarchives.gov.uk/20170106085242/ http://www.apho.org.uk/resource/view.aspx?RID=87882, accessed 1 August 2011).
12. World Bank (2010). Strategic Environmental Assessment Toolkit [web site]. (http://www.worldbank.org/en/topic/environment, accessed 1 August 2011).

C. 2010 research – other documents not included

Documents that were not further analysed as they were either no SEA guideline, or were from countries outside of the WHO European Regions:

1. AFDB (2001). *Environmental and Social Assessment Procedures for African Development Bank's Public Sector Operations*. Abidjan, Côte d'Ivoire, AFDB - African Development Bank.
2. AFDB (2003). *Integrated Environmental and Social Impact Assessment Guidelines*. Abidjan, Côte d'Ivoire, AFDB - African Development Bank.
3. Ball J et al. (2009). *Applying health impact assessment to land transport planning*. Wellington, Transport Agency - New Zealand (NZ Transport Agency Research Report).
4. Billante V (2008). *Health Promotion and sustainability through environmental design: a guide for Planning*. Christchurch, Christchurch City Council.
5. Cadw et al. (2005). *Strategic Environmental Assessment. Consultation Bodies' Services and Standards for Responsible Authorities in Wales*. Cardiff, Wales, Cadw, Environment Agency, Countryside Council for Wales.
6. Dalal-Clayton B, Bass S (2002). *Sustainable Development Strategies: A Resource Book*. Paris, New York, IIED - The International Institute for Environment and Development, OECD - Organisation for Economic Co-operation and Development, UNDP - United Nations Development Programme.
7. DEFRA (2008). *Guidance to Operating Authorities on the Application of Strategic Environmental Assessment to Flood Management Plans and Programmes*. London, DEFRA - Department for Environment Food and Rural Affairs.
8. Department of Transport, Communities and Local Government (2007). *Guidance on Transport Assessment*. London, Department for Transport.

9. Dreijerink L, Kruize H, Kamp I van (2008). *Gezondheid en milieu in ruimtelijke plannen [Health in spatial planning]*. Bilthoven, RIVM - Rijksinstituut voor Volksgezondheid en Milieu.
10. Environment Agency of the United Kingdom (2010). *"Do's and Don'ts" Guide to Strategic Environmental Assessment (SEA) and Sustainability Appraisal (SA) of Local Development Documents (LDDs)*. London, Environment Agency.
11. Goddard G, Bennett D (2008). *Providing Transport in Partnership. A guide for health agencies and local authorities*. Norfolk, North West Centre of Excellence, Norfolk County Council.
12. Health Scotland et al. (2008). *Health Impact Assessment of greenspace. A Guide*. Stirling, greenspace scotland.
13. Ministry for the Environment - New Zealand (2010a). *Major Event Greening Guide. A practical guide to reducing the environmental impact of a major event*. Wellington, Ministry for the Environment - New Zealand.
14. Ministry for the Environment - New Zealand (2010b). *Greener Events Guide. A practical guide to reducing the environmental impact of your event*. Wellington, Ministry for the Environment - New Zealand.
15. Ministry for the Environment of New Zealand (2009). *Urban Design Toolkit*. Wellington, Ministry for the Environment of New Zealand.
16. Mullan B et al. (2008). *Climate Change Effects and Impacts Assessment: A Guidance Manual for Local Government in New Zealand*. Wellington, Ministry of the Environment - New Zealand.
17. NORAD (2010). *Assessment of Sustainability Elements/Key Risk Factors Practical Guide*. Oslo, Norad - Norwegian Agency for Development Cooperation.
18. Northern Ireland Environment Agency (n.d.). *Strategic Environmental Assessment. Consultation Bodies' Services and Standards for Responsible Authorities*. Belfast, NIEA - Northern Ireland Environment Agency.
19. Public Health Advisory Committee (2005). *A Guide to Health Impact Assessment. A Policy Tool for New Zealand*. Wellington, New Zealand, Public Health Advisory Committee.
20. Sadler B et al.eds (2012). *Handbook of Strategic Environmental Assessment*. London, Washington DC, Earthscan.
21. The Countryside Agency et al. (2004). *Strategic Environmental Assessment. Consultation Bodies' Services and Standards for Responsible Authorities*. Cheltenham, Northampton, The Countryside Agency, English Heritage, English Nature, Environment Agency.
22. Verheem R, IAIA SEA Section (2002). *Strategic Environmental Assessment Performance Criteria*. Fargo, ND, USA, IAIA - International Association for Impact Assessment.
23. WHO, UNEP (2008). *Health environment: managing the linkages for sustainable development: a toolkit for decision-makers: synthesis report*. Geneva, WHO - World Health Organization.
24. World Bank (2003). *A User's Guide to Poverty and Social Impact Analysis*. Washington, The World Bank Poverty Reduction Group (PRMPR) and Social Development Department (SDV).
25. World Bank (2007). *Tools for Institutional, Political and Social Analysis of Policy Reform: A Sourcebook for Development Practitioners (TIPS)*. Washington, World Bank.

D. 2015/16 research SEA guidelines reviewed

1. ADB (2015a). *Identifying Sustainability Indicators of Strategic Environmental Assessment for Power Planning*. Manila, Philippines, ADB - Asian Development Bank.
2. ADB (2015b). *Integrating Strategic Environmental Assessment into Power Planning*. Manila, Philippines, ADB - Asian Development Bank.
3. Aulavuo T, UNECE (2015). Introduction to the UNECE Protocol on Strategic Environmental Assessment to the Espoo Convention. (https://www.unece.org/fileadmin/DAM/env/eia/meetings/2015/June_Chisinau_17.05_SEA/1.1._UNECE_Aulavuo_Chisinau.pdf, accessed 24 January 2017).
4. Buroni A, Jones L (2011). *Transport and Health Resource. Delivering Healthy Local Transport Plans*. London, RPS Planning and Development Ltd. for Department of Health, Department for Transport.
5. Canadian Environmental Assessment Agency (2010). Strategic Environmental Assessment: Public Statements of Environmental Effects [web site]. (https://www.canada.ca/en/environmental-assessment-agency/programs/strategic-environmental-assessment/strategic-environmental-assessment-public-statements-environmental-effects.html, accessed 13 April 2011).
6. Central Lincolnshire Joint Planning Unit (2012). Integrated Impact Assessment (IIA) of the Core Strategy: Central Lincolnshire (SA, EqIA, HIA) [web site]. (http://www.apho.org.uk/resource/view.aspx?RID=137167, accessed 24 January 2017).
7. CIDA, Global Affairs Canada (2016). Environmental Integration Process (EIP) Screening Tool [web site]. (http://www.international.gc.ca/development-developpement/priorities-priorites/enviro/eip_screening-pie_examen.aspx?lang=eng, accessed 24 January 2017).
8. CIDA, Government of Canada, Global Affairs Canada (2016). Handbook on Environmental Assessment of Non-Governmental Organizations and Institutions Programs and Projects, 2nd Edition [web site]. (http://www.international.gc.ca/development-developpement/priorities-priorites/enviro/e-handbook-manuel-e.aspx?lang=eng, accessed 24 January 2017).
9. DEFRA, EPA United Kingdom (2015). Drought plans: environmental assessment and monitoring. Guidance [web site]. (https://www.gov.uk/guidance/drought-plans-environmental-assessment-and-monitoring, accessed 24 January 2017).
10. Department for Business, Energy & Industrial Strategy (2016). Offshore Energy Strategic Environmental Assessment (SEA): An overview of the SEA process [web site]. (https://www.gov.uk/guidance/offshore-energy-strategic-environmental-assessment-sea-an-overview-of-the-sea-process, accessed 24 January 2017).
11. Department of Energy and Climate Change, AMEC (2013). *Strategic Environmental Assessment for Further Onshore Oil and Gas Licensing. Environmental Report*. London, DECC - Department of Energy and Climate Change, AMEC - Environment & Infrastructure UK Limited.
12. EC (2013). *Guidance on Integrating Climate Change and Biodiversity into Strategic Environmental Assessment*. Brussels, EU - European Union.
13. Environmental Safety and Risk Management Directorate (2010). *Guidelines for the Environmental Impact Report. Second Nuclear Power Plant Borssele*. The Hague, Ministry of Housing, Spatial Planning and the Environment of the Netherlands.
14. EPA Ireland (2013). *SEA Pack*. Wexford, EPA - Environmental Protection Agency of Ireland.
15. EPA Ireland (2014). *Ireland's third Nitrates Action Programme (NAP) Strategic Environmental Assessment Screening Statement*. Wexford, Department of Environment, Community and Local Government, Ireland.

