

# EVALUATION OF SITRA'S SUSTAINABILITY SOLUTIONS THEME

Part 2: Insights for possible future priorities

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Part 2: Insights for possible future priorities

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# Executive summary

The Finnish Innovation Fund Sitra commissioned this forward-looking outcome evaluation of its Sustainability Solutions theme (2015-2022) in late 2022. During the evaluation period, the theme had a broad overall objective to ensure and accelerate adaptation to the earth's carrying capacity through an ecological reconstruction of society and everyday life. Gaia, together with the Finland Futures Research Centre of the University of Turku, completed the evaluation in June 2023.

The evaluation was implemented with an innovative mixed-method approach, integrating two adapted foresight methods: horizon scanning and a Delphi panel. While the primary objective of the evaluation was to evaluate the outcomes of the portfolio, the foresight phase aimed to identify and evaluate the most significant future phenomena around ecological sustainability, which could be used to validate the relevance and timeliness of Sitra's strategic choices during the evaluated period and for strengthening Sitra's future-oriented approach to the thematic work.

The results and the process supported the evaluation well by producing insights around future phenomena that Sitra could work with and also by validating some of the strategic choices Sitra has already made.

Two significant and systemic phenomena were identified. These were: 1) the intertwined health of humans and nature (planetary health); and 2) nature-positive and regenerative economic models. These findings echo with the choices made in Sitra's latest projects. The Delphi panel participants considered Finland to have the potential to act as a global piloting platform for many solutions. And Sitra was regarded as being the right type of organisation to act as a global visionary and exporter of futures thinking.

# Tiivistelmä

Suomen itsenäisyyden juhlarahasto Sitra tilasi Kestävyysratkaisut-teeman (2015-2022) tulevaisuuteen suuntautuvan vaikutusarvioinnin vuoden 2022 lopulla. Kestävyysratkaisut-teeman tavoitteena tarkastelukaudella oli edistää luonnon monimuotoisuutta ja vauhdittaa ekologista jälleenrakentamista. Työllään teema edisti siirtymää kohti ympäristön tilaa parantavaa yhteiskuntaa, jossa maapallon kantokykyyn sopeutuminen on kaikille mahdollista.

Arvioinnin toteutti Gaia Consulting yhdessä Turun yliopiston Tulevaisuuden tutkimuskeskuksen kanssa ja se valmistui kesäkuussa 2023.

Arviointi toteutettiin innovatiivisella monimenetelmämallilla: työssä sovellettiin kahta ennakkointimenetelmää: ilmiökarttaa ja Delfoi-paneelia. Vaikka arvioinnin ensisijaisena tavoitteena oli arvioida Sitran työn tuloksia, ennakkointivaiheessa pyrittiin myös tunnistamaan ja arvioimaan ekologiseen kestävyysliittymiä merkittävimpiä tulevaisuuden ilmiöitä.

Näiden avulla voitiin validoida Sitran strategisten valintojen relevanssia ja ajantasaisuutta arvioituna ajanjaksona ja vahvistaa tulevaisuuteen suuntautuvaa lähestymistapaa kestävyysratkaisut-teeman työssä.

Ennakkointiprosessi ja sen tulokset tukivat hyvin arviointia tunnistamalla tulevaisuuden ilmiöitä, joiden parissa Sitra voisi työskennellä. Ennakkointiprosessi myös validoi joitakin Sitran jo tekemiä strategisia valintoja.

Prosessissa tunnistettiin kaksi merkittävää systeemistä ilmiötä. Nämä olivat: 1) ihmisten ja luonnon toisiinsa kietoutuva terveys, (planetaarinen terveys) sekä 2) luontopositiiviset ja uudistavat talousmallit. Havainnot ovat linjassa Sitran käynnissä olevissa projekteissa tehtyjen valintojen kanssa. Delfoi-paneelin osallistajat arvioivat, että Suomella on potentiaalia toimia monien ratkaisujen globaalina kokeilualustana. Samoin Sitra nähtiin organisaationa, jolla on mahdollisuus toimia edelläkävijänä ja tulevaisuusajattelun levittäjänä.

# Sammanfattning

Jubileumsfonden för Finlands självständighet Sitra beställde i slutet av 2022 en framtidsinriktad konsekvensutvärdering inom temat Hållbarhetslösningar (2015–2022). Målet med temat Hållbarhetslösningar var under granskningsperioden att främja den biologiska mångfalden och påskynda den ekologiska rekonstruktionen. Genom sitt arbete befrämjade temat övergången till ett samhälle som förbättrar miljöns tillstånd, där det är möjligt för alla att anpassa sig till jordens bärkraft.

Gaia Consulting genomförde utvärderingen tillsammans med centret för framtidsforskning vid Åbo universitet och den färdigställdes i juni 2023.

Utvärderingen genomfördes med en innovativ multimetodmodell. I arbetet tillämpades två förutsägelsemetoder: en företelsekarta och en Delfi-panel. Även om det primära syftet med utvärderingen var att utvärdera resultaten av Sitras arbete, strävade man i förutsägelseskedet också efter att identifiera och bedöma de viktigaste framtida företelserna i anslutning till ekologisk hållbarhet.

Med hjälp av dessa kunde man validera relevansen och aktualiteten i Sitras strategiska val under perioden som utvärderades och stärka det framtidsinriktade tillvägagångssättet i arbetet med temat Hållbarhetslösningar.

Förutsägelseprocessen och resultatet av den stödde utvärderingen på ett bra sätt genom att identifiera framtida företelser som Sitra skulle kunna arbeta med. Förutsägelseprocessen validerade också vissa av Sitras strategiska val.

I processen identifierades två betydande företelser på systemnivå. Dessa var: 1) människans och naturens sammanflätade hälsa (planetär hälsa) och 2) naturpositiva och förnyande ekonomiska modeller. Observationerna är i linje med de val som gjorts i Sitras pågående projekt. Delfi-panelens deltagare bedömer att Finland har potential att fungera som en global försöksplattform för många lösningar. Likaså ansågs Sitra vara en organisation som har möjlighet att vara föregångare och sprida framtidsänkande.

# 1 Introduction

The Finnish Innovation Fund Sitra is an independent fund operating as a catalyst for co-operation, a think tank and a promoter of experiments and new operating models, both nationally and internationally. Sitra's vision is that Finland will prosper by building a fair, sustainable and inspiring future that ensures people's well-being within the limits of the earth's carrying capacity. To reach its vision, Sitra focuses its work on three themes: finding solutions to the ecological sustainability crisis; promoting a fair data economy; and strengthening democracy and participation. Reforming the economy with the aim of ensuring sustainability and competitiveness is closely linked to all its operations.

Sitra has comprehensively evaluated the impacts of its work over the years, while continuing to develop its evaluation process. In January 2023 Sitra started an evaluation process for its sustainability work (its Sustainability Solutions theme) together with Gaia Consulting and the Finland Futures Research Centre (FFRC). The theme's strategic objective is that ecological reconstruction of society and everyday life will ensure adaptation to the earth's carrying capacity. The evaluation focused on three Sustainability Solutions projects that ended in 2022: Climate and nature solutions; Sustainable everyday life; and Nature strengthening the circular economy. The evaluation also looked at the international co-operation aspects of the theme, with the World Circular Economy Forum one of the flagship projects. The evaluated projects are a continuation of Sitra's previous projects.

The evaluation consisted of two parts. The first covered the analysis of the outcomes of Sitra's sustainability theme and related projects. The results of this part one are to be released as a separate public report [link will be added]. The evaluation also looked at the priorities Sitra has set for its sustainability work and assessed aspects such

as the timing and coherence of the topics Sitra has focused on.

The second part of the evaluation detailed in this report provided insights for possible future priorities. To support this part of the evaluation, a foresight process using a combination of horizon scanning and a variation of the Delphi method was completed. The foresight process took place in March and April 2023 in conjunction with the evaluation process. The aim of the foresight process was to identify and evaluate the most significant future phenomena around ecological sustainability, thereby strengthening Sitra's futures-oriented approach and futures work. The foresight was also used to validate some of the choices Sitra has made. The results of the process were also intended to benefit the general public and other organisations' futures thinking on sustainability issues. The foresight process was also an experimentation to integrate futures thinking into an impact evaluation. The methodological discussion and lessons learned will also be valuable for evaluation practitioners.

