HERA

Health Environment Research Agenda for Europe

EU Research agenda for the Environment, Climate & Health 2020-2030

ANNEX 1

Interim document

INDEX

Summary of Stakeholder Consultation and Engagement Processes in HERA WP3

1. INTRODUCTION

The aim of the HERA Work Package 3 is to consult and engage national, regional and international professional stakeholders into the forming of the research agenda. The approach of stakeholder consultation builds on collecting, reflecting, interpreting and elaborating the relevant key topics in policy and practice in a stakeholder driven process. In this approach, we include actors from the environment, climate and health nexus, working in policy and practice, acknowledging their essential role as end users, policy makers, and knowledge producers throughout the process of identifying key topics that need scientific support. The focus is on key topics related to health, climate and environment issues recognised in the Ostrava declaration including also perspectives of One Health, planetary health, EcoHealth and the health benefits of nature.

A systemic multi-actor approach is applied, and it includes professional stakeholders from different sectors (policy, practice, including NGO's and private sector) and disciplines (health, toxicology, epidemiology, climate change, ecology, sociology, etc.). This allows for cross-fertilisation between sectors and disciplines, however requiring tailored coordination. We built upon task 2.1 on identifying relevant stakeholders and building this cross-cutting stakeholder community. Participation of representatives of countries with less developed environment and health policies is encouraged by organising stakeholder workshops in all regions of Europe, by local partners, to ensure easy access for all, reduce travel time, and to optimize connection with the regional stakeholder community.

1.1. Methodology of Stakeholder Consultation

A three-step approach is applied for stakeholder consultation (**Figure 1**). First, topics are identified together with the Consultation Group representing hubs in existing networks in Europe that are involved in the environment, climate change and health nexus, such as EU level institutions and conventions, NGO's and UN authorities. An overview of key topics already identified in current policy programs governing environment, climate and health is provided as a starting point for this workshop.

In the second step, this first inventory of key topics is enriched in a multi-actor stakeholder consultation in countries and regions in Europe in the form of regional workshops. These workshops invite stakeholders representing national and regional level institutions, NGO's and other organisations and industries from different fields of expertise to further discuss important policy needs. A survey conducted for both national and European level stakeholders also clarifies the views of the stakeholder community on relevant policy and scientific support needs in the nexus. By applying this variety of consultation methods, an effective model for a multiscalar information production system is built upon to identify the key topics that require scientific support.

In the third and final step, these inputs are integrated and an overview of key topics that require scientific support from environment, climate and health research is synthesised. The Consultation Group is invited to reflect on this synthesis, and after processing their final inputs, we will deliver an overview of stakeholder driven key topics that need scientific support to coordination WP. We cooperate closely with other WP's on the agenda development and the identification of research gaps, as key topics in policy and practice and research gaps are related. During the project, we may encounter other activities that can be matched and shared.

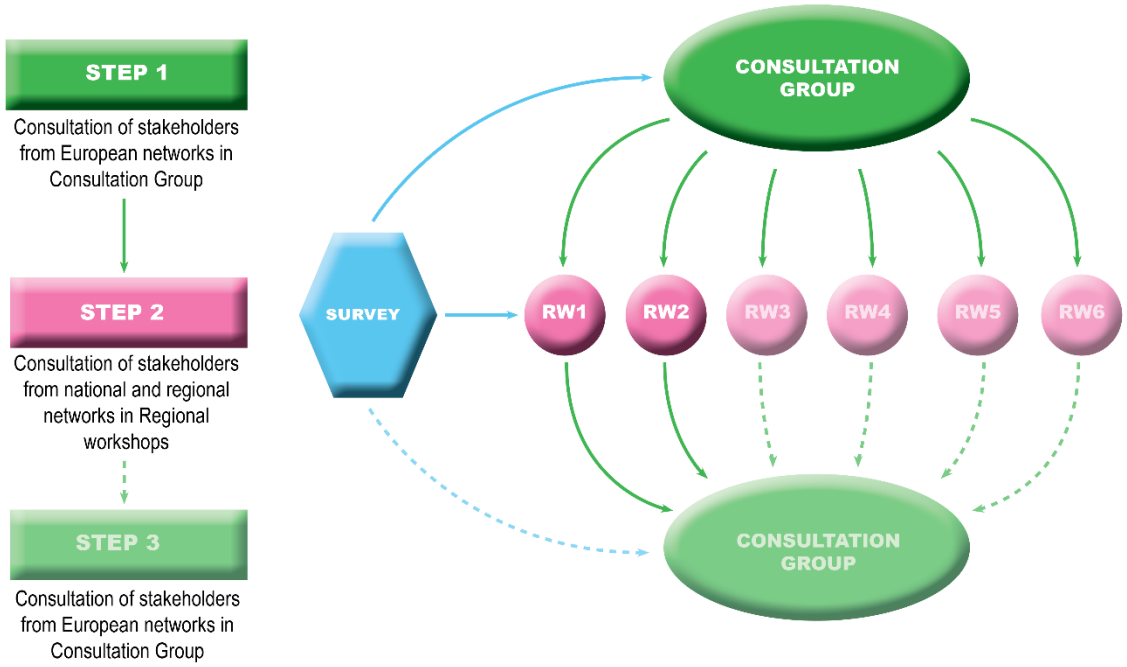

Figure 1. The three steps of stakeholder consultation highlighting the process so far.

Stakeholder consultation has not yet been finished. The first Consultation Group meeting was held in November 2019 in Brussels, and the first two Regional Workshops in December 2019 in Helsinki. The survey was opened, and invitations sent in September. The online questionnaire still remains open for responses and the data analysed here was gathered in October 2019. By then the survey had 355 responses. In the next steps, the other regional workshops will be organised during the spring of 2020, and the second Consultation Group meeting later this year. New responses to the survey will be analysed and added to the preliminary results after the initial closing time.

1.2 Summary of the Preliminary Results

The survey responses clarify which policy areas the respondents deem important in responding to the challenges in the nexus during the next 30 years. These are mainly environment and climate (rather than health) -related policy areas such as climate change, energy and agriculture. The need for scientific support in many of these areas is significant according to the responses. The most called for forms of scientific support are science-policy-society dialogue and applied research. The stakeholders also consider negative health impacts caused by global change more serious globally than in Europe, while opportunities in the nexus are also recognised. The response rate of the survey was 19,5% with the 355 respondents, of whom most work in a government agency or academia and identify their field of expertise as only environment or health. Only 19% of all respondents identified themselves "in" the nexus by stating any combination of environment, climate and health as their main fields.

The consultation group workshop identified policy needs and recommendations, such as coherent and justifiable policies. Some of the stakeholder survey results were considered as unexpected by the group members, for example the low importance given to biodiversity, public health and education policies. The consultation group felt there is a lack of research and evidence translating into policies and practice and a need for better and more creative science communication to public in order to build citizens' and stakeholders' trust in science and to ensure that scientific knowledge translates into practice. The groups recommendations for the future research include interdisciplinarity, identification of knowledge gaps, prioritisation of important research themes or topics in the nexus and a focus on creating opportunities and not just on the investigation of problems.

In the first regional workshop in Helsinki the participants discussed visions for the nexus, the important policies, strategies for achieving the vision, knowledge needs and the utilisation of existing knowledge. For the future vision the workshop emphasised four themes: reducing consumption and production, empowering people, making big business take more responsibility for health and environment issues and dealing urgently with loss of biodiversity. Equity was seen as an important key issue, and behavioural and social science research identified as key research gaps. It was also seen that the EU should take a stronger position in order to guide compliance and important to recognise that over demanding regulations actually do more harm than good.

2. SURVEY FOR EUROPEAN STAKEHOLDERS

The questionnaire was directed to experts and stakeholders in the field of environment, climate and health, and aims to clarify these persons' views on what are the policy priorities in this field in the future and what kind of scientific research is needed to meet the requirements of these policy needs in Europe. These national and EU level stakeholders' inputs will help in creating an inclusive research agenda for the years 2020-2030. The questionnaire was an online survey created with Webropol survey making tool and shared with a link to a selection of respondents. The survey will be presented in Sections A-D, first in regards of the structure and methodology, and then presenting the preliminary results and analysis of each section at a time.

2.1. The Structure, Methodology and Sending of the Survey

2.1.1 Section A: Threat and scenario related worries

Total of 11 questions, of which 9 have a- and b –sections

- that is, 18 a- and b –questions on a 5-level opinion scale (plus no opinion –option), all of these mandatory

- 2 open questions, not mandatory

In Section A of the survey the questions are presented in a form of statements. These are based on the UNEP (2019) *Global Environment Outlook 6* and OECD (2012) *Environmental Outlook to 2050* which both deal with possible scenarios for the future. These statements describe a scenario where no further policy steps have been taken between now and 2050, to show what might be the situation in 30 years' time, e.g. "1. Global mean temperature will be more than 2°C above pre-industrial levels in 2050". Each of these nine statements has a short additional information to acquaint the respondent to the theme, such as ""In 2016, the global mean temperature was about 1°C above pre-industrial levels". Other statements deal with biodiversity loss, increasing urbanisation, increasing water demand and stress, land degradation and global food demand, expanding chemicals industry, ocean pollution, acidifying and overexploitation and finally migration caused by environmental and climate-related hazards. These trends were not forecasts or predictions due to their uncertainties but can be used to estimate plausible futures.

The respondent is asked to evaluate these nine scenario examples based on how they see their possible negative health impacts in a- and b-sections which take into account both global and European specific levels of risks ("There will be severe health impacts caused by this trend…" a) "globally" b) "in Europe"). The answers are given in a five-level Likert -opinion matrix, where 1 is "totally disagree" and 5 is "totally agree". The sixth option is "No opinion". All of these questions are mandatory for the respondent to answer in order to continue the survey.

In this section the future scenarios derived from the aforementioned Outlook studies are used both as a way to gain insight to the stakeholders' views and worries, and an introduction into the topics being discussed. The scenario examples also clarify the time frame of the research agenda under development, that is, the upcoming 30 years from 2020 to 2050. Even as such scenarios cannot be discussed as other than just that, possible scenarios, the topics and related worries lead the respondent to consider the issues from many perspectives during the whole survey. Besides the introductory aspect, the results will show which "worries" are felt to be the greatest or most plausible and to have the most severe health impacts. This and the possible differences between global and European scale, will in themselves be interesting and show how the stakeholder community sees the interlinkages between mostly environmental risk scenarios and their health impacts. This will help provide more insight into the current state of the health, environment and climate nexus.

There are two open questions at the end of Section A (questions 10 and 11). In the first the respondent gets to specify and clarify which they think are the most severe health impacts in the environment, climate and health nexus in the next 30 years. The second open question asks possible opportunities in the nexus during the same period of time. Neither of these open questions is mandatory or requires the respondent to only refer to themes discussed in the nine scenario and threat related topics above. These two final questions of Section A allow the respondent to specify and open their interpretations of the challenges in the environment, health and climate nexus, but importantly also depict the possible opportunities related to and around the challenges. These opportunities may hypothetically offer some ideas for solutions, or realistically offer insight into the global change, perhaps in form social and societal responses to these complex challenges.