16. EPA United Kingdom (2011). *Strategic environmental assessment and climate change: guidance for practitioners*. London, EPA - Environmental Protection Agency of the United Kingdom (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/297039/geho0811buca-e-e.pdf, accessed 24 January 2017).
17. EPD (2015a). Strategic Environmental Assessment (SEA) Knowledge Centre [web site]. (http://www.epd.gov.hk/epd/SEA/eng/index.html, accessed 24 January 2017).
18. EPD (2015b). Hong Kong Strategic Environmental Assessment Manual [web site]. (http://www.epd.gov.hk/epd/SEA/eng/sea_manual.html, accessed 24 January 2017).
19. EU (2013). *Workshop Implementation Guide on Environmental Law. Training Module on EU Law on Environmental Impact Assessment (EIA)*. Brussels, EU - European Union.
20. Frey B, Olearius A, Palerm J (2011). *Strategic Environmental Assessment - a governance tool for sustainable development. Lessons learnt from applying Strategic Environmental Assessment within development cooperation focusing on aid effectiveness.* Bonn, giz - Deutsche Gesellschaft für Internationale Zusammenarbeit.
21. Gachechiladze-Bozhesku M, Smutny M (2017). *Application of the Protocol on Strategic Environmental Assessment: Manual for Trainers. Draft version, May 2017*. Geneva, Switzerland, UNECE - United Nations Economic Commission for Europe (EaP GREEN - Partnership for Environment and Growth).
22. Geneletti D (2014). *Integrating Ecosystem Services in Strategic Environmental Assessment: A guide for practitioners*. Nairobi, Kenya, UNEP - United Nations Environment Programme (Project for Ecosystem Services).
23. GHD (2013). *Environmental Best Practice Port Development: An Analysis of International Approaches. Report prepared for Department of Sustainability, Environment, Water, Population and Communities*. Canberra, GHD.
24. GIZ (2012). *Intensive training course for national and international specialists and managers*. Bonn, giz - Deutsche Gesellschaft für Internationale Zusammenarbeit.
25. Heinrich Boell Foundation of Palestine & Jordan (2012). Training Course: Strategic Environmental Assessment (SEA) 01-03 August 2016 [web site]. (https://www.giz.de/fachexpertise/downloads/giz2011-en-environmental-assessment.pdf, accessed 24 January 2017).
26. Huber S, Kurzweil A (2012). *Guide Municipal Soil Management*. Vienna, Austria, UBA - Umweltbundesamt (1 URBAN SMS WP3 Action 4).
27. Jendrośka J (2015). *Practical Guidance on reforming legal and institutional structure with regard to application of SEA procedure in accordance with the UNECE Protocol on SEA [General Recommendations]*. Geneva, UNECE - United Nations Economic Commission for Europe (EaP GREEN - Partnership for Environment and Growth).
28. Le Bris C, Brivadier I (2015). *Préconisations relatives à l'évaluation environnementale stratégique Note méthodologique*. Paris, CEREMA - Centre d'Études et d'Expertises sur les Risques, l'Environnement, la Mobilité et l'Aménagement.
29. Leitner M, Tulipan M (2011). *Guidance for Soil in Strategic Environmental Assessment and Environmental Impact Assessment (SEA/EIA Guidance)*. Vienna, Austria, UBA - Umweltbundesamt (URBAN SMS WP3 Action 3).
30. Loayza F et al. (2011). *Strategic environmental assessment in policy and sector reform: conceptual model and operational guidance* (World Bank et al., editors). Washington, DC, The World Bank (Environment and development).
31. Minister of Justice (2012). Consolidation Canadian Environmental Assessment Act, 2012. *S.C. 2012, c. 19, s. 52*.

32. Ministère de l'écologie, de l'énergie, du développement durable et de la mer (2014). L'évaluation environnementale stratégique (plans et programmes) - Ministère de l'Environnement, de l'Energie et de la Mer [web site]. (http://www.developpement-durable.gouv.fr/L-evaluation-environnementale.html, accessed 24 January 2017).
33. Ministry of Defence (2015). *Sustainability & Environmental Appraisal Tools Handbook. Section 3: Strategic environmental assessment*. London, Ministry of Defence.
34. Nkambwe M (2010). *Trainers' Guide to: Training Manual On Integrated Environmental Assessment and Reporting an Africa*. Gaborone, Botswana, University of Botswana.
35. OECD (2012). *Strategic Environmental Assessment in Development Practice. A review of recent experience*. Paris, OECD.
36. O'Mahony C (2015). *Integrating Climate Change into Strategic Environmental Assessment in Ireland - A Guidance Note*. Wexford, EPA - Environmental Protection Agency of Ireland.
37. Partidário MR (2012). *Strategic Environmental Assessment Better Practice Guide. Methodological guidance for strategic thinking in SEA*. Lisbon, Portugal, Portuguese Environment Agency & REN - Redes Energéticas Nacionais.
38. Santer E, UNECE (2014). Introduction to the UNECE Protocol on Strategic Environmental Assessment to the Espoo Convention.
39. Scottish Government (2013). *Strategic Environmental Assessment. Guidance*. Edinburgh, The Scottish Government.
40. SPAHG (2011). *Steps to Healthy Planning: Proposals for Action*. London, spatial planning & health group.
41. UNDP (2014). *Social and Environmental Screening Procedure*. New York, NY, UNDP - United Nations Development Programme.
42. UNECE (2012a). *Resource Manual to Support Application of the UNECE Protocol on SEA*. Geneva, UNECE - United Nations Economic Commission for Europe.
43. UNECE (2012b). *Simplified Resource Manual to Support Application of the Protocol on Strategic Environmental Assessment*. Geneva, Switzerland, UNECE - United Nations Economic Commission for Europe.

Annex 10 Document analysis of SEA guidelines

ID	Description/question	Variables
	Guideline No Reference Citation ID	
A	**Organization Type**	
		1 - multilateral organization 2 - international associations 3 - development agencies 4 - health authorities 5 - environmental authorities 6 - national/regional/local government 7 - others
	Name of the international organizations/country of agency or national authority	
B	**General information on the guideline**	
1	Author/editor	
2	Title of the guideline	
3	Year	
4	Number of pages	
5	Type of guideline	1 - downloadable document 2 - webpage
6	Target audience of the guideline/aim of guideline	
C	**Strategic Environmental Assessment**	
1	SEA definition	
2	SEA procedural steps	
3	SEA principles	
D	**Health in the guideline**	
1	"Health" scale	0 - unmentioned 1 - option or relevance mentioned 2 - (some) indication given how to 3 - comprehensive discussion
2	Who shall provide the health expertise?	
3	When shall health experts/issues be included into the SEA?	0 - not mentioned 1 - screening 2 - scoping 3 - assessment/appraisal 4 - consultation 5 - reporting 6 - decision-making 7 - monitoring
4	Is HIA mentioned or used?	0 - not mentioned 1 - mentioned 2 - used
5	What health data shall be used?	0 - not mentioned 1 - baseline data 2 - routinely collected, readily available 3 - newly collected 4 - mix of 1 & 2 data 5 - mix of 1 & 3 data
6	Is there a mix of quantitative and qualitative methods?	0 - not mentioned

ID	Description/question	Variables
		1 - yes 2 - no
7	Should/are health impacts quantified? "Quantification" scale	0 - unmentioned 1 - option or relevance mentioned 2 - some indication given how to 3 - comprehensive discussion
E	**Health determinants**	0 - no 1 - yes
1	Global ecosystem	
	Weather, climate (flooding)	
2	Natural environment – biophysical aspects	
2-1	Air	
2-2	Flora & fauna/wildlife & biodiversity	
2-3	Soil	
2-4	Water	
2-5	Noise and light pollution, vibrations, smell...	
3	Build environment	
3-1	Open and green space/landscape	
3-2	Houses & buildings	
4	Activities	
4-1	Waste	
4-2	Access to health activities/services/social care	
4-3	Occupational health and safety (for example, injuries and accidents)	
4-4	Education	
4-5	Satisfying employment (for example, work from home)	
5	Local economy	
5-1	Affordable housing	
5-2	Poverty	
5-3	Un-/ employment	
6	Community	
6-1	General in-/equality & in-/equity	
6-2	Health inequalities (for example, in different neighbourhoods)	
6-3	Health of minorities & vulnerable groups/impacts on different social groups	
6-4	Crime rates	
6-5	Social exclusion	
7	Lifestyle	
7-1	Healthy lifestyles (for example, cycling)	
7-2	Leisure activities opportunities (open areas, sport)	
7-3	Food	
8	Others	
F	**Sectors mentioned**	0 - no 1 - yes
1	Agriculture, fishery, forestry	
2	Energy	
3	Industry	
4	Mining/extractive industry	

ID	Description/question	Variables
5	Spatial planning	
6	Telecommunications	
7	Tourism	
8	Transport	
9	Urban planning	
10	Waste management	
11	Water management	
12	Education system	
13	Employment/business development	
14	Finance sector/taxation	
15	Health sector	
16	Poverty reduction strategies	
17	Public sector reforms/decentralization	
18	Trade	
19	Others	
G	**SEA examples given/case studies mentioned**	
		0 - no 1 - yes
H	**SEA practical tools described**	
		0 - no 1 - mentioned 2 - details