While this report serves as a stand-alone account outlining the results derived from the foresight process, it also provides an overview of the methodological approach, as well as the lessons learned, for those interested in applying foresight methods to evaluation approaches and frameworks.

This report consists of the following chapters. Chapter 2 includes a description of the foresight process, including the steps and methods used. Chapter 3 presents the preliminarily selected future phenomena as well as the selected key phenomena from the international Delphi process, including details of their scope and the selection process. Chapter 4 reports the results of the Delphi process. Finally, the conclusions from the foresight process and the lessons learned are presented in Chapter 5.

## 2 Foresight process and methods

### 2.1 Scope of the work and process description

There are countless interesting future phenomena that merit attention in the field of sustainability and a vast array of methods that can be used for analysing the future together with experts. The scoping of the foresight process is of utmost importance. The planning work for the foresight process was conducted in early 2023 together with Sitra's strategy and foresight specialists.

During the planning phase, the following decisions on the scope and implementation of the work were made.

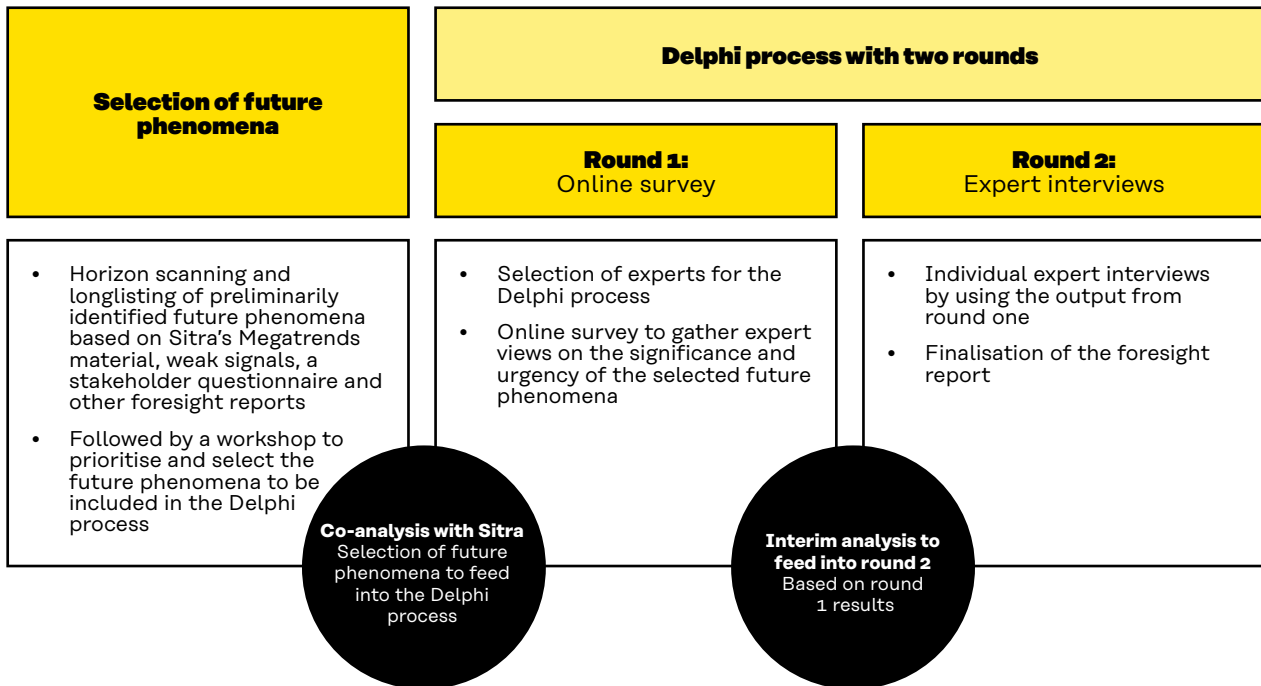
- The overall goal of the process was to obtain input and insights for future thematic directions for Sitra. The core question was: what are the main phenomena in the future that an organisation like Sitra could include in its agenda?
- The process would be supported by involving international experts in the process. Evaluation covered a large number of interviews and a survey with Finnish stakeholders, and these also included future-related questions. The foresight process complemented this and provided international views on future

phenomena. Sitra selected participants for the foresight process.

- The scope of the most significant future phenomena was limited to ecological sustainability as it is at the core of the work of Sitra's Sustainability Solutions theme.
- In order to achieve results that are applicable and useful for Finland and stakeholder organisations such as Sitra, the scope of the discussions was limited to a European perspective.
- The time horizon was set as the next 10 years, which was considered to be the most useful time horizon for Sitra's strategic planning.
- It was agreed that the most significant phenomena to be chosen should also advance Sitra's futures work by adding and exploring completely new phenomena.
- It was decided that a variation of the Delphi method was to be used (details presented in section 2.3) in combination with a horizon-scanning process to list future phenomena.

The foresight process itself consisted of two parts: selection of the future phenomena (horizon scanning) and a two-round Delphi process. The process is illustrated in Figure 1.



**Figure 1. Description of the foresight process**

**The first part of the foresight process** to select relevant future phenomena consisted of horizon scanning, longlisting, prioritisation and shortlisting of possible future phenomena concerning ecological sustainability. Based on this, key future phenomena were selected to be included in the Delphi process. The process for selecting and prioritising key future phenomena can be found in section 2.2

and the phenomena themselves are described in more detail in Chapter 3.

**The second part of the foresight process** consisted of a Delphi process. The Delphi process included two rounds; the first round consisted of an expert survey and the second round consisted of individual expert interviews. The Delphi process is described in more detail in section 2.3.

## 2.2 Selection of key future phenomena

The first part of the foresight process consisted of multiple phases. This process is illustrated in Figure 2.

### Horizon scanning of future phenomena

The phase included the identification and selection of possible future phenomena based on Sitra's futures work, such as megatrend analysis and weak signal analysis, stakeholder insights from the evaluation of Sitra's sustainability work and expert analysis conducted by the Gaia Consulting and FFRC project team. The selection focused on phenomena that are already of interest and significant for the future, as identified in previous studies and foresight processes that Sitra and the project team had been involved with.

It was agreed that the descriptions of the phenomena were to be formulated in a way that did not allow for any position to be taken on their "direction". For example, instead of using a description of a phenomenon such as "climate migration and

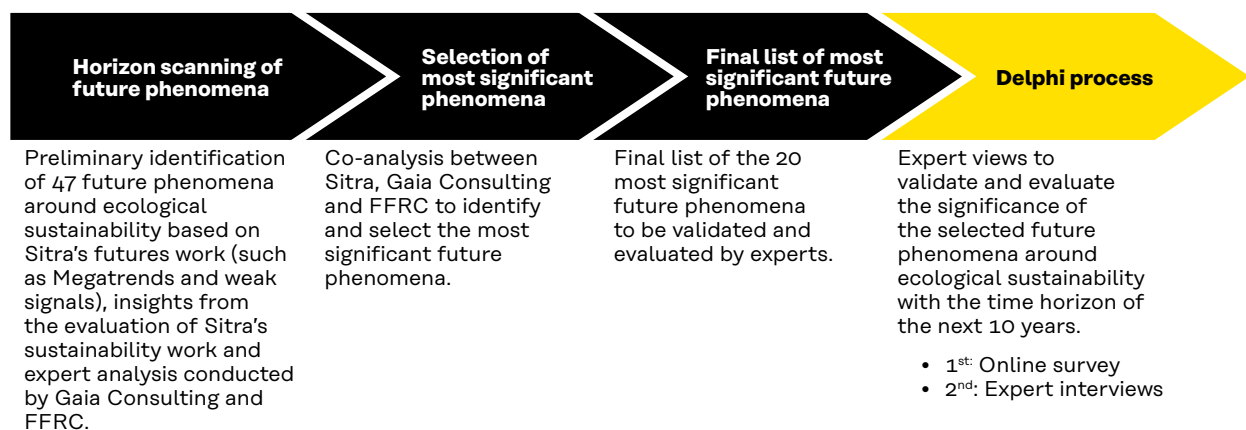
the number of climate refugees continues to accelerate", the description was formulated as "climate migration and refugees". This kind of formulation was adjudged to be most meaningful, as the aim of the following Delphi process was to address the growth in the significance of each phenomenon and the attention and resources required to address them.