2.1.2 Section B: The most relevant policy areas

Total of 22 questions, of which all are limited multiple choice questions. Only 4 are shown to each respondent based on their previous choices.

- That is, 1 in part one of the B section, and 21 in the second part

- Only the first is mandatory

The second section aims to find the most important policy areas in the nexus. First, the respondent is asked to evaluate and prioritize the main policy areas relevant in solving the issues during the upcoming 30 years. The respondent has to choose 3 main policy areas out of 21. The list of policy areas is based in the organisation of the European Commission's Directorate-General Departments (DG).

Once the respondent has chosen the 3 DGs they value as the most critical, they move on to the second part of section B where they have to specify these policy areas by choosing the altogether 5 most relevant sub-policy areas from the three main policy areas they chose in the previous phase. Here the questions visible to each respondent are determined based on what they chose on the previous page; there are altogether 21 questions for sub-policy areas under

each of the 21 main policy areas, but each respondent is only shown only 3 questions for the main policy areas they had chosen.

The number of these available sub-policy areas differs for every main policy area, for example the main policy area "Research and innovation policies" only has 2 options for sub-policy areas (1 for each type of policy, respectively). "Environment" then again has altogether 12 sub-policy areas to choose from. Each sub-policy area question also has an "Other, what" –option with a mandatory open answer text box. The respondent is asked to choose 5 sub-policy areas under those 3 main policy areas the previously chose, but they are not required to pick one from each e.g. they are free to choose all 5 from under the same one or two main policy areas. All the main and sub-policy areas are listed in **Appendix 1**.

2.1.3 Section C: Scientific support for policy needs

Total of 237 questions of which, of which all are single choice questions. Only approx. 10 are shown to each respondent based on their previous choices.

2 questions for each 108 sub-policy areas (including "other, what"-options of section B) and 21 open field questios (that is, one for each) to fill in the "other, what" choice again if previously selected.

All are mandatory

The third section of the survey asks the respondent to estimate if the policy areas they selected in the previous section need scientific support in order to succeed to respond to the issues in the environment, climate and health nexus during the upcoming decades. This is done with two questions which are answered separately for each 5 sub-policy areas selected in section B. The logic thus works in a similar way as in section B: only questions, which relate to the choices made on the previous page, are shown for each respondent. The first question asks the respondent to evaluate how much scientific support is needed in the field of the first chosen sub-policy area. The opinion is given on a scale from 1 (does not need scientific support) to 5 (needs significant scientific support). Sixth option is "No opinion".

In the second question the respondent is asked to specify what kind of scientific support would be most beneficial for the sub-policy area in question. The 6 options are (1) Basic research, (2) Applied research, (3) Science dissemination and knowledge transfer, (4), Science-policy dialogue, (5) Science-policy-society dialogue, and (6) Other, what?. These questions are repeated for each chosen sub-policy area. These scientific support types were chosen to represent different and most used practices in both research and support for policymaking. In the first version of the survey pre-run by the HERA consortium members, it was agreed that the previous option 3 "Knowledge brokering", may not be a familiar concept to all potential respondents. Hence, the wording was changed to knowledge *transfer* and the extra description "science dissemination" added.

The purpose of this section is to make the respondents further analyse and argue why they chose the policy areas they did, and recognising these areas as important for the future they get to open their views on the level of need and type of scientific support these important policy areas require to be able to answer the demands of the upcoming 30 years. The results will help us in understanding not just stakeholders' views on important policies and prominent knowledge gaps, but also their understanding of possible solutions. Each policy area may require different levels and kinds of scientific support, according to the respondents.

2.1.4 Section D: Background information

Total of 11 questions, of which 9 single choice questions and 2 open

- 6-7 mandatory, excluding e.g. the two open questions.

For the very basic background questions the respondents are asked to tell their gender (female, male or other), and the country where they work (drop selection with of all EU countries). If the respondent works in other than a EU country, they are asked to fill in which one. Next the stakeholders are asked to specify their institutional background and position. The choices given are (1) Academia, (2) Authority, (3) Government agency, (4) Private sector, (5) Civil society, and for position (1) Manager, (2) Professional, (3) Technician or Associate Professional. Both questions include an open "Other, what", option as well.

To keep the stakeholder sample clearly separate and independent of the forming agenda, the respondent is asked whether they are involved in the HERA consortium, with options (1) Yes, (2) No, (3) No, but my institute is, and (4) I don't know. A question concerning the respondents' self-identified area of expertise in the environment, climate and health nexus was added to further clarify the actuality and manifestation of said nexus in the EU stakeholder community, and to later analyse possible differences in the results and responses based on differing fields of expertise. There are two questions concerning the area of expertise, of which first is a multi-selection question with options (1) Environment, (2) Climate, (3) Health, and (4) Other, what? The respondent is free to select either just one of these fields, or combine two, or even all three. If more than one area gets selected by a significant number of respondents, conclusions could be drawn about the professional self-identification of stakeholders into the nexus. The respondents are free to further specify their area of expertise in an open text box if they wish, but this is not mandatory.

At the bottom of Section D, the respondent's interest to HERA project is asked with two non-mandatory questions, first "Would you like to be further informed about the HERA project and the development of the new EU mid-term research agenda?" and second "Would you like to participate in a regional workshop that further deliberates the key topics in policy and practice in the environment, climate and health nexus requiring scientific support?". Both can be answered simply with "Yes" or "No", and "Maybe" in the second question concerning interest in regional workshops. Answering "Yes" to the first question, the respondent will later receive a newsletter including information about the HERA project and the research agenda development in general. If the respondent indicates interest towards attending a regional

workshop (further aspects of the survey's connection to the workshops below), their attendance will be considered by corresponding region's workshop organisers.

If the respondent replies "Yes", or "Maybe" to either of these questions, they are required to leave their contact information (full name and e-mail address). Should the respondent reply "No" to both questions, the contact information field will not be shown as mandatory. Lastly, the respondents are free to leave their comments and feedback on the survey in general or share their further thoughts on the subjects discussed through it. This, however, is not mandatory in order to be able to submit the finished survey.

2.1.5 Sending of the Survey and Managing the Sample

The respondents of the survey are mainly from those European Union member states which are part of the HERA consortium. Other EU countries are represented as well, and so is a small selection of non-European countries. Each partner of the HERA consortium identified a list of important national stakeholder organisations and individual experts in the field of climate, environment and health, and an invitation to the survey was sent to each list of potential respondents in each country's national language by the partner organisation in each state. A separate invitation was also sent to those experts who work in the EU level organisations (e.g. COREPER). Another list was formed to cover a smaller group of stakeholders in those EU member states not involved in the HERA project per se. Lastly, for a shorter duration, a public link to the survey was published on Twitter, to reach those possible stakeholders not identified before but interested in replying. Most of the responses from countries outside of Europe came in through this public link.

Six different links to the survey were created. The aim of these separate links was to better keep track of the sample in the analysis phase, but it was also a choice made for technical reasons to ease both the sending of the invitations, as well as the follow up on the accumulation of the answers while the survey was open. Further statistics about the respondents (such as response rate, gender and area distribution, as well as self-described expertise) will be explored below in results and analysis. The respondent categories (that is, groups to whom different links were sent and thus the responses kept separate), and the types of survey invitations for each are:

Finnish stakeholders

Personal invitation to the survey sent by email via Webropol.

Sent to: 250 / Responses: 25

The EU level personnel

Personal invitation to the survey sent by email via Webropol.

Sent to: 110 / Responses: 12

Other Finnish and EU stakeholders

A link to be shared onwards to colleagues by the recipients of the invitation in groups 1 and 2.

Responses: 25

National stakeholders of the HERA partner countries

An invitation and link sent by each partner to their list of national stakeholders with a cover letter in their national language. This link could also be shared to colleagues.

Sent to: 835 / Responses: 223

Stakeholders in other EU countries

An invitation and link sent by SYKE to stakeholders identified in such EU member states which are not in the HERA consortium. This link could also be shared to colleagues.

Sent to: 186 / Responses: 9

Twitter

A public link to the survey published in the HERA Twitter account and shared by partners and others.

Responses: 61

2.2. Preliminary Results and Limitations of the Survey

2.2.1 Results from Section A: Stakeholders consider negative health impacts caused by global change more serious globally than in Europe

In the first phase of analysis the responses were divided between a) and b) sections to compare the perceived threat on global and European level in each presented scenario (**Figure 2**). Generally, stakeholders in Europe consider global trends such as climate change, species loss and pollution and chemical exposures severely threatening for human health both globally and in Europe. However, negative health impacts are perceived to be more severe globally than in European scale, especially in the question of water demand.