Annex 11 Programme of the CBEH international training week, Riga, Latvia, 19–23 March 2012

Monday, 19 March 2012	**The Policy Framework of Environment and Health**		
11.15 – 12.00	Registration		
12.00 – 13.30	Registration/Welcome lunch		
13.30 – 14.00	Opening of the Event Welcome speeches by ▪ M Krzyzanowski, WHO European Centre for Environment and Health ▪ R Muciņš, State Secretary, Ministry of Health ▪ R Bebris, Deputy Director Environment Protection Department, Ministry of Environmental Protection and Regional Development		
	Introduction to the CBEH Project, M Martuzzi		
14.00 – 15.00	Module 1 – Framework of EH in Europe and beyond ▪ The European Environment and Health Process - an international policy platform to support national actions, F Racioppi ▪ European Environment Agency's work in Environment and Health, D Jarosinska ▪ Views from the ERA ENVHEALTH consortium, A Pittmann		
15.00 – 15.30	Coffee break		
15.30 – 16.00	Module 1 – Framework of EH in Europe and beyond cont. ▪ Recent developments in EH research, P Wilkinson ▪ Recent developments in HIA, G Gulis		
16.00 – 17.00	Module 1 – Round table, Chair R Fehr ▪ Intersectoral action for environment and health: are two sectors enough? A Paldy, G Gulis, P Wilkinson, A Pittmann, D Jarosinska, F Racioppi		
17.00 – 17.45	Module 1 – Key lecture: Assessing health impacts of air pollution, M Krzyzanowski		
17.45 – 18.00	Module 3 – Introduction to the parallel workshops – plans for next days, J Nowacki		
18.30	Get together reception		
Tuesday, 20 March 2012	**Key lectures, case studies and parallel workshops**		
08.00 – 8.30	Registration		
08.30 – 09.30	Module 1 – Key lecture: Forms of impact assessment, R Fehr		
09.30 – 10.00	Module 2 – Case study Latvia "The new public health strategy 2012–20", J Feldmane		
10.00 – 10.30	Coffee break		
10.30 – 12.00	Module 3 – Parallel workshops:		
	3A. Health in EIAs of energy projects, B Cave & G Gibson ▪ Outline of three-day programme: aims objectives and cross-over with the SEA module ▪ Headlines: HIA in the wider context	3B. Health in SEAs of energy policy and strategies, M Partidário & L den Broeder ▪ Introduction of SEA and Health in SEA; ▪ Energy policies- strategic health issues- technical lectures and group work ▪ Q&A	3C.1 Health in industrial contaminated sites, R Pirastu, I Ivarone & R Pasetto ▪ Mortality study of residents in contaminated sites in Italy (SENTIERI Project) ▪ Evaluation of the epidemiological evidence of the association between environmental exposure and disease: case-study
12.00 – 13.30	Lunch		

13.30 – 15.00	Module 3A cont. ▪ Stages in an HIA ▪ Cultural influences on HIA practice	Module 3B cont. ▪ Case exercise: understand the energy policy strategy and health implications - group discussion	Module 3C.1 cont. ▪ Introduction to ecological studies ▪ Risk indicators: crude rates, direct standardized rates, Standardized Mortality/Morbidity Ratios ▪ Calculate risk indicators
15.00 – 15.30	▪ Coffee break		
15.30 – 17.00	Module 3A cont. ▪ Commonality of technical language within an HIA ▪ Introduction to case study	Module 3B cont. ▪ Case exercise cont. ▪ Groups feed-back	Module 3C.1 cont. ▪ A priori evidence and health statistics ▪ Key principles of evaluating EH aspects of contaminated sites ▪ Recognize the public health implications in terms of preventive intervention to be implemented
17.00 – 17.45	Module 2 – Case study Slovakia "The implementation of HIA in Slovakia", Z Kolchanova		
17.45 – 18.00	Feedback from the parallel workshops		
Wednesday, 21 March 2012	**Key lectures, case studies and parallel workshops**		
08.30 – 09.30	Module 1 – Key lecture, Health and energy, P Wilkinson		
09.30 – 10.00	Module 2 – Case studies Slovenia, P Otorepec ▪ Air pollution ▪ Strategic environmental health impact assessment		
10.00 – 10.30	Coffee break		
10.30 – 12.00	Module 3 – Parallel workshops:		
	3A. Health in EIA of energy projects, B Cave & G Gibson ▪ Health and socioeconomic assessment ▪ Health and Environmental protection	3B. Health in SEA of energy policy and strategies, M Partidário & L den Broeder ▪ Getting focused in SEA: mini-lecture ▪ Case exercise: relevant strategic issues to consider - group discussion	3C.2 Biomonitoring and quantitative methods for HIA, P Wilkinson ▪ Explanation of QRA exercise ▪ Group work: formulation of QRA, carrying out of calculations and preparation of group presentation of findings presentations
12.00 – 13.30	Lunch		
13.30 – 15.00	Module 3A cont.	Module 3B cont. ▪ Assessment in SEA – looking for strategic option – mini-lecture ▪ Case exercise: alternative policy options that enhance health issues - group discussion ▪ Groups feed-back	Module 3C.2 cont. Discussion of lessons from morning activities ▪ Carrying out a QRA calculation in a simple Excel spreadsheet ▪ Handling uncertainties: demonstration of methods for quantification ▪ Wrap-up lecture and discussion
15.00 – 15.30	Coffee break		

15.30 – 16.15	Module 2 – Key lecture, Risk communication and communicating uncertainties, A Leppin		
16.15 – 17.00	Module 2 – Key lecture, Environmental health inequalities, G Morris		
17.00 – 17.45	Module 2 – Case studies ▪ Estonia "Risk assessment of waste burning in Kunda town", J Tomasova ▪ Czech Republic, “Flash floods in the Liberec region from the point of view of public health authority", J Kucerova		
17.45 – 18.00	Feedback from the parallel workshops		
Thursday, 22 March 2012	**Key lectures, case studies and parallel workshops**		
08.30 – 09.30	Module 1 – Key lecture, Nanotechnology and health, V Howard		
09.30 – 10.00	Module 2 – Case study Lithuania "The Case of Wind Farm HIA”, V Uscila		
10.30 – 10.30	Coffee break		
10.30 – 12.00	Module 3 – Parallel workshops:		
	3A. Health in EIA of energy projects, B Cave & G Gibson ▪ Co-ordination of outcomes from day 2 ▪ Filtering pertinent information ▪ Assessing shortfalls in information ▪ Presenting findings into cohesive structure	3B. Health in SEA of energy policy and strategies, M Partidário & L den Broeder ▪ Assessment in SEA – option assessment and guidelines for follow-up – mini-lecture ▪ Case exercise: options assessment using health-inclusive criteria, and follow-up - group discussion	3C.3. Environmental Burden of Disease, O Haninen ▪ Introduction to the concepts and methods ▪ Formation of the small groups and handling of input data ▪ National data extraction and model development
12.00 – 13.30	Lunch		
13.30 –15.00	Module 3A cont. ▪ How does HIA fit into the wider process? How are HIAs used? What can they achieve? ▪ How can you assure the quality of a completed HIA? ▪ What information sources are there for HIA? ▪ What are your next steps?	Module 3B cont. ▪ Groups feed-back ▪ Discussion over SEA role for health enhancement.	Module 3C.2 cont. ▪ Demonstration of the EBD calculations ▪ Finalization of the case study models ▪ Presentation of the results to the class ▪ Exercise summary
15.00 – 15.30	Coffee break		
15.30 – 16.15	Presentation results SEA group		
16.15 – 17.00	Presentation results EIA group		
17.00 – 17.45	Feedback from the 3rd parallel workshop		
19.00 – 22.00	Guided tour and social dinner at Pauls Stradins Museum for Medicine History, http://www.mvm.lv/en		
Friday, 23 March 2012	**Training of trainers**		
08.30 – 09.30	Module 1 – Key lecture, Water, R Aertgeerts		
09.30 – 10.00	Module 2 – Case studies Hungary, A Paldy: ▪ Aspects of health risk assessment of red sludge catastrophe (Contaminated sites) ▪ Health impacts of climate change: Lyme disease, allergenic pollen as indicators (Climate changes) ▪ Assessment of pregnancy outcomes – as a tool in EHIA in relation to air pollution and drinking water quality (Risk assessment methodologies)		
10.00 – 10.30	Coffee break		