As an result, a list of 47 preliminarily identified future phenomena concerning ecological sustainability was produced (see Table 1 in Chapter 3). Based on the preliminary longlist, a phenomenon map was produced in a form of a matrix. The phenomenon map consisted of four dimensions or thematic clusters:

1. the climate and biodiversity crisis
2. the energy transition
3. the natural resource crisis
4. the shift in technology, economy and values

The phenomena were divided under these thematic clusters to link phenomena that fall under the same overarching themes and to illustrate the interconnections between different phenomena.

**Figure 2. Selection of future phenomena for Sitra's Delphi process**



### **Selection of the most significant future phenomena**

The next phase of the selection process included a co-analysis between Sitra, Gaia Consulting and FFRC to identify and select the most significant future phenomena. This co-analysis was conducted in a joint live workshop, which engaged experts from Sitra's strategy team, the Sustainability Solutions team and Sitra's foresight team. The workshop was facilitated by Gaia and FFRC.

The goal of the workshop was twofold:

- 1.** to validate the preliminary longlist of future phenomena and to gain Sitra's insights on the 20 most significant phenomena to feed into the international Delphi process;
- 2.** to test the method and validate the questions to be asked by experts in the Delphi survey.

When validating the preliminary longlist of future phenomena in the workshop, Sitra's experts were divided into small groups. Each of these groups were given one perspective, on the basis of which the significance of the future phenomena had to be evaluated. These perspectives were divided into four categories:

- 1.** phenomena with the widest impacts within Europe
- 2.** the most interesting phenomena
- 3.** the most familiar phenomena for Sitra
- 4.** the phenomena that Sitra has the most potential to affect

Each small group was given the task of voting for the seven most significant phenomena from their given perspective. Based on the exercise and the phenomena that gained the most votes regardless of the category, the 20 most significant future phenomena were identified.

Following the workshop, an online survey including all the phenomena addressed in the workshop was sent to

Sitra to confirm the preliminary list of the 20 most significant future phenomena concerning ecological sustainability.

As an outcome of the co-analysis, a final list of the 20 most significant future phenomena was produced and agreed to be assessed by international experts in the two-rounded Delphi process (see Table 2 in Chapter 3).

## **2.3 The Delphi process**

The second part of the foresight process consisted of the Delphi process, which was conducted during April 2023. The Delphi method is a well-established systematic approach to forecasting and assessing the most relevant future phenomena in relation to the studied societal theme by utilising insights from a panel of international experts. The core of the Delphi method is the repetition of similar questions to the participants so that they have an opportunity to revise their opinions or provide further arguments to their answers given in the first round. There can be more than one round and the content of the questions to be addressed is not limited in any way. The Delphi method is thus a very loose framework to be applied in different contexts and its successful use is dependent on the careful design of questions in the same way as with surveys or interview-based research methods.

The goal of the Delphi method was to highlight the focus areas in terms of future phenomena that are most important in relation to Sitra's Sustainability Solutions theme over the next 10 years. The Delphi process consisted of two rounds, an online survey and expert interviews.

### **The first Delphi round (online survey)**

The first round of the Delphi process included an online survey conducted via Webropol. In the survey the respondents

were asked questions about the 20 key future phenomena selected by the process described above. To help structure the survey and make it more respondent-friendly, the future phenomena were categorised under four different themes: trends, solutions, values and emerging issues.

Two following questions demanding answers on a scale from 0 to 10 were asked in the survey about each of the 20 phenomena.

- a. In your opinion, how much will the significance of the phenomenon increase in the next 10 years?
- b. In your opinion, how much more attention and resources does this phenomenon require in Europe than is currently the case?

Respondents were also given the opportunity to justify their answers in writing below each phenomenon-related scale questions.

The next section of the survey consisted of a list of all 20 phenomena. The participants were asked to choose a maximum of five most significant phenomena and to answer the following questions.

“If you were in the position to decide, which of these phenomena should a sustainability and future-focused organisation invest time and resources in within the next 10 years? Please choose five.”

Some phenomena were described more accurately to ensure clarity for the reader. For example, the phenomenon “Outsourcing of European environmental impact” was reworded as “Outsourcing of European environmental impact (management of sustainable value chains)”.

In the final section of the survey the participants were given the option to list phenomena any not included in the survey. The following question was asked:

“In terms of sustainability transition, are there other phenomena you think are more

important over the next 10 years than the ones already listed in this survey?”

At the end of the survey, the respondents were required to indicate their availability by choosing the most suitable times for a personal Delphi interview. Based on the times indicated, the participants were contacted and the virtual meeting times for personal interviews booked.

The results of the first Delphi round were analysed and synthesised and a synthesis report was produced, which summarised the results from the first round of the Delphi process. The synthesis report is contained in Annex 1 of this report.

### **The second Delphi round (expert interviews)**

In the second round, each participant was interviewed individually for about one hour, in a semi-structured online interview conducted via Teams. See Annex 2 for a full list of the interview questions.

Each of the participants' individual answers were reviewed before the interview and the synthesis report of the first round was sent to them before the interview. The participants were presented with the synthesised results from the first round during the interview and any deviation from the most common responses were elaborated on. In addition, the participants were asked, for example, about what kinds of thoughts the synthesised results evoked and to what extent they agreed or disagreed with the average results. The interview questions addressed in particular the phenomena about which the interviewees' opinions clearly differed from the views of other experts, as well as the phenomena that generated the most differing views (in other words, those that demonstrated the greatest deviation in values/answers) among the experts. It was also possible for the participant to change their previous opinion during the interview, but this was

not proactively encouraged by the interviewers.

The results of the Delphi process are presented in Chapter 4.

## 2.4 Panellists

The Delphi process was conducted using mainly international experts selected by Sitra and Sitra sent out the invitations to participate in the process.

Seven high-level experts with foresight, futures and environmental backgrounds

participated in the Delphi process as panellists. From these participants, five attended both rounds of the Delphi process, whereas two participated only in the personal interviews during the second round. They were also sent the synthesis report from the first-round survey responses.

The panellists represented different expert organisations, such as:

- intergovernmental organisations
- international institutes and think tanks
- investment funds
- government organisations

# 3 Key future phenomena selected for the Delphi process

Table 1 presents all 47 future phenomena concerning ecological sustainability that were preliminarily identified in the first part of the foresight process.

Based on the analysis by experts from Sitra, Gaia Consulting and the FFRC, it was concluded that the phenomena selected to the Delphi process must include phenomena previously not addressed by Sitra to advance the futures work. Hence, phenomena already familiar or covered by Sitra's work, such as

“Circular economy business models” or phenomena related to the energy transition (such as “Hydrogen energy replacing fossil fuels”) were eventually left out, albeit while recognising their importance to ecological sustainability. Furthermore, addressing novel perspectives through emerging phenomena was perceived as potentially offering new insights into the “old” and familiar future phenomena.