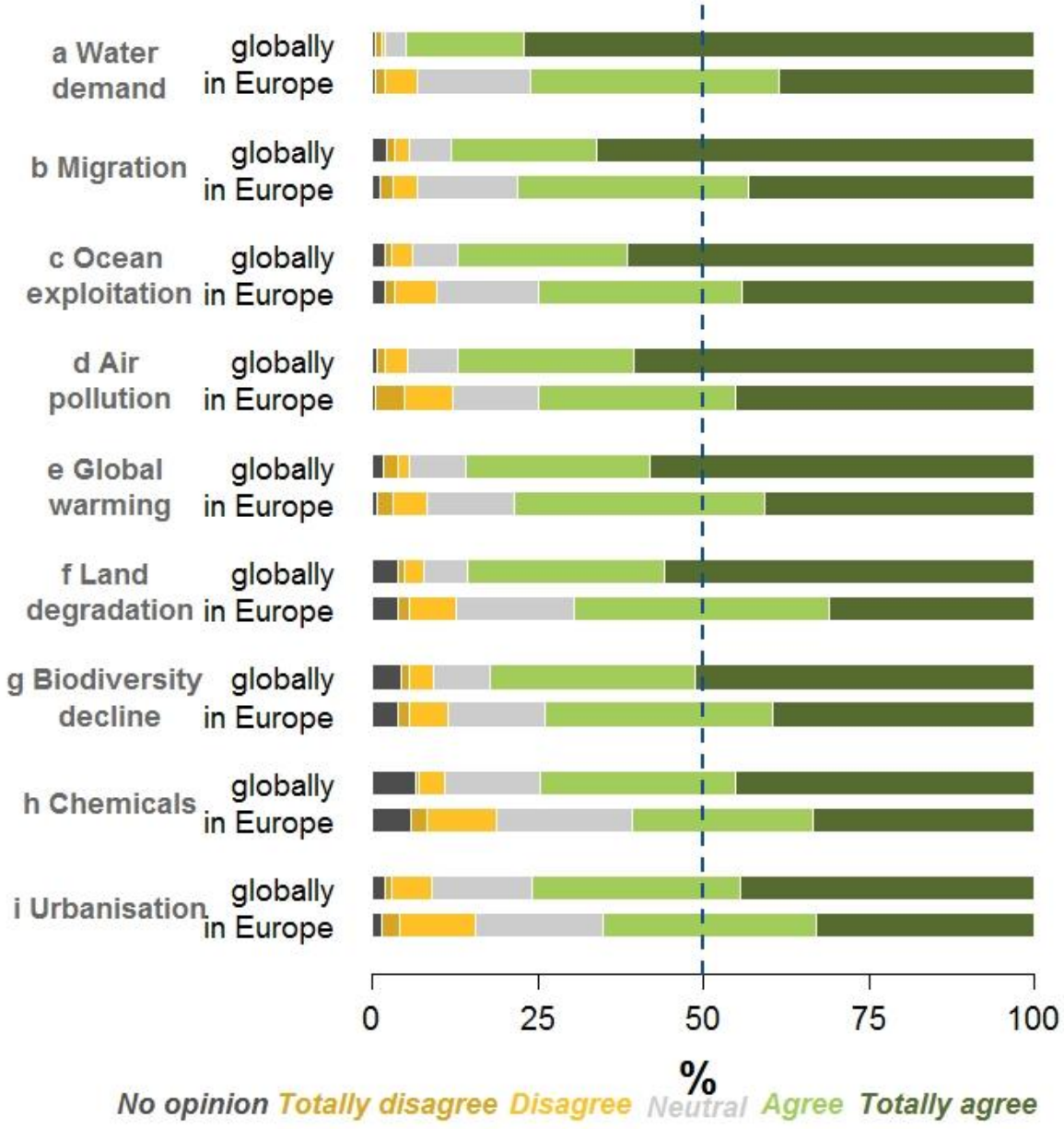

Figure 2. Severity of the negative health impacts of global trends in globally vs. in Europe**.** *Worries are organized based on global estimates. Wording of the statements in the survey: **a**. Global total water demand will increase by 55 % between 2000 and 2050, and severe water stress will impact the living areas of more than 3.9 billion people. **b**. Environmental and climate-related hazards lead to migration and forced displacement. **c.** Oceans will continue to be polluted, acidified and overexploited. **d**. Air pollution emissions will increase significantly due to economic activity and energy demand, which will increase by 50-70% between 2015 and 2050. **e**. Global mean temperature will be more than 2°C above pre-industrial levels in 2050. **f.** Increasing land degradation is a significant risk for food security while the global food demand is on rise. As a result of land-use changes, overgrazing and unsustainable land management, loss of soil organic carbon will increase by 15 % from the levels of 2010 by 2050. **g.** Biodiversity will continue to decline severely, and the Global Mean Species Abundance loss will be 43% in 2050. **h**. World chemicals industry will grow in sales by around 3% annually between 2010 and 2050. **i.** The level of urbanisation will continue to rise. In 2050, almost 70 % of the world population will be living in urban areas.*

In the next phase, the responses were categorised into four groups based on the European country the respondent is working in. These countries were combined into regions, which are Nordic and British Islands (n = 71), Southern Europe (n = 63), Western and Central Europe (n = 108), and Eastern and Central Europe and Baltic (n = 103). Countries outside of Europe were

excluded from analysis at this point (n = 10). The replies of these regional groups were compared with each other.

In general, the results oh Section A show, that stakeholders in all regions are worried about the health-impacts of the presented global trends, but Western Europeans tend to consider them more serious than Eastern Europeans. For example, in answering the first question about the negative health impacts of the rising global mean temperature, stakeholders from different regions agree that global warming poses serious risks for human health, both globally and in Europe. In this case, West Europeans tend to estimate global risks of global warming more serious than East Europeans. An example of a worry that is perceived greater in Eastern and South Europe are the health impacts related to biodiversity decline, especially on global level.

The open questions at the end of Section A were analysedd with NVivo qualitative data analysis software. The approach was data-based meaning that the answers were classified into different categories based on what came up from the data. Therefore the categories were not defined before the analysis. In NVivo this meant coding answers and their parts into nodes. It was possible to code same answers into several different nodes. 84% of the respondents answered in the question 10 and 73% of the respondents in the question 11. Altogether there were 559 answers. There was variability between the length of the answers; some of the respondents stated many factors while some of them only one.

In question 10, the responses mainly consisted of different drivers (n = 162) and impacts (n = 796) that were seen as threats There were remarkably greater amount of nodes in impacts, than in drivers, and some respondents also expressed advisable acts, which were coded into responses (n = 17) (shown as gray in **Figure 3**).

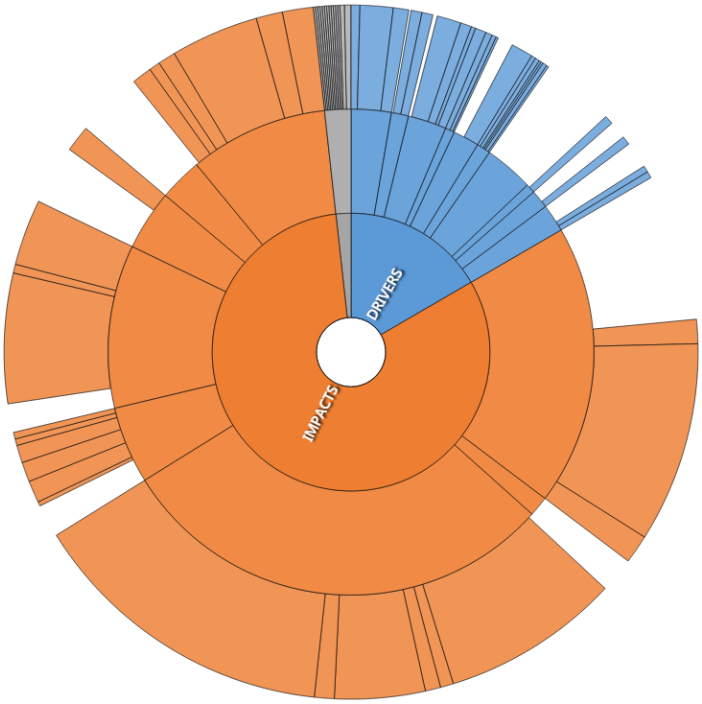

Figure 3. Threats in question 10: drivers, impacts and responses.

Drivers describe factors that affect or even cause impacts. They were divided into ten different categories, of which most included subcategories. Based on this categorizing, none of the drivers stood clearly out as a key topic, but the three most mentioned were overpopulation (32), anthropocentrism (26) and energy issues (25). Overly large and growing human population was seen as the biggest driver, and in the answers referring to anthropocentrism, the respondents expressed their critique towards human nature and destructive acts made by humans, mainly referring to overexploitation of resources. Use of fossil fuels was most often mentioned in the answers concerning energy issues. Eight other driver categories were urbanization, industry, poor policy development, complexity of issues, other, food production and poor infrastructure.

Impacts then, were categorized into eight groups. Environmental degradation (288) concerned the respondents most, including its subcategories such as pollution (141) and biodiversity loss (81). Climate change (182) was second most cited worry in this section with extreme weather events (91) being the largest subcategory. Health risks (106) and water insecurity (90) were also mentioned in many responses. The other four impact categories were food insecurity, migration, social injustice and conflicts.

The question 11 dealt with possible opportunities. There were three types of responses for this question: fields where the respondent described a need for action (n = 335), suggested means for dealing with the described problems (n = 222) and other descriptions of opportunities (n = 29). There were eight subcategories within "areas". The most referred fields or areas for opportunity was environmental management (119), which included further subcategories such as pollution management (32) and built environment (31). Energy production (86) was also seen as a clear opportunity, especially renewable energy (36). Also technology, economic system, science, food system, health and wellbeing and education were named as possible fields of positive development. Respondents also saw opportunities in possible future steps and suggested means for proceeding in the nexus during the next 30 years. Most opportunities were seen in climate action (34), policies (33) and behavior and lifestyle (31). Other means for realizing the opportunities were transition of society, integrated approach, co-operation, raise of awareness, innovations, new models and tools, local acts and birth control.

2.2.2 Results from Section B: Protection of human health demands environmental and energy politics, not necessary health politics

Based on the main policy-areas picked in part 1 of Section B, stakeholders propose that the most important policy areas for addressing adverse health-effect of global change are climate change, energy, agriculture and environment politics (**Figure 4**). The category "other" includes policy areas which received less than 40 "votes". Inside these main-policy areas there were 82 sub-policy areas, out of which the most chosen were sustainable agriculture (7%) (under

agriculture and rural development), renewable energies (7%) (under energy), climate change mitigation (6%) and climate change adaptation (5%) (both under climate change) (**Figure 5**). All other sub-policy areas received less than 5% of all responses, and almost half received less than 2%.

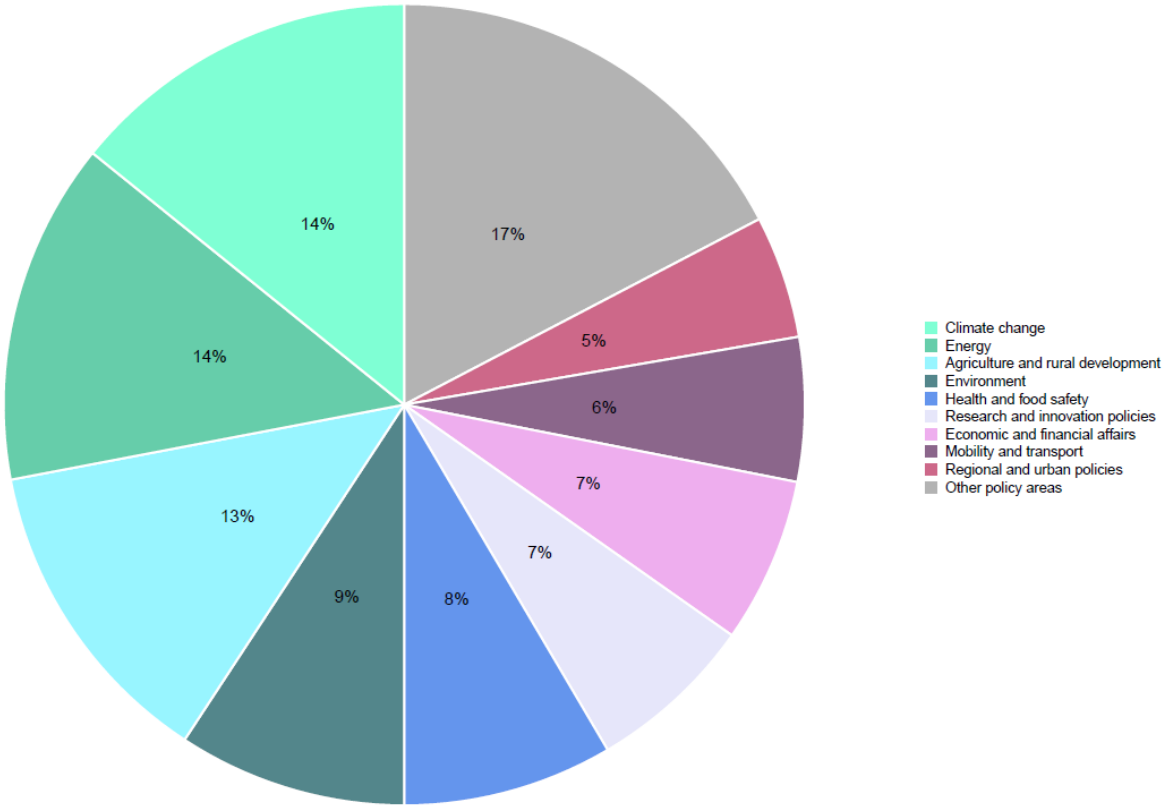

Figure 4. Most important policy areas that can respond to the issues in the environment, climate and health nexus during the upcoming 30 years.