10.30 – 12.00	Module 4 – Training of trainers, F Matthies ▪ Recap/feedback to teaching styles in previous days (scoring exercise and discussion)	Module 4 – Training of trainers, F Mitis ▪ Recap/feedback to teaching styles in previous days (scoring exercise and discussion)
12.00 – 13.30	Lunch	
13.30 – 15.00	Module 4 cont. ▪ Running a course – practical issues	Module 4 cont. ▪ Running a course – practical issues
15.00 – 15.15	Coffee break	
15.15 – 16.00	Module 4 cont. ▪ Practical exercise	Module 4 cont. ▪ Practical exercise
16.00 – 16.45	Round up and certificates	
16.45	End of the workshop	

Annex 12 Evaluation forms of the CBEH international training event

A. Daily evaluation form and codes during the week, Riga, Latvia, 19-23 March 2012

Question	Variables
ID	
1. Generic information	1 - Environment 2 - Health 3 - Environment & Health 4 - Agriculture/Consumer protection 5 - Administration 6 - Reginal Development/Planning 7 - Research 8 - other
1.1 Main sector of work	
1.2 other sector	
2. Years of working experience	
3. Module	1 - Module A 2 - Module B 3 - Module C
4. Key lecture	1 - Strongly disagree 2 - Disagree 3 - Neither agree nor disagree 4 - Agree 5 - Strongly agree
4.1. Key lecture contents were related clearly to objectives	
4.2. Details provided in the lectures were appropriate	
4.3. The level of difficulty of the lectures was appropriate	
4.4. The workload of the lectures was appropriate	
4.5. These lectures are relevant to my vocational/professional needs	
5. Module	1 - Strongly disagree 2 - Disagree 3 - Neither agree nor disagree 4 - Agree 5 - Strongly agree
5.1. Module content was related clearly to objectives	
5.2. Details provided in the lectures were appropriate	
5.3. The level of difficulty of the lectures was appropriate	
5.4. The workload of the lectures was appropriate	
5.5. These lectures are relevant to my vocational/professional needs	
6. The 3 most useful things	
7. The 3 least useful topics	

B. Overall evaluation form and codes of the last day, Riga, Latvia, 19-23 March 2012

Question	Variables
ID	
1. Area of work	1 - Environment 2 - Health 3 - Environment & Health 4 - Agriculture/Consumer protection 5 - Administration 6 - Regional Development/Planning 7 - Research 8 - other
1.1. Main sector of work	
1.2. other sector	
2. Years of working experience	
3. Country	1 - Czech Republic 2 - Estonia 3 - Hungary 4 - Latvia 5 - Lithuania 6 - Poland 7 - Slovakia 8 - Slovenia
4. Module	1 - Module A 2 - Module B

Question	Variables
	3 - Module C
5. Key lecture (of the final day)	1 - Strongly disagree 2 - Disagree 3 - Neither agree nor disagree 4 - Agree 5 - Strongly agree
5.1. Key lecture content was related clearly to objectives	
5.2. Details provided in the lectures were appropriate	
5.3. The level of difficulty of the lectures was appropriate	
5.4. The workload of the lectures was appropriate	
5.5. These lectures are relevant to my vocational/professional needs	
6. Training of trainers (Module of the final day)	1 - Strongly disagree 2 - Disagree 3 - Neither agree nor disagree 4 - Agree 5 - Strongly agree
6.1. Module content was related clearly objectives	
6.2. Details provided in the module was appropriate	
6.3. The level of difficulty of the module was appropriate	
6.4. The workload of the module was appropriate	
6.5. This module is relevant to my vocational/professional needs	
7. The three most useful things	…
8. The three least useful topics	…
9. Relevance of the session to vocation/professional needs	1 - Strongly disagree 2 - Disagree 3 - Neither agree nor disagree 4 - Agree 5 - Strongly agree
9.1 Mini lectures on the framework of EH in Europe and beyond	
9.2 Roundtable Intersectoral action for environment and health	
9.3 Key lecture: Assessing health impacts of air pollution	
9.4 Key lecture: Family of impact assessment	
9.5 Key lecture: Risk communication and communicating uncertainties	
9.6 Key lecture: Environmental health inequalities	
9.7 Key lecture: Nanotechnology and health	
9.8 Key lecture: Water and sanitation	
9.9 Case study: The new public health strategy 2012-20	
9.10 Case study: RA of waste burning	
9.11 Case studies: Flash floods & mosquito's	
9.12 Case study: Air pollution and bottom up HIA	
9.13 Case study: HIA implementation	
9.14 Case study: Mobile phones and electromagnetic fields	
9.15 Case study: HIA of onshore a wind farm	
9.16 Case studies: HRA of red sludge catastrophe, climate change	
9.17 Module A Health in EIA	
9.18 Module B Health in SEA	
9.19 Module C1 Contaminated industrial sites	
9.20 Module C2 Quantitative risk assessment	
9.21 Module C3 Environmental burden of disease	
9.22 Training of trainers	
10. Least useful topics	0 - no 1 - yes
10.1 Were there topic areas that you felt were not useful to learn?	
10.2 If yes, three least useful topics covered in these lessons	
11. Topics to be covered more	0 - no 1 - yes
11.1 Were there topic areas that you felt you would like to learn more about?	
11.2 If yes, the three topic areas to be covered more in details	

Question	Variables
12. The three most useful things learned during the week	…
13. Overall assessment	1 - Strongly disagree 2 - Disagree 3 - Neither agree nor disagree 4 - Agree 5 - Strongly agree
13.1 I was satisfied with the knowledge provided to me.	
13.2 I was satisfied with the quality of the lectures and parallel modules.	
13.3 I was satisfied with the mixture of key lectures, case studies and more in depth modules.	
13.4 I was overwhelmed by the workload during the week.	
13.5 I would like to see more similar training opportunities in my country.	
13.6 I would like to see more training workshops together with colleagues from the environment and the health sector.	
13.7 I would like to see more networking with colleagues from other countries.	
13.8 I will engage in EH training in my country in the future.	
13.9 It was worth devoting a full week to the training.	
13.10 The past week has changed my way of thinking	
13.11 If you agree/strongly agree can you give an example	
14. If an environment and health training event is repeated, I would favour	1 - Strongly disagree 2 - Disagree 3 - Neither agree nor disagree 4 - Agree 5 - Strongly agree
14.1 Attending an advanced training workshop	
14.2 Having other colleagues attending a similar workshop	
15.Level of agreement on the organizational issues	1 - Strongly disagree 2 - Disagree 3 - Neither agree nor disagree 4 - Agree 5 - Strongly agree
15.1 I was satisfied with the hotel services	
15.2 I was satisfied with the workshop facilities (plenary room/group rooms)	
15.3 I was satisfied with the social events during the week.	
15.4 I was satisfied with the pre workshop registrations process.	
15.5 I would like to see less print-outs.	
15.6 I would like to download all presentation hand-outs from Sharefile.	
16. Comments on what should change for future workshops	**…**

Annex 13 List of countries by WHO membership and participation in the online questionnaire

Country	Participation in online questionnaire?	Number of participants	Member State of the WHO Regional Office for Europe	other country group/ EU association
Albania	no		yes	EU Candidate country
Andorra	no		yes	EU Customs Union Agreements
Armenia	yes	1	yes	NIS
Austria	yes	3	yes	EU 15*
Azerbaijan	no		yes	NIS
Belarus	no		yes	NIS
Belgium	yes	2	yes	EU 15
Bosnia and Herzegovina	no		yes	EU potential Candidate country
Bulgaria	no		yes	EU 13**
Croatia	no		yes	EU 13
Cyprus	no		yes	EU 13
Czech Republic	yes	1	yes	EU 13
Denmark	yes	5	yes	EU 15
Estonia	yes	1	yes	EU 13
Finland	no		yes	EU 15
France	yes	4	yes	EU 15
Georgia	yes	1	yes	NIS
Germany	yes	1	yes	EU 15
Greece	yes	1	yes	EU 15
Hungary	yes	2	yes	EU 13
Iceland	no		yes	EEA
Ireland	yes	1	yes	EU 15
Israel	yes	1	yes	Other country
Italy	yes	4	yes	EU 15
Kazakhstan	no		yes	NIS
Kyrgyzstan	no		yes	NIS
Latvia	no		yes	EU 13
Liechtenstein	no		no	EEA
Lithuania	yes	4	yes	EU 13
Luxembourg	no		yes	EU 15
Malta	yes	1	yes	EU 13
Monaco	no		yes	EU Customs Union Agreements
Montenegro	yes	1	yes	EU Candidate country
Netherlands	yes	3	yes	EU 15
Norway	yes	1	yes	EEA
Poland	yes	1	yes	EU 13
Portugal	yes	1	yes	EU 15
Republic of Moldova	yes	1	yes	NIS
Romania	no		yes	EU 13
Russian Federation	no		yes	NIS
San Marino	no		yes	EU Customs Union Agreements

Country	Participation in online questionnaire?	Number of participants	Member State of the WHO Regional Office for Europe	other country group/ EU association
Serbia	yes	1	yes	EU Candidate country
Slovakia	yes	3	yes	EU 13
Slovenia	no		yes	EU 13
Spain	yes	5	yes	EU 15
Sweden	yes	2	yes	EU 15
Switzerland	yes	4	yes	EEA
Tajikistan	no		yes	NIS
The former Yugoslav Republic of Macedonia	no		yes	EU Candidate country
Turkey	no		yes	EU Candidate country
Turkmenistan	no		yes	NIS
Ukraine	no		yes	NIS
United Kingdom	yes	8	yes	EU 15
Uzbekistan	no		yes	NIS
Vatican City State and Holy See	no		no	EU Customs Union Agreements
Total	**28**	**64**	**53**	

Notes:

EU 15 includes the fifteen Member countries that joined the EU before 2004: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and United Kingdom;

EU 13 includes the 13 Member countries that joined the EU 2004, 2007, or 2013: Bulgaria, Croatia, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, and Slovenia;

EU Candidate countries: Albania, Montenegro, Serbia, The former Yugoslav Republic of Macedonia, and Turkey;

EU Potential candidates: Bosnia and Herzegovina;

EEA – European Economic Area: Iceland, Liechtenstein, Norway, and Switzerland;

Customs Union Agreements: Andorra, Holy See and Vatican City State, Monaco, and San Marino.