**Table 1: Preliminary longlist of selected future phenomena**

Preliminary longlist of 47 future phenomena (in random order)	
Climate migration and refugees	Hydrogen energy replacing fossil fuels
Migration to growth centres	Diminishing and unequal access to essential resources
Nature-positive and regenerative economic models	Scarcity of critical natural resources
Circular economy business models	Urban development and sustainable cities
Nature as capital and as an intrinsic value	Plant-based food production and consumption
Changing economic metrics	Sustainability of mining
Slow life and the changing meaning of work	Diversifying forest use – nature-based services
Micro-activism and direct forms of influence	Big data as a driver of the sustainability transition
Strengthening the rights of other species	Self-sufficiency in agricultural nutrients
Climate anxiety and mental health impacts	Role of culture in the sustainability transition
Assisted regeneration of nature	Adaptation to climate change
Regenerative agriculture	Socially just transition
Global water crisis	Rights of future generations
Emissions trading, carbon sinks and credits	Regional transitions towards sustainability
Food production in laboratories	Natural resources from space
Deterioration of the oceans	Natural resources from the Arctic
Corporate responsibility extending to handprints	Management of biodiversity hotspots
Algorithms as decision-makers	From climate neutral to climate positive
De-globalisation and geo-economic blocs	Biodiversity loss
Technological cold war	Creating new organisms by synthetic biology and gene technology
Resource wars	Health of humans and nature intertwined (planetary health)
Distributed, local energy production	Global value chains and outsourcing of European environmental impact
Plurality and trust in environmental politics	Challenges of the circular economy transition
Sufficiency and consumer lifestyles	

Thus, based on the preliminary list of future phenomena and the analysis, a final list of 20 key future phenomena was produced for inclusion in the Delphi process. The aim was to keep the number of phenomena limited so that it would be feasible for the high-level experts to complete the Delphi process within the allotted time constraints. The final list of key future phenomena is displayed in Table 2.

The formulation of some phenomena was modified and elaborated based on Sitra's

feedback. As an example, the final formulation of "Nature as capital and as an intrinsic value" was modified to become "Appreciation of the intrinsic value of nature". Furthermore, some phenomena perceived to fall under similar themes were merged, for example "Natural resources from space" and "Natural resources from the Arctic" were merged to "Natural resources from peripheries such as the Arctic and space".

**Table 2: List of selected future phenomena to feed into Sitra's Delphi process**

Appreciation of the intrinsic value of nature
Slow life and changing the meaning of work
Strengthening the institutional and legal rights of future generations and other species
Sufficiency and consumer lifestyles
Socially just transition
Health of humans and nature intertwined
Climate migration and refugees
De-globalisation and geo-economic blocs
Urban development and sustainable cities
Scarcity of critical natural resources
Micro-activism and direct forms of influence
Emissions trading, carbon sinks and credits
Diversifying forest use – nature-based services
Management of biodiversity hotspots
Outsourcing of European environmental impact
Nature-positive and regenerative economic models
Plurality and trust in environmental politics
Role of cultural practices in the sustainability transition
Natural resources from peripheries such as the Arctic and space
Creating new organisms by synthetic biology and gene technology

## 4 Results from the Delphi process

This chapter summarises the key results from the two rounds of the Delphi process.

In the first round, the original 20 phenomena were assessed from two perspectives: in terms of increasing significance; and the attention required over the next 10 years. Table 3 presents the 10 phenomena that received the highest points in these categories during the first-round survey.

The top two phenomena considered to have an increasing impact (“Health of humans and nature intertwined” and “Nature-positive and regenerative economic models”) received clearly higher marks than the others and they were also among the top four phenomena to require more attention and resources in the next 10 years.

During the second round the above-mentioned two most significant phenomena were strongly supported by all, whereas the relative importance of the rest of the phenomena varied. The different arguments and viewpoints raised in the interviews are discussed under the following sections

representing the points of view of the panellists. At the end of this section there are some concluding remarks.

- Top two phenomena emphasise a planetary approach (section 4.1)
- Trust and justice require more attention (section 4.2)
- How to manage planetary impacts and resource use (section 4.3)
- Changes in the global game (section 4.4)
- New perspectives and values (section 4.5)
- Outliers and additional phenomena (section 4.6)

It should be noted that the discussion presented here is based on the data and interviews gathered in the Delhi process, but it also includes clarifying interpretations by the writers of the report. To give depth, meaning and context beyond mere descriptive text, the message emanating from the source material is complemented by insights from the wider body of related understanding.

**Table 3: The phenomena receiving the highest points during the first Delphi round**

Highest points in terms of increasing significance	Highest points in terms of attention and resources required
1. Health of humans and nature intertwined (planetary health)	1. Nature-positive and regenerative economic models
2. Nature-positive and regenerative economic models	2. Socially just transition
3. Diversifying forest use – nature-based services	3. Health of humans and nature intertwined (planetary health)
4. Scarcity of critical natural resources	4. Plurality and trust in environmental politics
5. Strengthening the institutional and legal rights of future generations and other species	5. Diversifying forest use – nature-based services
6. Outsourcing of European environmental impact (management of sustainable value chains)	6. Management of biodiversity hotspots
7. Slow life and changing the meaning of work (downshifting, meaningfulness of work)	7. Climate migration and refugees
8. Climate migration and refugees	8. Outsourcing of European environmental impact (management of sustainable value chains)
9. Urban development and sustainable cities	9. Scarcity of critical natural resources
10. De-globalisation and geo-economic blocs	10. Creating new organisms by synthetic biology and gene technology



## **4.1 The top two phenomena emphasise a planetary approach**

Experts involved in the Delphi process saw that “planetary health” and “regenerative economic models” have a paramount importance and potential for having a notable positive impact on the health of our planet. Both are wide, systemic themes which emphasise a planetary approach where nature is not only an economic resource but an essential source of life and well-being. Both require deep changes in humans’ and societies’ relationship with nature.

### **4.1.1 Health of humans and nature intertwined (planetary health)**

This phenomenon calls for profound change in values and attitudes towards nature and a better understanding of how the well-being of humans and nature are linked. The ethos in the industrialised countries had long been to isolate our living environments as well as many of the commercial processes as much as possible from the natural environment. Technology in its various forms and applications (be it in manufacturing, agriculture, etc.) can be seen as an antithesis of nature, something that is the opposite of wild. This quest for control has meant that many activities have, at least implicitly, embraced the aim of reducing biodiversity as much as possible and thereby resulted in alienating the significance of nature and natural processes.

However, studies show that a healthy natural environment (measured in terms of volume and areas of greenery, biodiversity, etc.) has implications for human well-being (preventing chronic diseases, decreasing violence or lowering temperatures, for instance). In agricultural processes, a

healthier environment results in more resilient farmlands and better-quality ecosystem services. Planetary health shares similarities with the regenerative economic models through the idea that one key element of the health of humans and nature being intertwined is respect for the limits of the planet’s carrying capacity.

The importance of finding integrated solutions for human and planetary health is emphasised by the fact that the World Health Organization has concluded that climate change is the biggest threat to human health and therefore will place the greatest strain on the healthcare systems in many European countries. Unless new solutions are found, this is considered a potential area of collapse. Although many solutions may be simple (like planting trees), more operationalisation, pilot projects and research are needed.

### **4.1.2 Nature-positive and regenerative economic models**

The economic framework that focuses on maximising the volume of output while optimising efficiency of production and distribution has been hugely successful in providing material wealth and well-being. However, the economy has operated as if the planet had inexhaustible resources (or is operating in an “empty world”, to use the term made popular by Herman Daly, where the size of the economy is small compared to the containing ecosystem), without too much consideration for the costs incurred by nature or for the effects on natural processes. Now with climate change and accelerating biodiversity loss we are witnessing the effects of such negligence. We have reached “full world”, where the economy is too big with respect to nature’s regenerative capacity or the assimilative capacity of nature’s sinks. Therefore, we will need to transform our

economic systems to respect the boundaries that our planet has.

The regenerative economy is a system where extractive business models are not the standard way of operating; instead, economic activities provide positive contributions for nature and society. The task of transforming the economy to work for people and the planet is huge. Following the understanding gained from natural sciences, we would need boundaries or ecological ceilings for how much natural capital we can exhaust. All economic activities should respect these boundaries and operate within the set limits. At least at the initial stage, this task will most likely require more extensive involvement from national governments and international governmental organisations than we have been accustomed to in recent decades. Setting and enforcing such boundaries marks a departure from “normal” economic policies and economic thinking where the economy was free to expand without too much consideration for long-term environmental damage and where the focus was mostly on maximising the volume of economic activities.