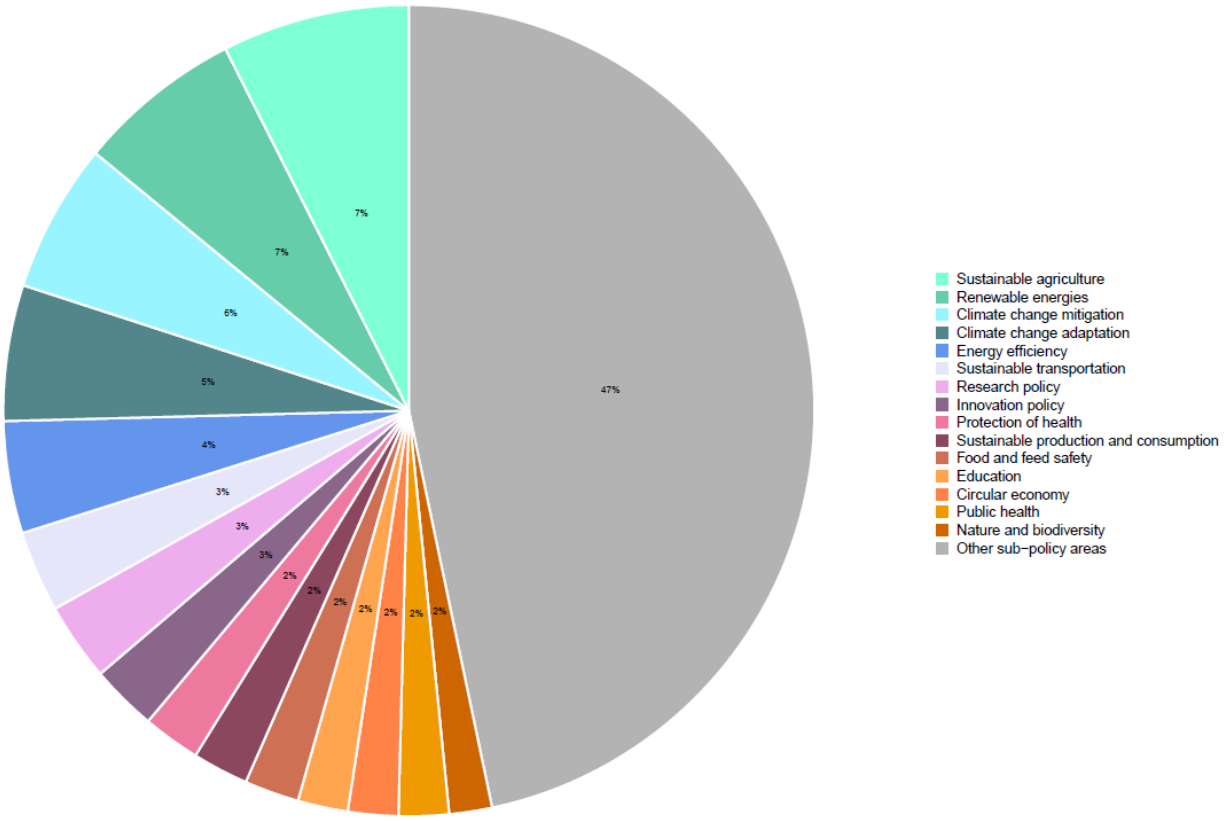

Figure 5. Most important specific sub-policy areas under the main policy areas chosen previously.

2.2.3 Results from Section C: Stakeholders consider need for further scientific support significant

Stakeholders consider need for further scientific support considerable in all fields. Especially Science-policy-society dialogue was considered the most important and needed-for (**Figure 6**) and applicable in many different fields (**Figure 7**). Applied research was also highly important, especially considering Renewable energies and Innovation policy.

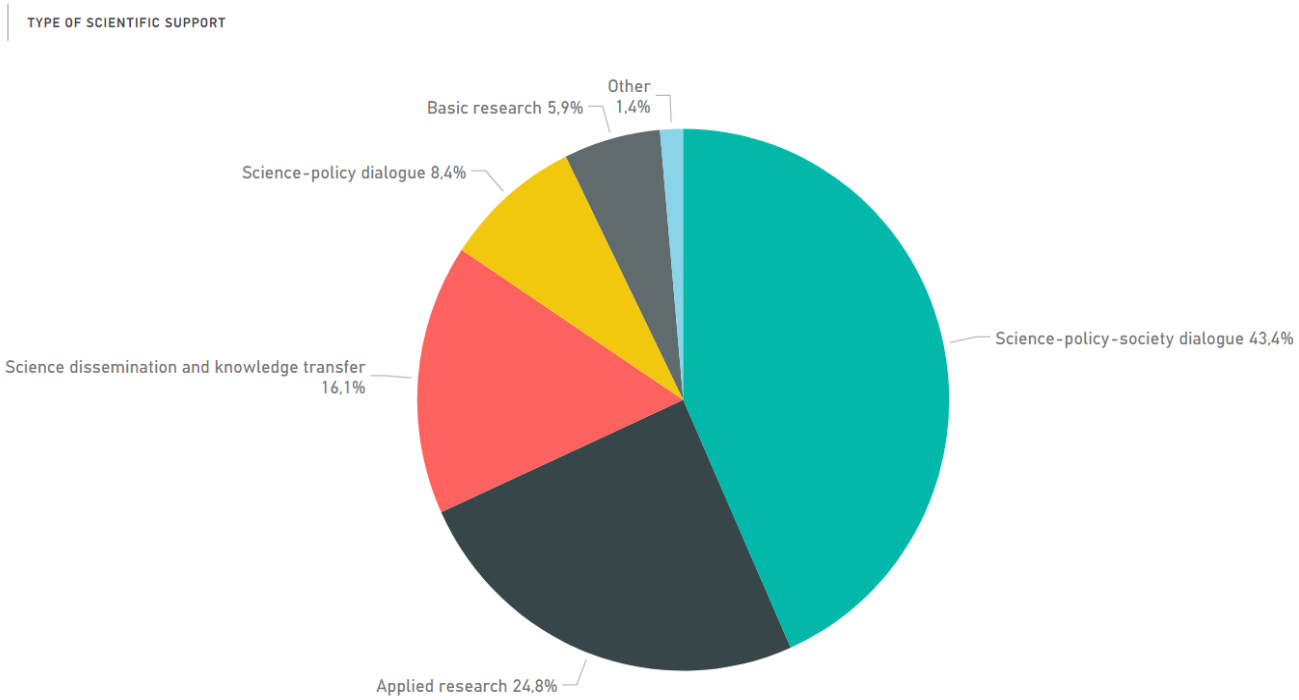

Figure 6. Most called-for types of scientific support.

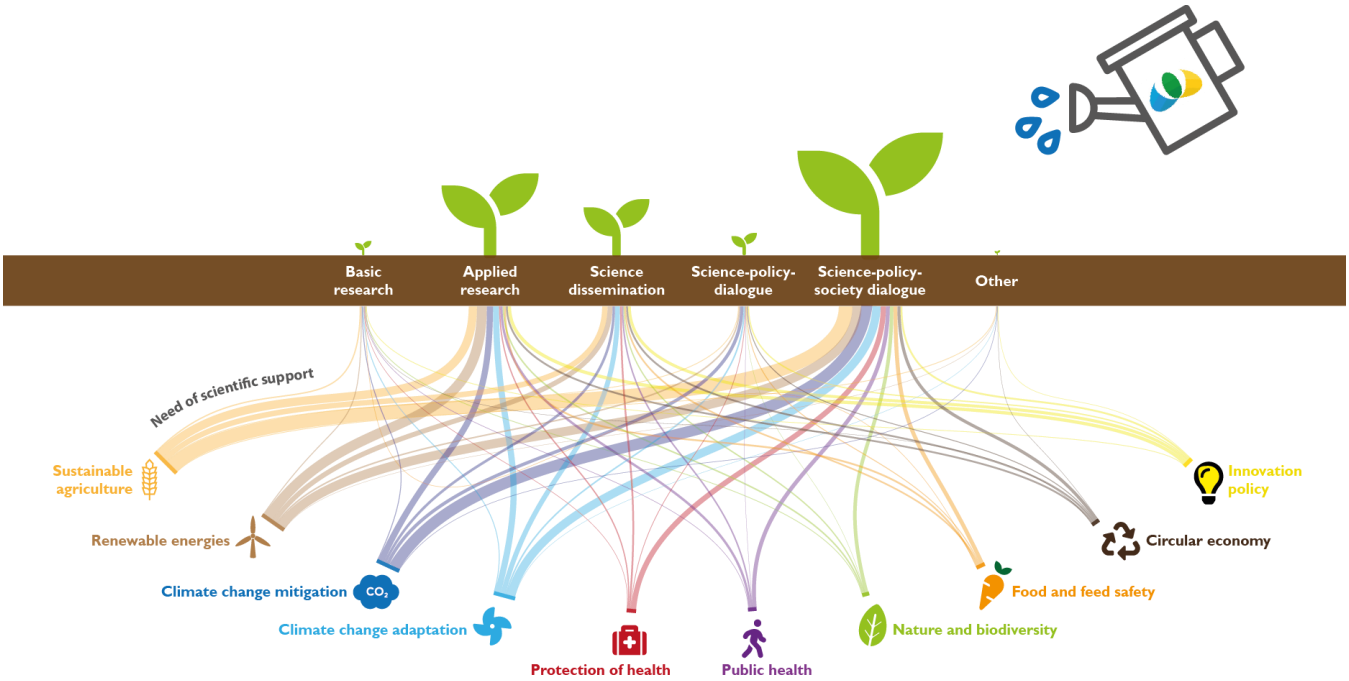

Figure 7. Flows of scientific support needed for different policy areas.

In a second phase of analysis, the stakeholders were divided to three groups based on their self-evaluation of expertise. Environmental specialists (n = 194), Health specialists (n = 99) and Other (n = 62). Health specialists included people who mentioned to be specialized both environment or climate and health (n = 3). In general, differences in worries are small between expertise areas, especially concerning global risks. However, health specialists and other tend to see risks somewhat worst in Europe that environment specialists.

2.2.4. Results from Section D: Respondent statistics

These preliminary results are formed from the data gathered in October 2019. It is worth noting the questionnaire is still open at the time of writing, and the final data and results will be analysed later. The data presented here is from the first month of the survey.

Altogether there were 355 responses to the survey during the first month. A direct invitation to the survey was sent to 1 381 potential stakeholders, and as 269 people responded through these individual links the actual response rate was 19,5%. This is considering only the links where a certain amount of invitation to the survey were sent. that is, excluding the open link for other Finnish and European stakeholders, as well as the Twitter link, as we cannot be certain how many persons these links "tried" to contact.

Most responses came from the regions Western and Central Europe (n = 108) and Eastern and Central Europe and Baltic (n = 103) (**Figure 8**). The five countries with most respondents were Belgium (n = 43), Greece (n = 36), Finland (n = 33), Poland (n = 31) and Ireland (n = 29). Other countries include single responses from European states outside of the EU, as well as African countries.