NIS – Newly Independent State: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Russian Federation, Tajikistan, Turkmenistan, and Ukraine.

Annex 14 The online questionnaire on HIA implementation and health in environmental assessments

Note:

Diverse information boxes were integrated in the online questionnaire to give definitions for specific terms. These will be shown at the end of the questionnaire.

Questions marked with * at the beginning are obligatory questions.

Generic information

Welcome to our questionnaire!

Thank you very much for agreeing to participate in this survey, on HIA implementation and its integration into environmental assessments!

Part 1 consists of 21 relatively general questions whereas Part 2 contains another 9 more in-depth questions and we would appreciate it if you could answer these as well.

Please note the following technical point:

To save your responses and return to the survey later, simply click on the “Exit this survey” button at the top right corner of the screen. To resume the survey at any time, click again on the "access the survey" button in the email send to you. In order to submit your answers, please click on the “Done” button on the last page when you are finished.

All information provided will be treated as strictly confidential by the conductors of the survey.

Contacts in case of any questions:

Piedad Martín-Olmedo for the European Public Health Association (EUPHA) and Julia Nowacki for WHO Regional Office for Europe

Introduction and purpose

The importance of assessing the health implications of policies, plans, programmes and projects of different sectors has been explicitly recognised for more than two decades. The WHO Regional Office for Europe framework on health (Health 2020) re-emphasises the need for a whole-of-government and whole-of-society approach. In such an approach Health Impact Assessment (HIA) plays a crucial role in identifying the links between activities performed in different sectors and their implications for human health. Importantly, not only are risk factors associated with hazards assessed, but also opportunities for positive health outcomes that can be achieved if appropriate activities are considered.

The need to perform HIA was recognized at the 1989 European Ministerial Conference on Environment and Health in Frankfurt. In the Parma Declaration of 2010, WHO European Member States further committed themselves to improving and strengthening development of identified tools, including health in environmental assessments (EA) of policies, plans, programmes and projects and the application of HIA. The implementation and use of HIA and other forms of health-relevant impact assessment vary greatly across the European Region: environmental impact assessments (EIA) and strategic environmental assessments (SEA) are widely implemented as required by law; available published evidence shows that, out of the 53 WHO European Member States, at least 27 use some forms of HIA, from capacity building workshops to HIA pilot projects to regularly conducting HIAs based on legal regulations.

This theoretical and practical wealth of experience can be better used in support of stronger implementation of HIA and health-friendly EAs in Member States – a goal of many countries in Europe. With the results of this survey, the WHO European Centre for Environment and Health, the HIA section of the European Public Health Association (EUPHA), and the Faculty of Health Sciences of Bielefeld University, Germany, aim to review models and methods of implementation of HIA and health in EAs, with a view to develop a resource for countries and individuals who wish to strengthen their practice of HIA or health coverage in EAs.

** 42 out of the 53 WHO European Member States are Parties to the UNECE Espoo Convention on EIA in a Transboundary Context, out of these 25 are also Parties to the UNECE Protocol on SEA to the Espoo Convention. In addition all 28 Member States of the European Union (EU) had to adopt procedures and rules for EIA and SEA in their national legislation based on the European Directives on EIA (2014/52/EU) and SEA (2001/42/EC).

About the respondent

*1. Please name the country and, if relevant, the subnational region, federal state, province or municipality to which your answers will refer. _____

If you work internationally, please name the country where you mainly work and, for this exercise, please consider your answers in relation to this country.

We will maintain strict confidentiality with your answers but would be grateful, if we could contact you in case queries.

2. Can we contact you in case we have any questions in relation to your answers?

☐ Yes; ☐ No

a) If YES,...

Last Name, First Name _____

Affiliation/Institution _____

City/Town _____

State/Province _____

Country _____

Email Address _____

Phone Number _____

b) Gender

☐ Female

☐ Male

c) What is your educational background (for example, public health, medicine, environmental science, etc.)? _____

Your experience with health impact assessment (HIA)

3. Your HIA experience:

a) Since which year have you been involved in the area of HIA? _____

b) Approximately how many HIAs have you been involved in to date?
(including health assessments in environmental assessments or as part of an environmental, social and health impact assessment [ESHIA]) _____

c) In which type of HIA have you mostly worked on throughout your career?
(Please indicate the percentage per category. The entries must add up to 100%.)

HIA of a policy/strategy (for example, national employment policy) _____%

HIA of a plan (for example, land use plan; transportation plan) _____%

HIA of a programme (for example, urban regeneration programme) _____%

HIA of a project (for example, expansion of an airport, waste management facility) _____%

Others _____%

☐ None of the options mentioned

If others, please specify _____

3d) What has been your main involvement with HIA to date?
(Please indicate the percentage per category. The entries must to add up to 100%.)

Conducting HIA _____%

Reviewing HIA _____%

Developing HIA legislation _____%

Developing HIA methodology _____%

Developing HIA training _____%

Others _____%

☐ None of the options mentioned

If others, please specify _____

e) At which proposal level has been your main involvement with HIA to date?
(Please indicate the percentage per category. The entries must to add up to 100%.)

International/transboundary proposals _____%

National proposals _____%

Regional proposals _____%

Local proposals _____%

Others_____%

☐ None of the options mentioned

If others, please specify _____

PART 1A - HIA implementation in your country/subnational region/municipality

4. To your knowledge, since when and how many HIAs have been conducted in your country/region/municipality?

a) Since which year has HIA been conducted? _____

b) Approximate total number of HIAs conducted:

☐ Less than 5; ☐ 5–10; ☐ 11–20; ☐ more than 20; ☐ Don't know

☐ Other (please specify) _____

c) Are HIAs currently conducted in your country/region/municipality?

☐ Yes; ☐ No; ☐ Don't know

5. Is HIA institutionalized* in your country/region/municipality?

*institutionalized = established in practice or by custom and usage

☐ Yes; ☐ No; ☐ Don't know

a) If YES, how is HIA formalized? (multiple answers possible)

☐ There is a specific national law on HIA.

☐ HIA is required through our Public Health act/law/regulation.

☐ All major national policies are subject to HIA.

☐ HIA is not mandatory in national legislation, but subnational or local binding norms require HIA, for example, public health act, local planning directives.

☐ HIA is required in the national environmental laws, for example, law on environmental impact assessment (EIA) and/or strategic environmental assessments (SEA).

☐ Assessing impacts on health is mandatory in our national environmental laws, for example, law on EIA and/or SEA.

☐ Consultation with health experts on possible health impacts is mandatory in our EIA legislation.

☐ Consultation with health experts on possible health impacts is mandatory in our SEA legislation.

☐ Health authorities can request HIA when they expect significant health effects on the population.

☐ Residents can request HIA when they expect significant health effects on their health/the health of the community.

☐ HIA is a working procedure of the departments within the Ministry of Health.

☐ HIA is a working procedure of the regional health department.

☐ HIA is a working procedure of the local health department.

☐ HIAs are undertaken outside the formal-decision making process, for example, by universities, community-based organizations, which have no authority over the decision-making process.

☐ Don't know

☐ Other (please specify)

Space for your comments (for example, reality of HIA implementation versus its prescription in laws): _____

If applicable, please provide reference to the piece of legislation that include HIA: _____

b) In your country/region/municipality is it recommended to conduct HIA? (multiple answers possible)

To conduct HIA is recommended ...

☐ … by the health authority.

☐ … in the countries (public) health strategy.

☐ … by environmental authorities.

☐ … in national policies/strategies others than from health or environmental authorities.

☐ … in existing national or area related guidance documents on HIA.

☐ … by local authorities.

☐ … by community representatives/stakeholders.

☐ … by national, regional or local NGOs.