Public discussion around new economic models will most likely be heated and characterised by unintentional and intentional misunderstandings. It would be wise for governments and other entities shaping public discourse to anticipate this development and begin awareness raising and capacity building on alternative ways to think about economics. Imagining and reimagining was emphasised in this context: we need to find cleverer ways to organise societies. And we need forums for regular people to imagine alternatives and discuss the values we want the system to reflect.

## **4.2 Trust and justice require more attention**

Two issues that were assessed as requiring more attention and resources are both related to the proper functioning of our democratic system and to the challenges climate change, biodiversity loss and other planetary crises present to it. The Delphi panellists were concerned about the capacity of a democratic system to act fast enough and implement potentially unpopular solutions.

### **4.2.1 Plurality and trust in environmental politics (diversity of views, tensions, trust in politicians)**

Trust in politics in general, and not just environmental politics, is challenged by various concurrent developments. Fake news, trolling and information warfare as well as social media bubbles create competing realities that may leave the public divided and suspicious of both each other and the governing systems. Simultaneously, increasing planetary crises are likely to require stronger and increasingly urgent responses, which could potentially meet with fierce opposition. However, if politicians do not manage to act on the crises, activists who have lost faith in governments may take power into their own hands. If the situation becomes dire, more radical environmental activism, such as attacks on big polluters, may be considered by the public and approved by society as a necessary next step.

The building of trust should be a foremost concern for those working on planetary crises. It is necessary to create space for constructive dialogue as well as to provide narratives to ensure the public support many of the changes that are needed. A further challenge is that when the

public realise that, in addition to climate change, there are a number of other breaches of planetary boundaries, they may grow even more weary.

#### **4.2.2 Socially just transition**

A rapid transition to more sustainable societal and economic structures will affect the livelihoods and well-being of many. The winners will be those with the capabilities or resources required for the transition, while the losers' skills will become outdated or their ways of operating will be challenged or made redundant. It is vital to manage the transition so that it is considered fair, particularly by parties that are affected by the change. Particular attention needs to be devoted to those who are adversely affected; giving them a voice, responding to their concerns and designing credible and respectful options to maintain their dignity and livelihoods. Failing to do so may jeopardise the goal altogether by eroding public acceptance for the sustainability measures.

A socially just transition does not mean delaying the execution of the needed sustainability initiatives. The risk of failing to meet the expectations of the public also exists if the transition is not considered to be effective or fast enough. In such a case, there is a risk of mainstreaming "eco-rebellion" or even "eco-fascism", where the legitimacy of governments and social stability is eroded by not doing enough. Governments are facing a difficult balancing act – they need to assist with transforming economies while accepting that many old industries (providers of tax revenues) suffer.

Another perspective concerning justice that was raised by some panellists was that in addition to the transition process being just, even more attention should be paid to ensure that the design of new social and economic structures will be just. The truly complex

issue here concerns inequality at the global level and how that can be addressed.

Visions and future images of the potential alternative ways to organise society and the economy are called for. Carefully executed and well-prepared visions could help see the benefits, obstacles and potential flaws of different transition paths. Foresight work on the risks and opportunities of the transition, as well as future-oriented attitudes, could prove beneficial.

### **4.3 How to manage planetary impacts and resource use**

Management of natural resources has traditionally been a very technology-oriented affair. Some panellists were pessimistic, however, that while there are many technological solutions that may be able to solve the climate change, technology will not be able to solve the collapse of ecosystems and planetary processes.

#### **4.3.1 Diversifying forest use – nature-based services**

The intensive use of forest products in industry is diminishing the carbon sinks in Finland. The management of forests is a particularly heated topic, while the biggest tensions lie between nature conservation and two other issues: the commercial use of forests and the private ownership and control of land (and whatever is on that land). Thereby the theme connects closely with the issue of a fair and just transition to sustainability.

The core of the problem is that forests are typically only valued for the amount of timber that one can fell. This leaves out all other functions such as the wide array of biodiversity services or climate benefits that a standing forest has. Creating biodiversity and ecosystem markets and offset systems, as

well as supporting environmental tourism and health services, would create opportunities for increasing income from forests without felling timber. Some of the Delphi panellists also highlighted the important role played by forests and green areas in urban environments in providing health and well-being for human beings.

#### **4.3.2 Management of biodiversity hotspots**

Biodiversity hotspots are areas with high biodiversity values that are under threat from human influence. Conserving these areas has an enormous impact on securing global biodiversity and therefore preserving these areas is a priority. However, in the responses it was noted that if one only concentrates on biodiversity hotspots, one might miss the bigger picture. Paying particular attention to biodiversity hotspots is something we will need to do in any case, but by focusing on just those, we might fail to pay attention to the importance of maintaining biodiversity elsewhere, in those areas where there are varying degrees of human activities such as areas used for agriculture, forests for economic use, cities, etc. A future where biodiversity is protected only in designated hotspots and the rest of the planet is used for intensive economic use is rather dismal and to avoid that biodiversity needs to be addressed everywhere, not just in hotspot areas.

As for biodiversity in general, it deserves more attention than it receives at the moment. In recent years the focus has been on climate issues, but other planetary boundaries that we have either crossed or are about to cross have received less attention. Biodiversity loss is probably the most severe one. Because of the complex and irreversible nature of biodiversity loss, tackling the problem will require another type of approach than merely concentrating on climate change. The kinds of technology fixes available for assisting with tackling

climate change (such as renewable energy technologies or possible carbon capture solutions) are unlikely to be able to solve biodiversity loss. The solutions will probably need to address more fundamental questions with regard to how we use natural resources. Biodiversity footprints may be one way to measure and make visible this effect.

#### **4.3.3 Scarcity of critical natural resources**

Although in the first round of the Delphi process this phenomenon was considered to be of relatively high importance, the topic itself raised much less discussion and prompted fewer diverse views than other topics considered here. For most it seemed quite self-evident that the scarcity of natural resources is a challenge that needs to be addressed. It is important to note that many considered that scarcity does not necessarily refer to materials or resources that are rare – like certain metals – but instead to any critical resource that may become scarce, like water.

#### **4.3.4 Outsourcing of European environmental impact**

In the Delphi responses this was seen as an issue where Europe needs to take more responsibility. At the moment, not all European green policies are necessarily about making sure the plan is green for everybody. Even though the result of an initiative, increasing the number of electric vehicles on Europe's roads, for example, might be good for the environment at large, the benefits and costs of the transition might not be equally distributed. Those lower in the value chain, including countries, who are typically responsible for sourcing minerals and other raw material, may bear the biggest environmental burden. More transparency and willingness to take into account the effects of the whole value chain are required.

Solving the issue is a balancing act between environmental issues, maintaining control of value chains, the relative benefits of the global division of work and the costs of the final products. The outsourcing of environmental impacts was seen as a central theme for many commercial enterprises, through accountability and raising awareness of consumers, and this aspect was therefore not considered to need as much attention as others.

#### **4.4 Changes in the global game**

While the world is rapidly dissolving into competing power blocs, some panellists were concerned about what will happen to global thinking, shared values and shared identities that have been fostered over the past decades. Other panellists posed the question of whether globalisation has ever been able to bring success in terms of protecting our planet or if the impact has actually been the opposite. Furthermore, will Europeans take responsibility for the survival of those in the rest of the world who are suffering the impacts of planetary crises or will they concentrate only on their own well-being? Will migration be the only aspect that we are concerned about as far as the rest of the world is concerned or are we ready to sacrifice some of our well-being to protect others?

##### **4.4.1 De-globalisation and geo-economic blocs**

De-globalisation was not considered as necessarily meaning the cutting of ties and contacts but rather a restructuring of the global order. Signs of change are the slow deterioration in international multilateral contracts and tensions between economic blocs, the US and China being one example. Perhaps ways and forums of global

interaction between nations will change and the emphasis may be more on technocratic issues while issues related to democracy, for example – or other themes held high on the agenda by Western countries in the past – will receive less attention. For Europe to maintain and strengthen its standard-setting authority, it is important to operate as a single cohesive bloc and to co-ordinate policies more strongly with like-minded partners elsewhere in the world (Canada, New Zealand, etc.). A fragmented Europe will shrink.