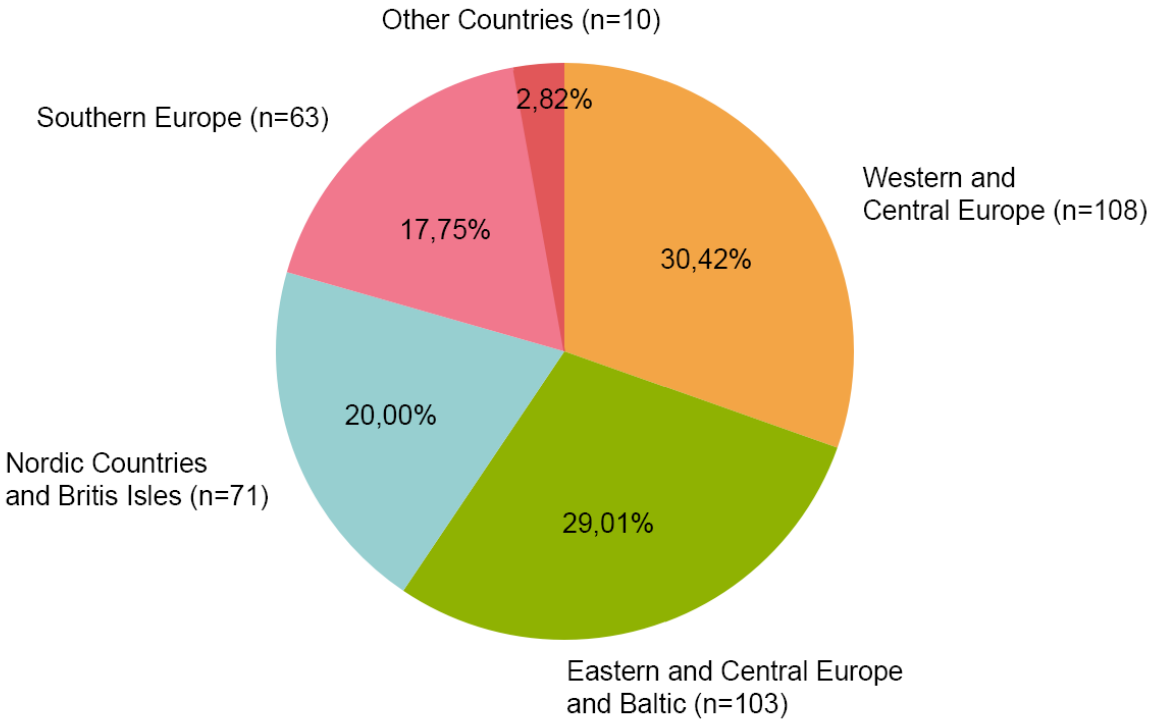

Figure 8. Respondents per region.

Majority of the respondents classified their institutional background as Government Agency (39,44%) or Academia (21,97%) (**Figure 9**). Many of the respondents who chose the "other" category specified working in a research institute or facility, or in an international organisation. Only 8,45% of the stakeholder respondents work in the private sector. As for the respondent's positions in these institutions, more than half (51,55%, n = 183) say they works as professionals. 27,32% have a manager status and 10,42% are technicians or associate professionals. The rest 10,70% of respondents chose the "other" option, and specified being for example (doctoral) students, advisors, researchers or civil servants.

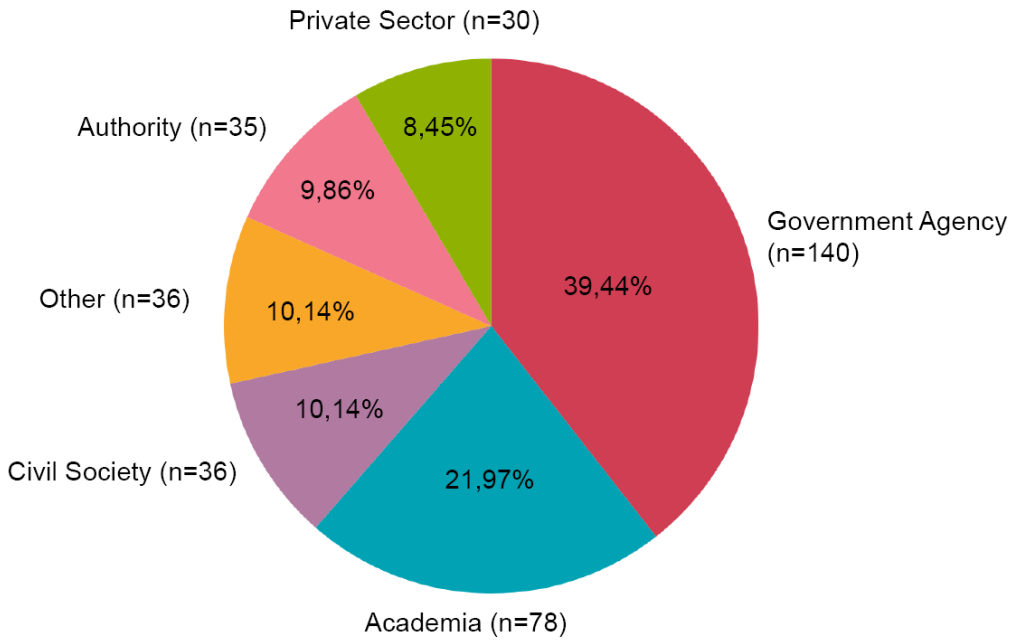

Figure 9. Respondents' institutional background.

The respondents were asked to classify their field of expertise in terms of the environment, climate and health nexus in a multiple-choice question. The aim of the question was to draw a picture of how the stakeholders identify professionally inside the nexus, or whether there is indeed, an existing nexus. Most respondents identified their expertise as being only in the field of environment (29,86%) or only in health (26,48%) (**Figure 10**). However, only 7,61% of the respondents identified their field as only climate. Out of those who choose multiple answers (that is, anywhere between 2-4 fields of expertise, including other), most identified in the combination of environment and climate (n = 25), or in environment and health (n = 22). Only 6 respondents found themselves completely inside the nexus, choosing all environment, climate and health -options.

The "Other" category includes many different fields, from energy, agriculture and economics to social sciences and humanitarian aid. Some of the responses in the other category could well be categorised to the other three (or a combination of these), but at this state of analysis they are left under "other". For example, some respondents have chosen the other option and

described their field as "environmental health" (without choosing the environment option); these responses could also be categorised into the environment field.

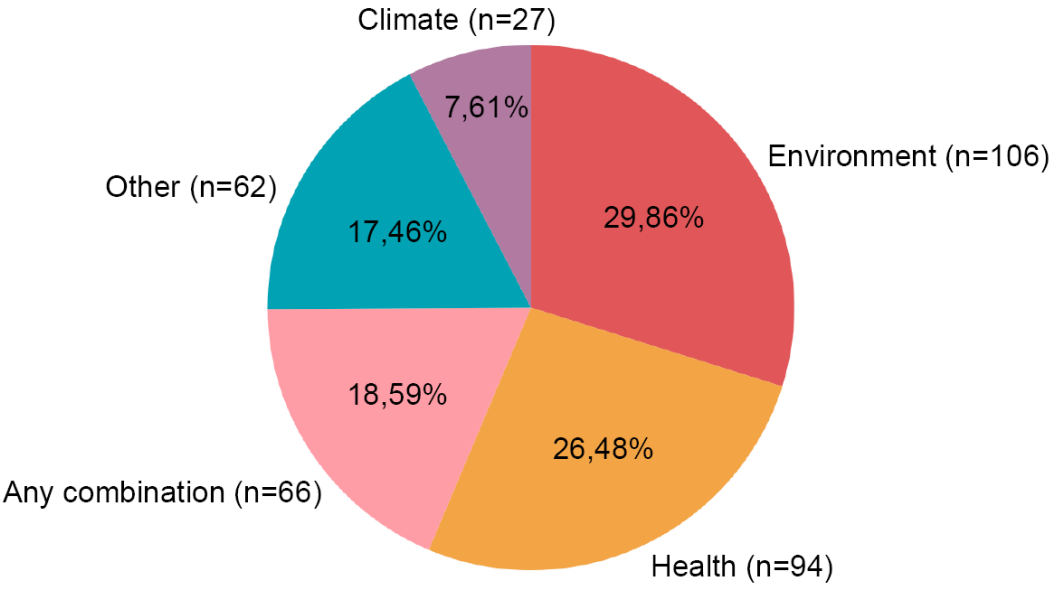

Figure 10. Respondents' fields of expertise in the nexus

2.2.5 Limitations

With a survey of this scale some challenges will be confronted along the way. As this survey has so many different and quite complex layers, the technical composition of the survey was a challenge in itself with its hundreds of individual questions, as was the wide range of respondents from different expertise and language groups.

First, there were some technical issues. The linking of the "paths" from certain answers to certain questions on the next page to make the B and C section work took a lot of time and planning. However, some errors were met in the finalised survey, where some respondents were shown continuing questions for themes they had not chosen in the previous section (such as sub-policy areas for main policy areas they had not picked). This led to a total of 6 respondents seeing and answering too many questions. In most of these cases, the same respondent had answered to more than just one extra question. This was either a regrettable bug or the result of these respondents going back inside the survey to change their responses on the previous page, and the survey website not being able to follow up on this (especially if the now "wrong" questions had already been answered on the next page). The extra answers were deleted from the data before analysis taking into account which selections were logical based on the saved choices the respondent had done. Single users also reported different technical errors, but these did not result in problems for the data.

Respondents were able to leave feedback on the survey. While some commented more on the topic itself, or told they found the survey either very well done and interesting, but some suggested improvements. A few respondents argued it was hard to make decisions in single

choice questions. There were also important notes on how the vocabulary of the survey might be more challenging for non-scientist or those, for whom English is not a preferred language. Better formulation of questions was also called for in this respect. It is a shame it was not in the scope of this survey to be translated to more European languages, and it is recognised, that completing it was more challenging to some respondents.

The aim was to create a fast and easy-to-follow questionnaire, but it would seem based on the feedback and answering times, that while majority of the respondents found it very interesting, filling it in was more time-consuming and challenging for some. Should a re-run of the survey be done, more attention would be paid to the equal accessibility of the survey to all potential respondents, even if translations are not possible. Also, age as a background information would be added to the survey, which now only asks gender and country of residence.

2.2.6 Conclusions

While the respondents view scenario-based threats to human health severe both globally and on European scale, they are capable of acknowledging possible opportunities in the otherwise dim-looking next 30 years' time period. There was a clear message of the need for scientific support on many policy areas, going as deep as to be able to determine which policy areas are the most important in general, as well as what kind of scientific support they should need in order to be able to answer to the future challenges in the environment, climate and health nexus. Agricultural, environmental and climate policies were held as the most important fields for this, while health policies were not as called-for. There is perceived not to be much need for basic research or science-policy dialogue anymore, and instead many fields could benefit from science-policy-society dialogue especially, as well as applied research. The variation in the responses was not considerable between respondents from different areas of Europe or different fields of expertise. The results of the survey can then be claimed to represent quite a common opinion of the European stakeholder community.