☐ … by academic institutes.

☐ … by none of the ones mentioned.

☐ Don't know

☐ Other (please specify) _____

6. Who is funding the HIA in your country/region/municipality?(multiple answers possible)

☐ The initiator or developer of the project/proposal.

☐ The ministry developing the policy.

☐ The health authority – depending on the proposal level the Ministry of Health, the regional or local health department.

☐ The environmental authority - depending on the proposal level the Ministry of Environment, the regional or local environmental department.

☐ Foundation with legal capacity, for example, concerned with health promotion, environmental health etc.

☐ Municipalities for local HIAs.

☐ Academic institutions through research projects.

☐ Don't know

☐ Other (please specify) _____

7. Are there activities offered in your country/region/municipality that support the implementation of HIA?

☐ Yes; ☐ No; ☐ Don't know

If YES,

a) …which kinds of activities currently support the implementation of HIA? Please indicate if the activities are done on a regular (for example, once a year) or an ad hoc basis (for example, if a need for it is assumed). (multiple answers possible)

	regularly	**ad hoc**	**don't know**	**N/A**
HIA training for public health authorities	☐	☐	☐	☐
HIA training for health experts (for example, at universities)	☐	☐	☐	☐
HIA training for environmental assessors	☐	☐	☐	☐
HIA training for researchers	☐	☐	☐	☐
Development of specific HIA guidelines	☐	☐	☐	☐
Development of specific HIA tools	☐	☐	☐	☐
Other supporting activities	☐	☐	☐	☐

(please specify)/space for your comments _____

b) … which other kind of support for HIA exist in your country/region/municipality? (multiple answers possible)

☐ Legal requirement for HIA.

☐ A well-developed legal process for HIA.

☐ A (permanent) HIA support unit to monitor, coordinate and/or support HIA.

☐ Established HIA licensing system.

☐ A registry of HIA (licensed) experts.
☐ National/regional/local adjusted guidelines for HIA.
☐ National/regional/local adjusted screening tool for health impacts.
☐ Political support for HIA.
☐ Collaborative partnership with other sectors.
☐ Intersectoral working group between ministries.
☐ Broad recognition about health and well-being across other departments.
☐ Political commitment to a Health-in-All-Policies approach.
☐ None of the options mentioned.
☐ Don't know
☐ Other (please specify) _____

8. Based on your experience, who mainly commissions the HIA in your country/region/municipality? (multiple answers possible)

☐ Governmental health department
☐ Governmental environmental department
☐ Regional or local health authority
☐ Regional or local environmental authority
☐ Health inspectorate
☐ Public health institute
☐ Community-based organizations
☐ Project proponent
☐ Non-governmental organizations/public health advocates
☐ Don't know
☐ Other (please specify) _____

9. Based on your experience, who mainly conducts the HIA in your country/region/municipality? (multiple answers possible)

☐ National health authority
☐ Regional/local health authority
☐ Regional/local environmental authority
☐ National environmental authority
☐ Health inspectorate
☐ Public health institute
☐ Public health consultant/private company
☐ Academic unit
☐ HIA licensed assessor
☐ Licensed environmental assessor
☐ Environmental consultant/private company
☐ Other (please specify) _____

10. In your country/region/municipality, do HIAs go beyond the description of baseline conditions in the affected communities, i.e. do they also analyse (qualitatively or quantitatively) the impacts on...?

	routinely	sometimes	rarely	never	don't know
vulnerable groups	☐	☐	☐	☐	☐
inequalities among population subgroups	☐	☐	☐	☐	☐

11. Please select the areas where, to your knowledge, HIAs have been undertaken or are currently undertaken in your country/region/municipality (multiple answers possible)

For further information on the different categories please have a look at the information box below.

	routinely	sometimes	rarely	never	don't know	N/A
a) Agriculture, forestry and fishery	☐	☐	☐	☐	☐	☐
b) Energy industry	☐	☐	☐	☐	☐	☐
c) Extractive industry	☐	☐	☐	☐	☐	☐
d) Other industry (for example, chemicals, food, minerals, metals, rubber, textile, leather, wood and/or paper industry)	☐	☐	☐	☐	☐	☐
e) Infrastructure projects	☐	☐	☐	☐	☐	☐
f) Telecommunications	☐	☐	☐	☐	☐	☐
g) Tourism and leisure	☐	☐	☐	☐	☐	☐
h) Waste management	☐	☐	☐	☐	☐	☐
i) Water management	☐	☐	☐	☐	☐	☐
j) Sectoral policies	☐	☐	☐	☐	☐	☐

☐ Other (please specify) _____

12. In your view, on a scale from 1 (not at all) to 5 (very much), how effective is HIA in your country/ region/municipality in terms of enhancing people's health?

☐1 - not at all; ☐ 2; ☐ 3; ☐ 4; ☐ 5 - very much

13. Can you give a reference to an HIA good practice example in your country/region/municipality?

Author/Editor _____

Title of the report _____

Year of publishing _____

Language of the report _____

Link - if publicly available _____

PART 1B – Health in EIA and SEA in your country/subnational region/municipality

* 14. Have you ever been involved in an environmental assessment?

☐ Yes; ☐ No

If YES, at which proposal level within environmental assessments have you been mainly involved to date? (Please indicate the percentage per category. The entries must add up to 100%.)

Policy/strategy development level (for example, national employment policy) _____%

Plan development level (for example, land use plan; transportation plan) _____%

Programme level (for example, urban regeneration programme) _____%

Project level (for example, expansion of an airport, waste management facility) _____%

Others _____%

☐ None of the ones mentioned

If others, please specify _____

15. To your knowledge, are health factors beyond those generated by well-established environmental factors (for example, air, noise, soil, smell, water) being addressed in the EIAs or SEAs conducted in your country/region/municipality?

(For more information on other health factors beyond environmental factors please refer to the information box below.)

☐ Other health factors beyond environmental factors are regularly assessed* within the EIA/SEA.

☐ Other health factors beyond environmental factors are assessed* within the EIA/SEA but depend highly on the context.

☐ Other health factors beyond environmental factors are assessed* within the EIA/SEA but depend highly on the proponent/developer.

☐ Other health factors beyond environmental factors are assessed* within the EIA/SEA but depend highly on the regulating authorities.

☐ Other health factors beyond environmental factors are assessed* within the EIA/SEA but depend highly on the knowledge/experience of the person/team conducting the health assessment.

☐ Only environmental factors and their limit values are assessed* but they are not linked to health outcomes of the affected population.

☐ Only environmental factors and their limit values are assessed* and linked to health outcomes of the affected population.

☐ A community health profile is developed but it is not further linked to the proposal impacts on the health of the affected population.

☐ Don't know.

☐ Other (please specify)

* assess = to judge, determine, estimate, analyse, evaluate

16. To your knowledge, who mainly conducts the health assessment within EIA/SEA HIA in your country/region/municipality? (multiple answers possible)

☐ National health authority

☐ Regional/local health authority

☐ Regional/local environmental authority

☐ National environmental authority

☐ Health inspectorate

☐ Public health institute

☐ Public health consultant/private company

☐ Environmental consultant/private company

☐ Academic unit

☐ HIA licensed assessor

☐ Licensed environmental assessor

☐ No one

☐ Don't know

☐ Other (please specify) _____

17. Is the health assessment mainly done as a separate HIA or integrated into the environmental assessment? (Please indicate the percentage per category. The entries must add up to 100%.)

Separate HIA _____%

Integrated in the environmental assessment _____%

18. Who is funding the health assessment within the EA in your country/region/municipality? (multiple answers possible)

☐ The initiator or developer of the project/proposal.

☐ The ministry developing the policy.

☐ The health authority – depending on the proposal level the Ministry of Health, the regional or local health department.

☐ The environmental authority - depending on the proposal level the Ministry of Environment, the regional or local environmental department.

☐ Foundation with legal capacity, for example, concerned with health promotion, environmental health etc.

☐ Municipalities for local HIAs.

☐ Academic institutions through research projects.

☐ Don't know.

☐ Other (please specify) _____

19. To your knowledge, are (public) health experts consulted or involved in environmental assessments in your country/region/municipality?