In order to solve planetary challenges, we need to build co-operation and trust among nations on issues wherever possible. It is also plausible that firms will act and create procedures for managing climate change and biodiversity issues if nations and global intergovernmental organisations fail to do so. In the short term, it is probable that the supply chains of different systems that are considered critical, such as healthcare or key technologies, will be localised.

##### **4.4.2 Climate migration and refugees**

As a result of the adverse effects of climate change, is quite likely that many densely populated areas around the globe will suffer from conditions that force people living in those areas to migrate. By some estimates, parts of India, for instance, might begin to frequently suffer wet-bulb temperatures in the near future. For people in areas most severely hit by climate change, Europe might appear as a “green island”. Already with the current migration levels there are tensions between upholding human rights and societal stability. In the face of migration pressure, we in Europe are forced to address the question as to what Europe is. Is it a collection of states that are distinguished by being ethnically homogenous nations or is Europe, and European nations, defined more on a set of principles and ideas that anybody

can assimilate into? With the possibility of intense climate migration to Europe, ideas about human rights and universal ideas will be put to the test.

## 4.5 New perspectives and values

Rethinking and reimagining ways of organising and doing things was a theme called for by the panellists. The question is, does the current system reflect our values or could our values be better reflected with some changes to the current system?

### 4.5.1 Slow life and changing the meaning of work

As for this theme, there were some differences in how the two components of the theme – slow life and changing the meaning of work – were seen. Slow life was seen as an appealing idea, but there was not unanimous support for the interpretation that people would be content to do less work in the future. It was interpreted more in a way that in the future the ways of carrying out all everyday activities (including work) should be less harmful for the planet and more beneficial for people and the planet.

On the changing meaning of work, however, there was rather widespread agreement. This change would be reflected in the need for psychological safety, an improved work-life balance, work being something that provides meaning to life (other than just a salary) and perhaps being less committed to a particular employer. Reframing the discussion would require reimagining what work could be and how it could bring human fulfilment and happiness: is it coaching soccer to children, taking care of the elderly or cultivating tomatoes? One perspective on work was also the question of dividing resources and maintaining balance:

while some people work too much and suffer from stress and burnout, others have no work at all.

### 4.5.2 Strengthening the institutional and legal rights of future generations and other species

The rights of future generations and species other than humans are underrepresented in decision-making. From an ethical perspective, the generation(s) in power at present should aim to act so that a safe and stable environment, ecosystems and the climate are preserved for all species in future. This is currently not the case; instead, long-term interests are overridden by short-term solutions.

As for the rights of other species, the question relates to strengthening the value placed in decision-making for the intrinsic value of nature. For future human generations, one way to approach the question is to underline the importance of what time horizon is applied when making decisions. Our societies and economic systems tend to operate with rather short time frames, typically election periods. If one were to operate within time frames that extend over decades, sustainability questions (as well as other slowly developing issues such as education) might get the attention they deserve. This would also act as a tool to transform our economies. Applying long enough time frames would limit the lure of making economic decisions that might yield benefit in the short term but create new problems in the longer term (such as investments in fossil fuels, manufacturing low-quality goods or cuts in public services). With a longer time frame, there is often no conflict between sensible economic activity and sustainability.

The rights of the future generations and other species could be included in the decision-making system through laws and

the establishment of new institutions that would protect these interests.

## 4.6 Outliers and additional phenomena

There were a number of other specific topics that were mentioned by the panellists and some additional perspectives that were brought up. These are briefly summarised below.

- Geoengineering was brought up by several panellists as being an important phenomenon in the near future. Especially with the increasing division between various global powers, it is likely that potentially risky initiatives from different blocs are implemented without regard for the safety or impacts on competitors or enemies. The risks of unilateral, irresponsible or ill-advised actions or the use of geoengineering as a weapon were a notable cause for concern.
- Faster economic growth in emerging economies and decreasing growth in Western economies was mentioned as an important phenomenon that will have significant impacts in the near future.
- The search for natural resources from space sparked some comments about the importance of the public sector being involved in space development so that it is not monopolised by private interests. Activities in space were also considered very relevant within the next 100 years, if not in the near future. Discussions on space are also considered as a culturally important source of imagination and alternative perspectives. However, scouring space for resources was considered problematic if we cannot manage to solve our own planetary crisis first and instead seek solutions beyond our own planet.
- Synthetic biology and gene technology were considered as both posing a great risk and having enormous potential for

creating a positive impact. They could be a source for new methods and opportunities for solving planetary crises, but could also create a threat, especially if new technologies are rolled out before they are tested and secure. What will become of new types of bees or mosquitoes?

- Food shortages and food system collapse were brought up as very possible scenarios in the next 5-10 years.
- The fast development of AI was considered to have potentially hazardous and unpredictable impacts that should be studied carefully.
- The potential stopping of ocean circulation and consequent Arctic conditions in Northern Europe were considered to have gained too little attention in public discussion.

## 4.7 Cross-cutting discussion notes – we need to do the things that should have been done yesterday

To conclude, there were some generic ideas that arose from the panellists' comments during the Delphi process that we wish to share here.

Some of the phenomena that were identified as important are actually consequences of something we would wish to avoid (such as climate refugees). So, our focus should be on addressing the origins of problems, such as climate change and biodiversity loss, and being aware and paying attention to what we will face if we fail to address these main causes. Furthermore, the solutions need to prevent damage occurring again; in other words, the systems must be fundamentally changed to prevent further damage. At the same time, we need to acknowledge that some damage has already been done and we need to prepare for the consequences, such as severe drought (or

heatwaves, storms, flooding, effects on economies, refugees, etc.) in different parts of Europe and the consequences of that for different areas of society such as agriculture, energy production or transportation. There is a need for foresight work on both the processes of speeding up the transformation to more sustainable economies (in the longer term) and managing the consequences of climate change and biodiversity loss (in the immediate term).

When assessing possible developments (be it risks or possibilities), we need to be able to identify characteristics, the speed and expected significance of the change. In general, we tend to assess risks and possibilities by thinking in linear terms, but many issues might be difficult to grasp with linear thinking. For example, the growth of AI capabilities (which might grow exponentially in the near future), climate change and biodiversity change (reaching tipping points produces sudden changes), the compound effects of economics of scale, and learning and diffusing new understanding in networks (with regard to technology development, for instance) are all examples of issues where a more refined understanding of the dynamics of change might lead to more educated thinking about the future.

Concerning the planetary crisis, the panellists shared a notable concern about the urgency of finding solutions and the potential for the situation to get out of hand. Extreme solutions were considered likely to be tested over the next five to 10 years, and the question was who will co-ordinate and control that: "The worse the climate gets, the more desperate decision-making gets and the less likely are we to ensure that there aren't really big externalities of the deployment of these things."

Uncertainty was a common theme in most interviews: the panellists struggled with the enormous uncertainties surrounding the impacts and consequences of issues such as climate change, AI, political trust, social media, synthetic biology, migration and gene technology. Dealing with and managing such uncertainty is a key issue both at the personal level for individuals and for professionals in their jobs. To deal with this uncertainty, many panellists called for carefully prepared and executed processes that would trigger discussions on long-term values we want to maintain and promote in our society. Although these visions cannot predict what the future will bring, they might clarify for us what it is we want as a society. Potential promises, benefits and risks might also be easier to frame that way.



# 5 Lessons learned from the foresight process

The foresight process to support the evaluation of Sitra's Sustainability Solutions work was a piloting experiment. The results and the process supported the evaluation well by producing insights into future phenomena that Sitra could work with and also by validating some of the strategic choices Sitra has already made. In particular, the two significant and systemic phenomena related to the reform of economic models and planetary health echoed with the choices made in Sitra's latest projects.

Panellists gave positive feedback about the process. Although requiring a lot of work, the process worked well and they found it interesting to have the interview discussions based on the first-round results. Overall, Finland was considered to be an interesting nation that could act as a global piloting platform for many solutions. Sitra was considered to be the right type of an organisation to be a global visionary and exporter of future thinking.