3. CONSULTATION GROUP WORKSHOP

The second phase of stakeholder consultation and engagement was the HERA Consultation Group Workshop in Brussels on 7 November 2019. The aim of the workshop was to elaborate the concept of nexus, discuss the policies which may tackle the future threats and further deliberate usable knowledge, research processes, and dialogue between science, policy and society in the nexus. The 15 participants were professionals representing European level organisations, such as EU institutions, global conventions, UN authorities, NGO's, industries on fields related to the nexus, such as environment policies, human health, food safety, chemicals, occupational health and sustainability (**Appendix 2**). The outcomes of this workshop were considered in drafting the first Research Agenda Preliminary Report.

3.1. Methods of the Consultation Group

In the first session of the workshop the attendees were divided into 3 small groups to discuss what they believed are the main threats and opportunities in the nexus and which types of policies are needed as well as which policy areas can best respond to the threats (see **Appendix 3** for the whole programme). The interlinkages between the "silos" were emphasized to form a more holistic approach, and it was asked if there are synergies, co-benefits or possible trade-offs of certain policy areas.

The members of the Consultation Group had also received a link to the survey, and at the workshop the preliminary results of the survey (such as the most relevant policy-areas, risks and opportunities in the nexus, differences in worries between regions and the most important types of scientific support needed) were presented for the attendees. The second session aimed to put these points of views together with the scientists' perceptions (collected through a survey in WP4) and asked the participants how they would interpret the results.

For the third session the small groups were mixed again, and this time the focus was on integration and policy needs specifically for the research agenda. The aim of this session was to achieve further deliberation on usable (legitimate, salient, credible) knowledge, research processes, and dialogue between science, policy and society relevant for tackling issues in the environment, health and climate nexus. The participants were asked how they believe the evidence-base for the future nexus policies should be developed, and e.g. what kinds of processes are needed to ensure successful responses to the nexus both from research and policy sides, or how scientific support could help with overcoming the silos. The attendees could also give a "main message" they wanted to share for the development of the research agenda.

During all sessions the main points from each small group were shared for the whole group, and there was a longer general discussion on the topics at the end of the workshop. The online interactive questionnaire software Mentimeter was used during the workshop to collect first impressions and more deliberated short answers to specific questions. For example, in the first session the participants answered questions about balancing between risk management and support for opportunities, and how to prioritise the policy needs presented through the survey results.

3.2 A Brief Summary of the Discussions in the Consultation Group

This is a tentative summary of the HERA Consultation Group workshop mainly on the basis of the whole group discussions and the Mentimeter responses.

3.2.1 Policy needs and recommendations

Coherent and justifiable policies

The commonality and synergies between several global goals and frameworks must be understood in order to build coherent policies and to understand both the co-benefits and trade-offs of different policies. This cannot succeed if thinking and working in silos, which is still typical at EU and national level policy-making. Cross-sectoral and interdisciplinary collaboration through integrated approaches to health and environment support systemic and holistic policy-making. There is a need for an overarching framework for environment and health at EU level, and perhaps even for a common overriding and collectively defined concept of sustainability that integrates health, environment, and social impacts. It is crucial to plan justifiable policies and understand the intervention logic. Policies that support the development of sustainable technologies and incentivise (green) behavioural change are both needed. Economic policy and growth could be driven by environment and health.

Reactions to the stakeholder survey policy priorisations

Some of the stakeholder survey results were considered as unexpected, for example the low importance given to biodiversity, public health and education policies. Also, chemicals not ranking as one of the top future risks was regarded as surprising. These might reflect people's awareness and level of understanding, possible misconceptions, and the attention that topics get in public discussion. For example, climate change is quite topical at least in Europe, whereas biodiversity may not be connected to health issues so often. Sustainable agriculture, which was selected most often in the survey as the policy area that can tackle issues in the nexus, is

regarded as an actionable item which can feed into food security and safety, health, biodiversity, water, etc.

3.2.2 Science-policy interface

Science communication to policy-makers

There is a lack of research and evidence translating into policies and practice. Science is often diluted before it comes down to policy-making and policy-makers are introduced information that is not always based on scientific research. Also, national and European governance tends to work in silos, which does not lead to coherent policies and utilising the existing knowledge in the right context. Furthermore, science itself is not completely objective. Maximising co-benefits and assessing trade-offs is important to understand multiple drivers and to ensure that science is translational and does not lead to unwanted policy implications. Think tanks and knowledge brokering can help with better integration of knowledge. Very clear and targeted message without research jargon support effective communication to policy-makers. Communication should be emphasized more in research projects, which requires communication specialists and communication budgets. Also, focusing on opportunities for action is important to avoid disempowering messages.

Science communication to the public

A need for better and more creative science communication to public is recognised in order to build citizens' and stakeholders' trust in science and to ensure that scientific knowledge translates into practice. Citizen engagement and citizen science are processes that support achieving these aims. Clear messages without research jargon help to clarify the messages also for the researchers themselves.

Successful science-policy-society dialogue

Successful science-policy-society dialogue is a continuous and sustained process to jointly interpret evidence and to agree on key outcomes. It supports identifying science and policy priorities, acting on them, and translating them into justifiable policies. It is inclusive and multidisciplinary and involves iterative learning, knowledge co-production, adjusting policies based on new (scientific) findings, and monitoring of results. It ideally results in more trust in scientific researchers and policy-makers. There are several factors that support the success of science-policy-society dialogue, including openness, appropriate clarity, common and understandable language, constructive dialogue without pre-defined conclusions, self-reflection, and working on a common task. Also, transparency about certainty, uncertainty, trade-offs, co-benefits, gaps and connected risks as well as methodologies is crucial, and the potentially existing uncertainty should be addressed with precaution.

3.2.3 Recommendations for future research

Interdisciplinary research

The new research agenda should focus especially on the environment, health and climate nexus, which requires interdisciplinary research. Interdisciplinarity is already emphasised in academia, but it continues to be a priority. There must be opportunities for mutual learning and for researchers to build their capacities to work in an interdisciplinary manner.

Connecting what we know, identifying knowledge gaps

The current knowledge basis and existing data need to be further organised and integrated to make better use of the evidence that there already is, and to ensure that the knowledge is in the right context and can translate into new and innovative approaches and policies. This also helps to find and fill knowledge gaps and to identify emerging risks and solutions for tackling them. Researching multiple stressors is a necessity and requires multidisciplinarity. Methodologies that support identifying emerging risks and new ways of generating data include for example citizen science and crowd-sourcing, AI, machine learning and extracting weak signals, taking advantage of big data, scenario and foresight studies, and science-policy-society collaboration and co-creation.

Priorities for research themes or topics

Several research and topics were raised in the discussions. There is already quite a solid knowledge basis on some issues, such as air quality and pollution, yet many topics have lots of knowledge gaps, for example water, chemicals and their cocktail effects, biodiversity, and microplastics. Non-communicable diet-related diseases are a global pandemic and their understanding requires looking at several common drivers simultaneously. Studying simultaneously multiple drivers, such as environmental, technological, social and political development, or multiple stressors, such as overfishing, mercury and climate change, is not done sufficiently yet. Vulnerable groups and socio-economic differences must be considered in policy assessments and recognising regional differences and multiple histories and social situations supports finding more effective solutions. Behavioural responses, citizen engagement, and increasing citizens' trust towards science are suggested to be addressed in the new agenda. In terms of occupational health, research needs include understanding the several reasons that cause occupational diseases, including intensification of work, psychosocial risks, and digitalisation.

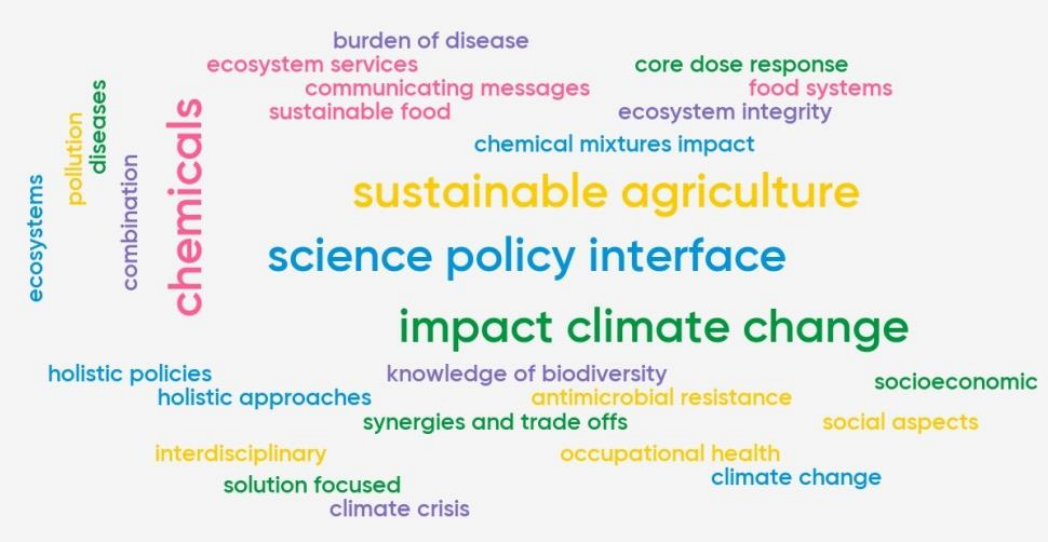

Figure 11. A word cloud of the most important research themes or topics for the nexus, according to the Consultation Group (Mentimeter responses)

Investigating problems vs. creating opportunities

The nature of science often tunes researchers to focus on investigating problems rather than creating opportunities. There is a need for investigating the common drivers for certain risks but also for finding synergistic solutions to tackle those risks. Policy commitment and agreed policy targets help to translate scientific knowledge into actionable solutions.

3.2.4 Main messages for the research agenda development (Mentimeter responses)

- Stress the need to implement significant and impactful changes at all levels
- Make active suggestions for interdisciplinary research and combinations of disciplines that can create added value.
- Rebuild trust in science as the reference framework
- Focus on solutions and produce scenarios of potential health benefits under different scenarios, both policies and behavioral change
- Research should influence policies. Are they justifiable (e.g. social, health, environmental impacts). What are the health impacts of environmental problems and policies? Material gaps?
- Not only communicating risks but how to create health promoting environments. Developing whole-of-government, whole-of-society approaches. Better understanding of multiple drivers of change.

- Identify key higher tier potential health and environment objectives from which should stem more targeted integrated vertical research agendas that will span applied integrated research all the way down to basic research.
- Think outside the box – how to bring forward outlier views: not always serving the same research groups. How to engage researchers and citizens from outside Western Europe.
- Use your communication specialists and do quality media work to get your message clear and engage with others early on.

4. REGIONAL WORKSHOPS

The regional workshops continue the engagement of stakeholders on the national and regional level. The goal of the workshops is further identification of the research needs and analysis of the scientific support for key topics in policy and practice in health, environment and climate nexus during the years 2020-2030. The stakeholders representing this nexus will discuss EU policies and their implementation at national and regional levels as well as national policies and practices and their linkages to European and international scales. They will be invited to actively engage the workshop in a cross-sectoral and multidisciplinary setting to collaboratively identify trends, additional key topics in policy and practice and possibly also related research needs. The interactive workshop will build upon the current key topics as identified in the summaries of national documents related to the fields of the agenda. This integrative stakeholder engagement approach requires professional facilitation, to be able to merge all the views, approaches and context from the different sectors and disciplines to a coherent overview of communalities.