☐ Yes; ☐ No; ☐ Don't know

If YES, at which stage and how often are they consulted or involved?(multiple answers possible)

	routinely	sometimes	rarely	never	don't know	N/A
Screening	☐	☐	☐	☐	☐	☐
Scoping	☐	☐	☐	☐	☐	☐
Appraisal/risk assessment	☐	☐	☐	☐	☐	☐
Reporting and recommendations	☐	☐	☐	☐	☐	☐
Stakeholder engagement	☐	☐	☐	☐	☐	☐
Monitoring	☐	☐	☐	☐	☐	☐

20. Based on your knowledge, what is already in place or further needed to integrate health into EIA/SEA in your country/region/municipality? (multiple answers per columns and rows possible)

	not done yet	already existing or being done	further needed	don't know	N/A
Review and development of regulatory aspects	☐	☐	☐	☐	☐
Availability supporting units specialised in health considerations at the authority responsible for the environmental assessment	☐	☐	☐	☐	☐
Intersectoral working groups of health and environmental assessors within the administration	☐	☐	☐	☐	☐
Training for environmental authorities on health issues	☐	☐	☐	☐	☐
Training for environmental assessors and EIA/SEA consultants on health issues	☐	☐	☐	☐	☐
EIA/SEA training for public health authorities	☐	☐	☐	☐	☐
EIA/SEA training for health experts (for example, at universities)	☐	☐	☐	☐	☐
Joint trainings on health and EIA/SEA for health and environmental experts	☐	☐	☐	☐	☐
Joint pilot projects for health and EIA/SEA experts	☐	☐	☐	☐	☐
Availability of country/region/municipality specific training modules, tools and guidance documents	☐	☐	☐	☐	☐
Availability of sector/area specific training modules, tools and guidance documents	☐	☐	☐	☐	☐

Other supporting activities already existing or further needed (please specify) _____

21. Can you give a reference to an example where health has been meaningfully included in the EIA or SEA in your country/region/municipality?

Author/Editor _____

Title of the report _____

Year of publishing _____

Language of the report _____

Link - if publicly available _____

End of PART 1

Thank you for taking time to go through this part of the questionnaire

We would be grateful if you could give us some more of your time and answer 9 more detailed questions.

If you are willing to proceed with the questionnaire please go to the following pages.

If you have any questions in relation to the questionnaire please do not hesitate to contact us.

Julia Nowacki and Piedad Martín Olmedo

* Are you interested in proceeding with the questionnaire?

☐ Yes; ☐ No

PART 2A – HIA implementation in your country/subnational region/municipality

22. To your knowledge, which health determinants and/or related factors have been or are being considered for analysing the impacts on health when conducting HIA in your country/region/ municipality? Are determinants just described/notified or are impacts explicitly assessed*? (multiple answers possible)
[*Assess = to judge, determine, estimate, analyse, evaluate]

	only described	routinely assessed	sometimes assessed	rarely assessed	never assessed	N/A
A) General social, economic and political factors	☐	☐	☐	☐	☐	☐
B) Environmental factors	☐	☐	☐	☐	☐	☐
C) Built environment and housing	☐	☐	☐	☐	☐	☐
D) Health services	☐	☐	☐	☐	☐	☐
E) Other public services	☐	☐	☐	☐	☐	☐
F) Private services and local economy	☐	☐	☐	☐	☐	☐
G) Employment and livelihood	☐	☐	☐	☐	☐	☐
H) Family and community structure	☐	☐	☐	☐	☐	☐
I) Behavioural risk factors	☐	☐	☐	☐	☐	☐
J) Biological factors	☐	☐	☐	☐	☐	☐
K) The interrelationship between the above factors	☐	☐	☐	☐	☐	☐

☐ Other (please specify) _____

23. In your experience, are projects or HIA-like work which are not labelled or known as such conducted in your country/region/municipality? (for example, in the health promotion domain, or through consultative groups on policy development etc.)

☐ Yes; ☐ No; ☐ Don't know

If YES, can you give an example? _____

Responsible for the HIA like work/report (Author/Editor) _____

Type of the HIA like work (for example, health promotion, public consultation) _____

Title of the HIA like work/report _____

Language of the report _____

Link to the work or report, if publicly available _____

24. In your opinion, is there a need to further implement HIA in your country/region/municipality?

☐ Yes; ☐ No; ☐ Don't know

If YES, in your opinion, what would support the further implementation of HIA in your country/region/municipality?

Please list the 3 most important facilitators.

1. _____ 2. _____ 3. _____

25. In which stage(s) of an HIA have you been mainly involved? (multiple answers possible)

	routinely	sometimes	rarely	never	N/A
Screening	☐	☐	☐	☐	☐
Scoping	☐	☐	☐	☐	☐
Appraisal/risk assessment	☐	☐	☐	☐	☐
Reporting and recommendations	☐	☐	☐	☐	☐
Stakeholder engagement	☐	☐	☐	☐	☐
Monitoring	☐	☐	☐	☐	☐

26. Are you informed about the decision(s) taken and how the recommendations were taken into account*?
*As for example, required by Article 11 of the UNECE SEA Protocol, Article 9 of the EU EIA Directive 2014/52/EU and Article 9 of the EU SEA Directive 2001/42/EC.

☐ routinely; ☐ sometimes; ☐ rarely; ☐ never

27. Have you been involved in the evaluation of HIAs?

	routinely	sometimes	rarely	never	N/A
Process evaluation	☐	☐	☐	☐	☐
Impact evaluation	☐	☐	☐	☐	☐

Other (please specify) _____

Continue with the 3 more questions on health in EIA/SEA or finish the questionnaire

* Is health addressed in environmental assessments in your country/subnational region/municipality?

☐ YES, health is addressed in environmental assessments, I will continue with the following 3 questions.

☐ YES, health is addressed in environmental assessments, but I want to finish the questionnaire.

☐ NO, health is not addressed in environmental assessments, I will finish the questionnaire.

PART 2B – Health in EIA and SEA in your country/subnational region/municipality

28. To your knowledge, which health determinants and/or related factors have been or are being considered for analysing the impacts on health when conducting EIAs or SEAs in your country/region/ municipality? (Multiple answers per row and per column possible.)
(For detailed information on the different categories of the health determinants and related factors influencing health and well-being and on the different sectors/area please refer to the information box below.)

	1. Agriculture, forestry and fishery	2. Energy industry	3. Extractive industry	4. Other industry (see below)	5. Infrastructure projects
A) General social, economic and political factors	☐	☐	☐	☐	☐
B) Environmental factors	☐	☐	☐	☐	☐
C) Built environment and housing	☐	☐	☐	☐	☐
D) Health services	☐	☐	☐	☐	☐
E) Other public services	☐	☐	☐	☐	☐
F) Private services and local economy	☐	☐	☐	☐	☐
G) Employment and livelihood	☐	☐	☐	☐	☐
H) Family and community structure	☐	☐	☐	☐	☐
I) Behavioural risk factors	☐	☐	☐	☐	☐
J) Biological factors	☐	☐	☐	☐	☐
K) The interrelationship between the above factors	☐	☐	☐	☐	☐

☐ I don't know

Space for your comments _____

28. Continued - Which health determinants and/or related factors have been or are being considered for analysing the impacts on health when conducting EIAs or SEAs in your country/region/municipality? (Multiple answers per row and per column possible.)
(For detailed information on the different categories of the health determinants and related factors influencing health and well-being and on the different sectors/area please refer to the information box below.)

	6. Tele-communi-cations	7. Tourism and leisure	8. Waste manage-ment	9. Water manage-ment	10. Sectoral policies
A) General social, economic and political factors	☐	☐	☐	☐	☐
B) Environmental factors	☐	☐	☐	☐	☐
C) Built environment and housing	☐	☐	☐	☐	☐
D) Health services	☐	☐	☐	☐	☐
E) Other public services	☐	☐	☐	☐	☐
F) Private services and local economy	☐	☐	☐	☐	☐
G) Employment and livelihood	☐	☐	☐	☐	☐
H) Family and community structure	☐	☐	☐	☐	☐
I) Behavioural risk factors	☐	☐	☐	☐	☐
J) Biological factors	☐	☐	☐	☐	☐
K) The interrelationship between the above factors	☐	☐	☐	☐	☐

☐ I don't know

Space for your comments _____

29. In your opinion, is there a need to further strengthen the health assessment within environmental assessments in your country/region/municipality?

☐ Yes; ☐ No; ☐ Don't know

If YES, what do you think would support the further integration of the assessment of health impacts within environmental assessments in your country/region/municipality?

Please list the 3 most important facilitators.

1. _____ 2. _____ 3. _____

30. In your opinion, what would hinder the further integration of the assessment of health impacts within environmental assessments in your country/region/municipality?

Please list the 3 most important barriers.

1. _____ 2. _____ 3. _____

Your comments on the questionnaire and further contact to interested persons in the questionnaire

Could you name a colleague who might be interested in participating in this survey and whom we could contact?

Last Name, First Name _____
Affiliation/Organization _____
City/Town _____
Country _____
Email Address _____
Phone Number _____
Do you have any further comments or information for us? _____

Thank you!

Thank you once more for taking your time to go through our questionnaire.

We highly appreciate your efforts and would be most happy to collaborate with you further on these important issues.

If you have any questions in relation to the questionnaire please do not hesitate to contact us!

Best regards

Julia Nowacki and Piedad Martín Olmedo

Information Boxes

Information Box: Health Impact Assessment (HIA)

Based on the Gothenburg definition, HIA can be understood as a combination of quantitative and qualitative procedures, methods and tools by which a policy, plan, programme or project may be judged prospectively as to its potential future positive or negative effects on the health of a population, and the distribution of those effects within the population.