Combining this type of futures exercise with evaluation is worth developing further. The main lessons learned and considerations for the future are set out below. These lessons learned are useful for those foresight and evaluation practitioners who would like to design similar exercises.

## Participants determine the benefits from the process

The main benefits from the foresight processes usually stem from the process itself in co-designing the exercise and in participating in it. The foresight process was co-designed with Sitra combining horizon scanning and the Delphi method, which also

supported the learning objectives set for the evaluation. The horizon-scanning part of the work relied on Sitra's previous foresight efforts and benefited from Sitra's megatrends work. The integration of the exercise with the normal processes of the users of the results is of high importance. The integration of foresight as part of the evaluation process was seen as motivating for the users of the evaluation results.

The aim of the Delphi part of the process was to collect and analyse expert opinions from outside Sitra. The results reflect the opinions of the participants and thus the selection of the participants is critical. In this exercise, the invited panellists were people who are very knowledgeable about sustainability; most of them are foresight professionals and are familiar with Sitra. Although at the end there were only seven experts participating in the process, the end results were useful and varying viewpoints emerged. The panellists were motivated to participate and provided their insight. The survey and interview questions that were developed can be extended to a wider group of participants, or the process can be repeated in the future.

With a different group of panellists, the Delphi results could have been different. One should note that the views of this report stem from a selection of experts, who are specialised in foresight and sustainability issues. This is particularly noticeable with the discussion and results on the theme of a slow life and changing the meaning of work. While these issues may be reality for some, at the other end of the spectrum (manual work in platform economy jobs, for example) many face a very different reality. The importance and thereby social acceptance of the needed activities are of course subject to

complexity around such issues. What is missing from the data and the interpretations is a wide variety of views and interpretations that emerge from different angles. For greater diversity of results, a larger exercise with a broader range of different participants would be needed.

## Objectives set for the process dictate the methods to be used

The precise objectives for the foresight were co-designed by the evaluation team and Sitra and covered a number of choices.

### 1. The choice to use a list of future phenomena.

The first main choice was to decide whether the objective was to find very new topics (“thinking the unthinkable”) or validate something that is already known. This was discussed in-depth in planning meetings and in the planning workshop. At the beginning of the process, it was discussed whether the exercise should focus on assessing different policy actions, but it was decided to design the exercise to explore different future phenomena that could be of interest for Sitra. The final choice leans also more towards including topics that are already rather well known for Sitra. When discussing the results with Sitra, it was pointed out that some topics that seem to be well known from Sitra’s point of view are not yet high on the agenda or well known throughout society.

### 2. Defining a list of phenomena.

Based on the first decision to focus on future phenomena, there was a need to decide how the content would be structured and described to the participants in the Delphi process. It was decided that a ready list of phenomena would be the basis for the process. The following points should be

taken into account in future when similar approaches are used.

- The list of phenomena used was not created from scratch and this particular foresight exercise could draw from a rich set of foresight data and knowledge. One major source for the list was Sitra’s 2023 Megatrends report and the signals collected for that. These were created based on extensive consultations and background work. Also, the larger survey and interviews done as a part of the evaluation included futures-oriented questions and that material was used to create the list of phenomena.
- To keep the list relatively short, Sitra’s experts selected those phenomena of particular interest to Sitra, to be fed into the process. These types of ready and validated lists would not necessarily be available for other similar exercises and this should be taken into account in resourcing the work. On the other hand, another type of process could be designed to collect interesting and new phenomena or a similar process could be carried out without the evaluation context.
- Describing very complex topics in a very simple manner is a big challenge. Among different alternatives, it was decided to use quite simple titles and wording for each of the phenomena. Considering the experts participating in the process, it was very important to keep the amount of text limited and also leave room for elaboration and interpretations. This seemed to work well in this process. One next step would be to use the results to define the main connections and relationships among the key phenomena and possibly use them as a basis for a scenario exercise. Some panellists mentioned this and pointed out that

many of the phenomena have systemic interdependencies.

3. **Choosing questions for the Delphi process.** After finalising the list of future phenomena to be used in the Delphi process, the questions asked over the first round were specified. There were multiple alternatives discussed together with Sitra in the planning workshop. It was clear that the significance of the phenomena needed to be addressed but the question remained as to how – in a general manner or by specifying the rate of increase in significance? In the end, the latter option was chosen. The connection to the evaluation questions was kept in mind and this was the main reason for adding questions that also addressed the future need for action (“required attention and resources”). There were also many other questions that could have been asked, but keeping the length of the survey reasonable for the participants limited the number of questions to be asked.

## Lessons learned from using a variation of the Delphi method

The foresight exercise was designed from the beginning to involve international panellists in the Delphi process. There are a few lessons to be learned from the foresight exercise, which used a variation of the method.

1. **Pros and cons of the Delphi method.** Delphi is not a very strictly defined method, but it has a certain brand name which has positive and

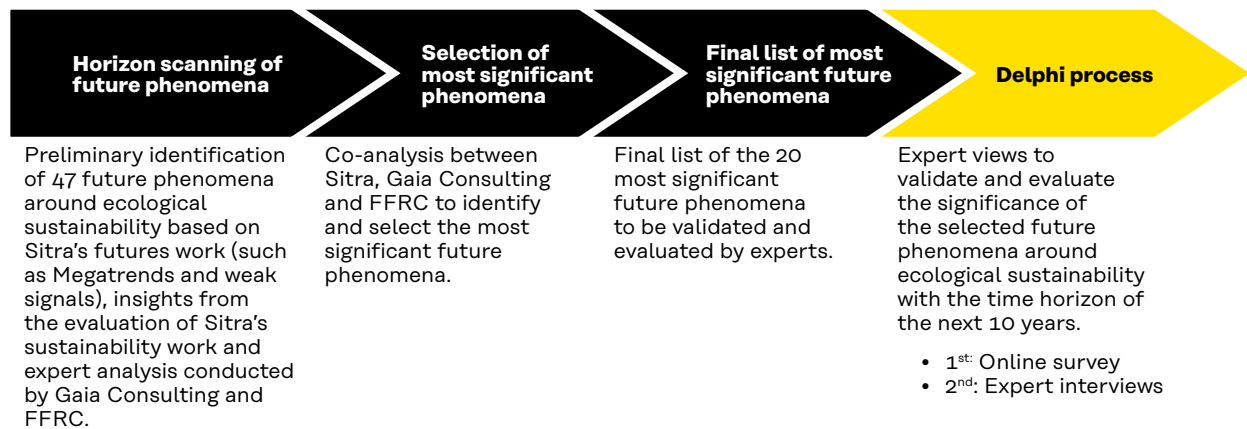
negative implications. Some people have experience of using Delphi as a first step for a larger scenario-building exercise and some have used the method to seek consensus among expert opinions, for example in medical decision-making. Previous experiences affect these expectations. It may be that the anticipated burden of the method scared off some of the invitees. Some participants, on the other hand, might have been more interested in participating to see how the method would be applied in this case.

2. **The number of rounds.** The core of the method is the repetition of the questions over more than one round and in this manner the method differs from a typical interview process. The repetition ensures a systematic dialogue among the experts and provides deeper insight into various arguments. For the purposes of Sitra's evaluation project, the two rounds based on different methods for collecting opinions (a survey and interviews) worked well. It was also easy to participate only in the second round. The pool of experts participating in the first round with a survey could have been larger. One should note that Sitra could repeat the process in the future with the developed set of questions and content.
3. **Designing interviews.** The main design parameter was the questions presented to the participants. In this respect, the Delphi method does not provide any special guidance. Normal methodological considerations need to be followed in the same way as with any other qualitative research using a survey and interviews.