There will be altogether six regional workshops for the Nordic countries, the British isles, Southern Europe, France/Belgium and Netherland, Eastern/Central Europe and German speaking region (**Appendix 4**). Each workshop is organised by local consortium partners in the region. Of these the first two were organised together, when the stakeholders from Finland, Sweden, Ireland and the United Kingdom met in Helsinki in December 2019. The rest of the workshops are planned for spring 2020. The aim is to invite approximately 25 persons for each workshop, representing the relevant networks across sectors and disciplines relevant to environment, climate and health issues (**Appendix 5**). Results of both the survey and the consultation group will be utilized in the regional workshops, and the survey also suggests potential attendees for each workshop. Below is analysis of the first regional workshop held in Helsinki, but the other workshops will slightly differ in structure from the Helsinki workshop.

4.1 Analysis of the Helsinki Workshop Data

The aim of the Nordic Regional Workshop was to bring together key participants in policy and practice across the Nordic, Irish and British regions. This was the first HERA regional workshop to be run and a detailed protocol was devised to guide facilitators and participants in order to maximise possibility of new cross disciplinary and cross region input. In total there were 22 participants divided into 4 groups (see **Appendix 6** for the organisational backgrounds of the participants). Each group was chaired by a facilitator and assisted by a note keeper. The afternoon was divided in to two facilitated sessions and a final feedback session (**Appendix 7**). A separate feedback session was arranged the following day for those running the workshops. This paper outlines the format and focus of the workshop sessions, approach to analysis of the data and the analysis of feedback.

4.1.1 Format and focus of the workshop sessions

Session 1 focused on the ambitious goal of ascertaining the groups' vision for environment, health, climate nexus for 2030. This was followed by examining the identified policy areas to determine how they could support the emerging challenges in the environment, health and climate nexus. Then the participants were asked to suggest concrete areas for (European) policies that support tackling the emerging challenges in the environment, health and climate nexus, as well as prioritizing 1 or 2 policy areas in particular.

Session 2 then built upon the earlier session by asking participants to suggest what scientific support that integrative future policies need as well as gaps that exist between science and policy-making in terms of what are the main knowledge needs required for these integrative policies?

4.1.2 Approach to analysis of the data

This report comprises an analysis of the key findings of the workshop utilising the structure of the key questions requirements (**Figure 12**) and then analysing the responses under the key question headings thematically. The qualitative analysis approach is drawn from Braun & Clarke (2006). This is a 6 step analytical procedure. In Phase 1 the researcher familiarises herself with the data. Phase 2 involves generating initial codes which begins the systematic analysis of the data through coding. Phase 3 focuses on searching for themes. A theme is a coherent and meaningful pattern in the data relevant to the research questions. Phase 4 reviews themes which involves checking that the themes 'work' in relation to the coded extracts and the data-set. Phases 5 & 6 then comprises defining and naming themes and writing up.

Figure 12: Key questions for the first regional workshop

1. Vision for health, environment, climate
2. What is important among these policies
3. Strategy: EU policies: how to achieve the vision
4. Knowledge needs
5. Utilisation of knowledge

4.1.3 Thematic analysis of the workshop feedback

QUESTION 1: Vision for health, environment, climate for EU (2020-2030)

The interpretation of a vision for health, environment, climate for the EU varied across groups. A number of issues arose such as what exactly is a vision. Essentially a vision in a strategic sense is a statement in terms of an aspirational description of what an organisation would like to

achieve or accomplish in the mid or long term future (Scholes & Johnson, 2001). It is intended to serve as a guide for choosing current and future courses of action. It should provide a credible answer for 'where are we going?' Some participants looked at this task more from identifying targets and one group did not fully specify their vision. The vision themes were grouped into reducing consumption & production, empowering people, making big business take more responsibility for health and environment issues and dealing urgently with loss of biodiversity.

- Reduce consumption and production across the board (food consumption, production and diet highlighted across 2 groups as well as reducing carbon emissions - through managing agriculture, food production, innovation in renewables use, car use, etc.
- Empower people in their environment through community and collective action. Take account of vulnerable populations, mental health issues and the importance of equity - make the SDGs a starting point. Think local - make the environment livable through important initiatives such as green and walkable cities. Increase awareness of health benefits of diet and alternative modes of transportation.
- Make big business take responsibility - manage food production and safety, take responsibility for impacts such as biodiversity loss. Food production a priority
- Deal urgently with decreasing biodiversity Including urgent action on agricultural policy by incorporating both environmental and health impacts.

QUESTION 2: How can these policy areas support tackling the emerging challenges in the environment, health and climate nexus?

Again findings across the groups varied and not all groups linked this question to their previous vision. In some groups there was a brainstorming as the ideas grew and developed and new ideas emerged. Notable amongst the groups was a lack of focus on actual or potential policies - the focus was more on potential areas in which to develop policy. The policy areas can be grouped into main core themes; managing inequality, measuring social impacts, how to move a vision into policy, focusing research on citizen impact and citizen choice and building on synergies.

- Manage inequality through access to green areas/good affordable food. There are good systems versus less good across the EU - equity needs to be a driver in policy. Support and assist small versus big companies to achieve health/environment/climate goals
- Measure social, as well as economic impacts - take account of vulnerable and minorities. Address biodiversity loss in terms of social/life impacts. Utilise the social and behavioural sciences more.
- How to translate vision into regulation/law and policy through appropriate communication tools to inform policy makers about relevant data. Legislate and educate. Explore the level of control the EU should have in areas such as safety and control in food

production/plastics/agriculture. Need to assign an economic value/putting a money label to greening. Need to integrate environment and health issues into agriculture policy

- Research focus on the policy impact for the citizen. Need choice for people in terms of good food and environment. Go back to our roots. Educating through schooling. Policies to support responsible marketing. Consumer protection. Need a holistic approach in terms of information (food reformulation, impacts). To be achieved through a common language across silos and researchers. Need a behavioural science focus.
- Build on synergies already there - Technologies for cars / green approaches already developed.

QUESTION 3: Strategy (concrete ideas) for EU policies: how to achieve the vision

Strategy across the groups varied depending on their subtopic focus. However, this particular question showed a consistency across all groups as they all prioritised that health/environment/climate needs to be integrated into all policies and explored how to do that. Some groups looked at the responsibility of big business and mechanisms to achieve that outcome. Equity as a common theme emerged again.

Integrating Health and Environment considerations into all policies

- Mechanisms for achievement include creating a joint platform at European level (high-level) with a clear mandate & dedicated budget to bridge the health and environment sides and promote health in all policies. Utilising directives at EU level. Applying standards and common procurement rules where sustainability and green aspects are taken into consideration, or to put certain weight in the decisions.
- Explore/research how to use taxes and price levels to deliver on these policies. Directives at EU level.

Equity

- Make big business pay true costs of impacts on Health and Environment - including regulatory action taken to clearly limit harmful impacts. e.g. air pollution and noise through penalties/fines. Examine food chains regarding their impact on health/environment/climate such as waste of resources, chemical use.
- Equity - There can be a conflict between national/higher level with local autonomy need to empower. Leadership is important. Supporting assessment of local ideas. Building trust. Investing in human capital. Protect poor with social policies.

QUESTION 4: Knowledge Needs

Knowledge needs across groups varied partially because each group had a particular focus and also the profiles and experience of participants. The two main themes were what type of data is needed and facilitating legislation/regulation that would hinder or facilitate data gathering. Within the core themes there were subthemes.

Data needs:

- Measure different data than we have been - true cost of food and its waste. Effects of production on micro nutrients in food. Circular economy: assessing human impacts and different types of exposures when designing product and processes for model development (2 & 3).
- Health and environmental impact assessments for all policies as well as economic. Vulnerability assessments (1 & 2). Land use regression model to see what crops are vulnerable to extreme weather conditions, predictions (2). Map vulnerable groups across EU (1 & 2)
- Data on successful small or local initiatives in health & the environment and their scalability. Look at nature based solutions (2 & 3). Community approaches, social planning approaches (1). Share data on how to do things differently - sustainable fishing, alternative food production methods across countries (1,2, 3 4)
- Social/Behavioural data; behaviour and values of young people and their needs. Effects of health promotion on behaviour. Motivational aspects of behavioural change. Drivers/causes of consumption. Data on best use and type of communication tools to change behaviour and inform.
- Measure global burden of disease or DALYs due to climate change and how to integrate that data and knowledge with the other stressors. Climate change effects on environment and health under different scenarios such as measuring the impact of the heat on the body and the antecedents of certain diseases. Establishing European cohort studies - track development and health - cross compare (Groups 1 & 2).
- How to access funding for these alternative/non-mainstream approaches (Groups 1 & 2) (Partner with universities, companies & NGOs).

Regulation:

- Over demanding regulations might actually harm efforts at gathering data - need to consider a derogation from or revision of GDPR for health & environment research (Groups 2 & 4).
- EU needs to consider high level environment and health targets (legislation/directives) – then need to understand better how to achieve those targets. Utilise approaches such as water framework directive for health in EU policies - a model for human health framework.

QUESTION 5: Utilisation of knowledge

(What kind of scientific support would encourage better utilisation of scientific knowledge in policy and decision-making processes?)

This question received less attention than the others preceding due to time limits. There was less data emerging. However, this question had somewhat been addressed through earlier parts of the session(s) and was addressed at the general feedback session after this and the mentimeter feedback. Some themes issues that did arise were the following:

Need research support to:

- Use existing data: utilise surveillance economics, user data, access to data, artificial intelligence. Use this data for public good through cooperation between politicians and science
- Develop behavioural/social science/economic research as it is needed to
    - explore how to measure effectiveness
    - tackle existing inequalities and support local action
    - raise awareness but communicate in a way that brings hope
    - explore how to implement in practice - implement what we already have with the SDGs and WHO recommendations
- Develop health policy as its less active than environmental policy at the EU level because of the subsidiary principle.
- Integrate and utilise public health research (green and blue spaces etc) to measure effects of climate change on populations
- Examine environmental impacts of CAP programme

4.1.4 Conclusion

There are a number of core issues that emerged from the workshop and these can be integrated together with the final feedback session (flip chart) and mentimeter results.

- Equity is a key issue that emerged from the questions asked and across the 4 groups. Equity in terms of citizen impact and equity in terms of big business taking responsibility. Need to empower people in their environment through community and collective action and take account of vulnerable populations, mental health issues.
- Behavioural and social science research are identified as key research gaps and would enable us to make the leap between policy and practice and understanding the wider impacts of behaviour both organizational and individual, use of communications, motivation and consumption. Need to measure social, as well as economic impact.

- The use of legislation, regulation and directives were seen as important to guide success in integrating and implementing health, environment and climate policy. It was seen as important that the EU took a stronger position in order to guide compliance.
- Over demanding regulations actually harm efforts at gathering data - need to consider a derogation from or revision of GDPR for health & environment research.
- Deal urgently with decreasing biodiversity Including urgent action on agricultural policy by incorporating both environmental and health impacts.
-

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5. APPENDIX

Appendix 1. Main and sub-policy areas used in the survey, respectively

- 21 Main policy areas

- 108 Sub-policy areas (including "other, what" -options)

1. Agriculture and rural development
   Sustainable agriculture

   Market measures

   Rural development

   Other, what?