Information Box: Environmental Assessments

Under environmental assessment (EAs) we understand a process and a tool for evaluating the effects of proposed policies, plans, programmes or projects on natural resources, social, health, cultural and economic conditions and the institutional environment in which decisions are made.

We especially want to focus on those EAs that are prepared under the regional, national or international legislation transposing for example, the UNECE Convention on Environmental Impact Assessment (EIA) in a transboundary context (Espoo Convention) and the UNECE Protocol on Strategic Environmental Assessments (SEA) to the Espoo Convention (SEA Protocol), the EU Directive 2014/52/EU on the assessment of the effects of certain public and private projects on the environment (EU EIA Directive) and the EU Directive 2001/42/EC on the assessment of effects of certain plans and programmes on the environment (EU SEA Directive).

Information Box: Policy - Strategy – Plan – Programme – Project

Policy – A policy can be defined as an agreement or consensus on a range of issues, goals and objectives to be addressed.[3] For example, "Saving Lives: Our Healthier Nation" can be seen as a national health policy aimed at improving the health of the population of England, reducing health inequalities and setting objectives and targets which can be used to monitor progress towards the policy's overall goal or aims.[1]

Strategy – Broad lines of action to achieve the goals and targets, including: identifying suitable points of intervention; ways of ensuring involvement of relevant partners; a range of political, social, economic, managerial and technical factors; constraints and how to deal with them.[3]

Plan – A plan typically describes the vision and goals of a community or a problem that must be solved, includes a systematic synthesis of available information to analyze the problem, and identifies future actions that must be taken and future investments that must be made to address the stated problem and achieve the desired vision. Plans are prepared and implemented by all levels of government but are especially common at local government levels. Plans include general or comprehensive plans, land-use plans, economic development plans, and transportation plans. Plans that are commonly subjected to health impact assessment include plans for land use, infrastructure, and natural resource management.[2]

Programme – The term programme usually refers to a group of activities which are designed to be implemented in order to reach policy objectives.[4] For example, many Single Regeneration Budget programmes and New Deal for Communities initiatives have a range of themes within their programmes – often including health, community safety (crime), education, employment and housing – and within these themes are a number of specific projects which, together, make up the overall programme.[1]

Project – A project is usually a discrete piece of work addressing a single population group or health determinant, usually with a preset time limit.[1]

Sources:

[1] WHO (2015). HIA. Glossary of terms used. www.who.int/hia/about/glos/en/index1.html;
[2] Committee on HIA (2011). Improving Health in the United States. The Role of HIA. Washington: National Research Council of the National Academies;
[3] Ritsatakis et al., e (2000). Exploring health policy development in Europe. European series, No.86. Copenhagen: WHO Regional Office for Europe;
[4] WHO (1984). Glossary of Terms used in the "Health for All" Series No.1-8. Health for All Series, No.9. Geneva: WHO

Information Box: Areas/sectors with HIA activities

a) Agriculture, forestry and fishery (for example, intensive livestock installations; deforestation; intensive fish farming)

b) Energy industry (for example, refineries; thermal, nuclear power stations; storage of petroleum; power lines)

c) Extractive industry (for example, open-cast mining, quarries; underground mining; deep drilling; oil, natural gas extraction installations)

d) Other industry (for example, **chemical industry** - pesticides, pharmaceutical; **food industry** - packaging and canning, brewing and malting; **mineral industry** - coke ovens, cement, asbestos, glass, ceramic products; **production and processing of metals** - production of pig iron or steel, manufacture of motor vehicles, shipyards, swaging by explosives; **rubber industry** - elastomer-based products; **textile, leather, wood and paper industry** - paper and board production, dyeing of fibres or textiles)

e) Infrastructure projects (for example, coastal works to combat erosion, dams; industrial estate development; pipelines - oil, gas, CO2 transport, chemicals; spatial planning – town and country or land use planning; transport - for example, motorways, express ways, railways, tramways, waterways, airports, harbours; urban development including shopping centres and car parks)

f) Telecommunications (for example, masts and base stations installations)

g) Tourism and leisure (for example, ski runs, marinas, holiday villages, caravan sites, theme parks)

h) Waste management (for example, disposal, incineration, waste water treatment

i) Water management (for example, groundwater abstraction, works for transfer of water resources; long distance aqueducts)

j) Sectoral policies (education sector reforms, employment/business development strategies, finance sector/taxation policies, health sector reforms, poverty reduction strategies, public sector reforms/decentralization, trade policies)

(Source: based on Annex I and II of the EU EIA Directive 2014/52/EU, Paragraph (10) and (11) of the EU SEA Directive 2001/92/EC, Appendix I of the UNECE Espoo Convention on EIA in a Transboundary Context and Annex I and II of the UNECE Kiev Protocol on SEA to the Espoo Convention.)

Information Box: Categories of health determinants and factors influencing health and well-being

A) General social, economic and political factors (macro level) (for example, discrimination/racism; economic, social, environmental and health trends; freedom of speech and press; general inequalities; local and national priorities, policies, programmes and projects; political participation; poverty; social exclusion)

B) Environmental factors (for example, indoor and outdoor air quality; biodiversity; natural spaces and habitats; climate change; disease vectors; floods, wildfire, and landslide hazards; food resources and safety; light pollution; noise pollution; smell/odours; soil contamination; transportation hazards; vibrations; waste disposal; water resources and safety)

C) Built environment and housing (for example, sites of cultural significance – sacred or historic; open and green space, parks/landscape; places; streets and routes; housing supply, affordability, and accessibility; housing size and level of crowding; housing safety; neighbourhood infrastructure and liveability; residential segregation)

D) Health services (for example, access to, quality of and cost primary community and secondary health care – especially for vulnerable groups; access to hospitals; emergency response)

E) Other public services and local economy (for example, child care services – access and quality; educational – access and quality; police – security and emergency response; public transportation – access and quality; social services – access and quality; waste management systems)

F) Private services – local economy factors (for example, financial institutions; retail food resources; shopping – access and quality)

G) Employment and livelihood factors (for example, un-/employment and job security; income and employment benefits; workplace occupational hazards; workplace rewards and control)

H) Family and community structure (for example, crime and violence; community centres; cultural and spiritual participation; family structure and relationships; health inequalities (for example, in different neighbourhoods); health of minorities and vulnerable groups/ impacts on different social groups; social support (neighbourliness, social networks and isolation); voluntary group participation)

I) Behavioural risk factors (for example, alcohol consumption; diet; leisure and recreational activity; physical activity/inactivity; smoking; substance abuse)

J) Biological factors (for example, age; gender; existing health conditions and disabilities in the community)

(Source: adjusted from Barton/Grant, 2006; Bhatia, 2011; Human Impact Partners, 2011; Public Health Advisory Committee, 2005; WHO Regional Office for Europe, 2005; WHO Regional Office for Europe, 2014)

Information Box: Assessment phases

Screening – determining if an HIA is warranted/ required.

Scoping – determining which impacts will be considered and the plan for the HIA.

Appraisal/risk assessment – determining the magnitude, nature, extent and likelihood of potential health impacts.

Reporting and recommendations – identifying appropriate actions to avoid or mitigate negative effects or reinforce positive effects, making explicit the trade-offs to be made in decision-making and formulating evidence-informed recommendations.

Stakeholder engagement – engagement of the affected population for example, through public consultation, as well as consultation with the relevant authorities.

Monitoring – defining health indicators; monitoring and management of health impacts.

Information Box: Evaluation

Process evaluation – for example, What went well during the assessment? What went wrong? Where the most relevant health impacts assessed? How did the different assessment teams work together? Were the "right" stakeholders consulted? Was the assessment process efficient? etc.

Impact evaluation – for example, did the EIA/SEA component influence the decision-making process? Were the health impacts considered in the recommendations? etc.

Annex 15 Final remarks

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The World Health Organization (WHO) is a specialized agency of the United Nations created in 1948 with the primary responsibility for international health matters and public health. The WHO Regional Office for Europe is one of six regional offices throughout the world, each with its own programme geared to the particular health conditions of the countries it serves.

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This research project examines the integration of health into environmental assessment such as EIA and SEA and analyses the challenges and opportunities that EIA and SEA offer to further address health issues. The overall objective of the research was to identify the main methods, tools, institutional and procedural factors that facilitate the integration of environmental health aspects into environmental assessments such as SEA. For this five research questions were formulated regarding: 1) the environmental health aspects mainly considered in environmental assessments and specifically in SEAs; 2) the way of how these aspects are considered; 3) if and how these aspects are considered in guidelines on SEA; 4) the main barriers and facilitators for the integration of health in environmental assessments; and 5) the kind of capacity building activities needed to further support the integration of assessing health impacts into environmental assessments.

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