2. Climate change
   Climate change adaptation

   Climate change mitigation

   EU Emissions Trading System

   Funding for climate action

   Other, what?

3. Communication
   Political communication to the public

   Informing the Commission about public opinion and political developments

   Other, what?

4. Competition
   Antitrust

   State aid

   Other, what?

5. Economic and financial affairs
   Economic surveillance

Financing of EU policies

International economic relations

Sustainability of public finances

Other, what?

6. Education, Youth, Sport and Culture
   Education

   Culture

   Sport

   Youth policies

   Other, what?

7. Employment, social affairs and inclusion
   Working skills

   Occupational health and safety

   Job creation

   Disability and inclusion

   Social security and social protection systems

   Other, what?

8. Energy
   Energy efficiency

   Nuclear energy, radiation protection and nuclear safety

   Renewable energies

   Energy security

   Other, what?

9. Environment
   Funding for environmental action

   Circular economy

   Sustainable production, products & consumption

   Waste management

   Clean air

Clean waters

Industrial emissions

Noise

Soil

Nature and biodiversity

Land use and management

Sustainable development goals

Other, what?

10. Financial systems and services

Financial system surveillance

Financial market stability

Other, what?

11. Health and food safety

Antimicrobial resistance

Animal health and welfare

Food and feed safety

Health promotion

Plant health

Protection of health and prevention of diseases

Public health

Quality of health systems and health care

Other, what?

12. Humanitarian aid and civil protection

Emergency response coordination

Emergency preparedness

Disaster risk reduction

Civil protection

Emergency support inside EU

Emergency support outside EU

Other, what?

13. Internal market, industry and entrepreneurship
    - Biotechnology
    - Clean technologies and products
    - Chemical policies
    - Environmental technology
    - Food supply chain
    - Health technology
    - Resource efficiency and raw materials
    - Other, what?

14. Justice and consumers
    - Equality
    - Consumer policy
    - Other, what?

15. Maritime affairs and fisheries
    - Maritime policy
    - Ocean governance
    - Fisheries policy
    - Other, what?

16. Migration and home affairs
    - Migration
    - Home affairs
    - Other, what?

17. Mobility and transport
    - Aviation policy
    - Transport network
    - Transport safety
    - Sustainable transport
    - Other, what?

18. Regional and urban policies
    Regional policies

    Urban policies

    Sustainable growth

    Other, what?

19. Research and Innovation policies
    Research policy

    Innovation policy

    Other, what?

20. Taxation and customs
    Taxation

    Customs

    Other, what?

21. Trade
    Economic partnership agreements

    Investments

    Intellectual property

    Public procurement

    Trade and sustainable development

    Trade services

    Other, what?

Appendix 2. Organisations represented in the Consultation Group

- CEFIC (European Chemical Industry Council)
- Convention on Biological Diversity
- DG Climate
- DG Environment
- DG Health
- DG Research and Innovarion
- EuroHealthNet
- European Environment Agency
- European Food Safety Authority
- European Respiratory Society
- European Trade Union Institute
- Health Care Without Harm
- ICLEI (Local Governments for Sustainability)
- Rotterdam and Stockholm conventions
- UNEP (United Nation Environment Programme)

Appendix 3. Program outline for Consultation Group Workshop

10h-10h45: Introduction, participant presentation and HERA presentation

- Welcoming words (5 minutes, Sandra)
- Participant presentation and "breaking the ice" (20 minutes, Sandra)
- HERA presentation (10 minutes, Robert)
- Today's programme and the aims of the day (5 minutes, Sandra)
    - To discuss and reflect on key topics in the health, environment and climate nexus based on HERA findings
    - On the basis of this workshop and other participatory activities, we will have a better understanding of the nexus and what it requires from policy and research.
- Dividing participants into the first groups and giving instructions for the roundtable discussion (5 minutes, Sandra)

10h45-11h45: I Roundtable on key policy topics in the nexus

- Aim: Elaborating on the nexus and the needed policies for responding to the threats against the results of the survey.
- Presentation (10 minutes, Riikka+Aino):
    - Results of the survey: drivers and impacts, severity of trends, possibilities, key policy topic areas to respond to the risks -> defining how we currently understand the nexus
- Small group discussion (40 minutes):
    - Questions:

        - What are the main threats in the nexus? What about opportunities?
        - What are the key policy areas that can respond to the threats in the nexus?
        - What types of policies are needed?
            - From institutional approach and "silo perspective" to a holistic approach and seeing the interlinkages
            - What are interlinkages between the sectors in the pie, major linkages that should be recognized in integrated policies
            - Synergies and co-benefits of certain policy areas
            - Are there any trade-offs?
- Menti and comments (10 minutes):

11h45-12h45: II Blank and blind spots in the nexus: identifying knowledge gaps

- Aim: Identifying the most crucial knowledge gaps in the nexus. Bringing the stakeholders and scientists' perceptions together.
- Presentations:
    - Results of the WP3 survey (5 minutes, Riikka+Aino): *In the previous session, the most important policy areas in the nexus were identified (in terms of their health impacts).* In this session, the type of scientific support, and the differences in perceptions of key policy areas to respond to the risks between the different expertise fields and regions
    - Results of the WP4 survey (10 minutes, Franziska+Anke)
- Pair discussion on the initial thoughts (10 minutes)
- Whole group discussion (25 minutes):
    - Questions and comments about the results
    - How do you perceive the results? What are the interlinkages between them? "Are they on the same page"? "Do they speak the same language"?
    - Deliberating the most crucial research areas to support successful policy-making in the nexus
- Menti and comments (10 minutes):

12h45-13h30: Lunch

13h30-15h15: III Roundtable on integration of research and policy needs – towards research agenda

- Aim: Further deliberation on usable knowledge, research processes, and dialogue between science, policy and society relevant for tackling issues in the environment, health and climate nexus.
- Small group discussions (50 minutes):
    - Questions:
        - What kind of evidence do effective nexus policies require?
            - Linkages to policy analysis – role of various research traditions, e.g. evidence-based information, scenarios etc. (T3.1): reflecting on the current situation, what can/should be improved for the future?
        - What kind of knowledge is usable (legitimate, salient, credible) for policy-making in the nexus?
        - What kinds of processes are needed to ensure successful responses to the nexus both from research and policy sides?

- How scientific support could help with overcoming the silos?
- How to take into consideration the regional differences in the research agenda?

- Whole group discussion (45 minutes):
  - Questions:
    - Sharing some insights from the small group discussions
    - *Something specific?*
- Menti and comments (10 minutes):

15h15-15h45: Concluding remarks and next steps

15h45 Closure & refreshments

Appendix 4. Regional workshops per regions/countries

Region	Countries
Nordic	Finland Sweden
British Isles	Ireland United Kingdom
South Europe	Spain Portugal Italy Greece Albania Northern Macedonia Bulgaria Romania
FR/BE/NL	France Belgium Netherlands
East/Central Europe	Poland Slovenia Czech Republic possibly Slovakia
German speaking region	Austria Germany Luxembourg Switzerland

Annex 5. Expertise areas of the participants in the regional workshops: a table for guidance in the planning of invitations

	Decision makers (8-10 persons)	NGOs (6-8 persons)	Business sector (Max. 4 persons)	Other (Max. persons)
Biodiversity conservation				
Climate change adaptation and mitigation				
Marine issues				
Fisheries				
Water and sanitation				
Air quality				
Forestry				
Agriculture				
Food safety				
Mining				
Energy				
Chemicals				
Pharmaceuticals				
Healthcare				

Disease prevention and health promotion				
Occupational health				
Urban/rural development				
Sustainable development				
Children and youth				
Migration				
Finance and insurance				
Technology				
Other regionally relevant topics in the environment, climate, health nexus				

Appendix 6. Organisations represented in the Helsinki Workshop, per country

Finland	- Academy of Finland - Age Institute - Finnish Heart Association - Finnish Institute for Health and Welfare - Finnish Meteorological Institute - Ministry of Social Affairs and Health - Ministry of the Environment - Northern Dimension Partnership for Health and Social Wellbeing - Organisation for Respiratory Health
Ireland	- Environmental Protection Agency - Public health - Tobacco Free Research Institute
Sweden	- Public Health Agency
UK	- The Lancet Countdown

Appendix 7. Outline for Workshops

Plan for the session:

14.30-15.25: Policy session: Policies to approach issues in the environment, health and climate nexus

Aim: Elaborating on the policy areas that were identified as the most important ones that can respond to the issues in the environment, health and climate nexus during the upcoming decades in the stakeholder survey. Finding co-benefits, synergies and trade-offs between the different policy areas.

Materials: Short descriptions of the policy areas, mapping of SDGs' co-benefits and trade-offs

1) **Vision for environment, health, climate nexus for 2030** (10 min).

2) **How can these policy areas** support tackling the emerging challenges in the environment, health and climate nexus? (15 min)

- Focus on 2020-2030
- Level at which we aim to discuss:
    - EU policies and their implementation at national and regional levels; and national policies and their linkages to European and international scales
- Supportive questions to guide the discussions:
    - Are there any **co-benefits, synergies or trade-offs** between these policy areas? How should these be taken into consideration in formulating the future policies?

3) **Create concrete ideas for European policies** that support tackling the emerging challenges in the environment, health and climate nexus. (15 min)

- What kinds of regulations, financial and economic instruments, soft instruments and incentives are needed?
- Can be developed on the basis of current policies or be completely new ideas.
- Examples of current EU policies: Natura2000 (Habitats and Birds Directives), Trans-European Transport Network (TEN-T), Common Agriculture Policies (CAP), *see more in the supporting materials*

4) **Select 1 or 2 most desirable ideas** for European policies that support tackling the emerging challenges in the environment, health and climate nexus and present to the others. (5 min)

5) **Sharing** these 2 ideas with the other groups. (15 min altogether, 3 min for each group)

15.30-15.45: Coffee

(The policy needs will be grouped for the next discussion and also added to Mentimeter)

15.45-16.00: Scientific support session

Aim: Evaluating scientific support that integrative future policies need as well as gaps that exist between science and policy-making.

1) **What are the main knowledge needs** concerning these integrative policies? (25 min)

- Focusing on the concrete policy suggestions deliberated in the previous session.
- Supporting questions:
    - What are the main questions that, when answered, can lead to effective policy-making in the environment, health and climate nexus?
    - What kinds of questions Horizon Europe projects should ask to be able to answer to policy challenges?
    - What kind of scientific support would encourage better utilization of scientific knowledge in policy and decision-making processes?

2) **Present** the knowledge needs to the whole group. (15 min altogether, 3 min for each group)

3) Filling in a **Menti survey** while discussing in pairs (15 min)

Participants ponder the knowledge needs and scientific support necessary for the success of the integrative policies deliberated in the previous session. Each policy suggestion will be reflected against the two statements below:

1) There are clear knowledge gaps concerning this policy suggestion.
2) There is enough scientific knowledge concerning this policy suggestion but the knowledge must to be better utilised in policy-making.

Menti: *feedback*

Conclusion.

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