## Appendix 1: Synthesis report on the first round of the Delphi process

### 1. Process description and list of all the phenomena in the Delphi process

**Figure 3. Selection of future phenomena to Sitra's Delphi process**



#### List of future phenomena addressed in Delphi-survey

1. Appreciation of the intrinsic value of nature
2. Slow life and changing meaning of work (downshifting, meaningfulness of work)
3. Strengthening the institutional and legal rights of future generations and other species
4. Sufficiency and consumer lifestyles (sustainable consumption, new ways of owning, self-sufficiency)
5. Socially just transition
6. Human and nature health intertwined (planetary health)
7. Climate migration and refugees
8. De-globalization and geo-economic blocks
9. Urban development and sustainable cities
10. Scarcity of critical natural resources
11. Micro-activism and direct forms of influence
12. Emissions trading, carbon sinks and credits
13. Diversifying uses of forests – nature-based services
14. Management of biodiversity hot-spots
15. Outsourcing of European environmental impact (management of sustainable value chains)
16. Nature-positive and regenerative economic models
17. Plurality and trust in environmental politics (diversity of views, tensions, trust on politicians)
18. Role of cultural practices in sustainability transition (cultural diversity, consumption patterns, values in society)
19. Natural resources from peripheries such as the Arctic and the space
20. Creating new organisms by synthetic biology and gene technology

**Questions covered in the survey**

For each phenomenon:

- In your opinion, how much will the significance of the phenomenon increase in the next 10 years?
- In your opinion, how much more does this phenomenon require attention and resources in Europe than is currently the case?
- Please, provide further justification to your answer and/or examples of what more needs to be done

Summary question at the end:

- If you were in the position to decide, which of these phenomena should a sustainability and future-focused organization invest time and resources in within the next 10 years? Please choose five

## 2. The 9 most significant phenomena based on given values with their variation, attention and resources needed, and qualitative synthesis

**Table 4. Most significant phenomena**

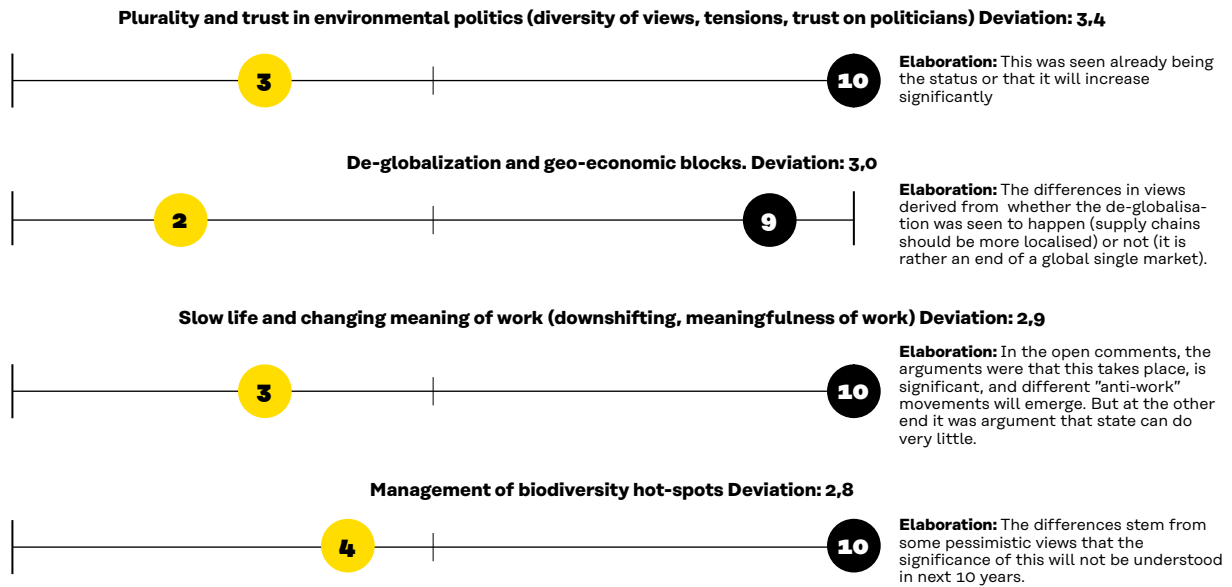
Phenomenon	Minimum value	Maximum value	Average value	Attention and resources required	Elaboration / what needs to be done
Human and nature health intertwined (planetary health)	8,0	10,0	9,2	Considerable	Calls for better understanding of how crucial healthy nature is to human wellbeing. Emphasizing the interconnection of human and nature's health could be useful in promoting, planetary holistic sustainability.
Nature-positive and regenerative economic models	6,0	10,0	8,6	Top priority	The discussion around these solutions will only grow and yield competitive advantage for businesses, hence governments should anticipate this change and help in enabling it.
Diversifying uses of forests – nature-based services	7,0	10,0	8,2	Considerable	Nature-based solutions and urban forests were brought up as important issues. Also, supporting the change outside Europe (especially where European resources are used).
Scarcity of critical natural resources	7,0	10,0	8,2	Considerable	The issue will become more critical as the environment degrades. Europe cannot "recycle its way out" of the problem. This needs greater focus on diplomacy and building a new consensus on a rule-based international order.
Strengthening the institutional and legal rights of future generations and other species	7,0	10,0	8,2	Considerable	Funding for participatory processes and public reflection is needed. The focus should be in the ecosystems and humankind as a whole instead of individual beings. Growing youth movements are expected.
Outsourcing of European environmental impact	5,0	9,0	7,8	Considerable	Europe's role in global economy (esp. Consumer markets) will decrease. More environmental processes also means higher costs that should be taken into account.
Slow life and changing meaning of work (downshifting, meaningfulness of work)	3,0	10,0	7,8	Moderate	People's understanding of a good life is changing. The state's role would be to support local communities. Broken social contracts may speed up the development.
Climate migration and refugees	3,0	10,0	7,6	Considerable	Key points raised relate to the effects and impacts of climate change that force people to flee, and increasing the understanding of the European general public that this can be evicted by adaptation. The phenomena will put European human rights claims to test.
Urban development and sustainable cities	5,0	10,0	7,6	Moderate	Adaptation to climate change; the lesser significance of European development (compared to that in developing countries).

Scale: 0–10

**Moderate:** responses 5,0 – 7,5  
**Considerable:** responses 7,6 - 8,9  
**Top priority:** responses 9,0 – 10,0

### 3. Phenomena with largest deviation in terms of their significance in the next 10 years

**Figure 4. Phenomena with largest deviation in terms of their significance in the next 10 years**



Question asked in the survey: In your opinion, how much will the significance of the phenomenon increase in the next 10 years?

## 4. Most significant emerging phenomena

**Table 5. Most significant emerging phenomena**

Phenomenon	Minimum value	Maximum value	Average value	Attention and resources required	Elaboration / what needs to be done
Creating new organisms by synthetic biology and gene technology	3,0	10,0	7,4	Considerable	Safe evolution of these technologies must be ensured, and the development should be value-based and mission-oriented. Ensuring fair access to all to avoid inequalities as well as risk management is essential. Harnessing AI into gene technology purposes will accelerate its development.
Plurality and trust in environmental politics (diversity of views, tensions, trust on politicians)	3,0	10,0	7,3	Considerable	Tensions around environmental politics will continue to emerge and trust diminish in the face of difficult decisions that need to be made in the future. This can already be seen in the rise of eco-fascists movements. Building trust would be crucial.
Natural resources from peripheries such as the Arctic and the space	4,0	10,0	7,0	Considerable	Investing into space is important for Europe. However, the development is slow, hence action should be taken now in order to assure Europe's future position. Privatization of space is, however, a concern to address.  In terms of arctic resources, the sovereignty of different nations, societies and groups to utilize these resources will be subject to growing debate.  Development of relevant policies are essential to ensure fair use of natural resources from both space and the arctic.

**Other emerging issues:**

- The role of AI in solving environmental sustainability challenges, e.g. climate crisis
- The shift in economic growth from Europe to emerging economies
- Global consensus and coordination of geo-engineering projects
- Emergence of biodiversity offset markets
- Rise of eco-fascism

**Moderate:**

**Considerable:**

**Top priority:**

**responses 5,0 – 7,5**

**responses 7,6 – 8,9**

**responses 9,0 – 10,0**

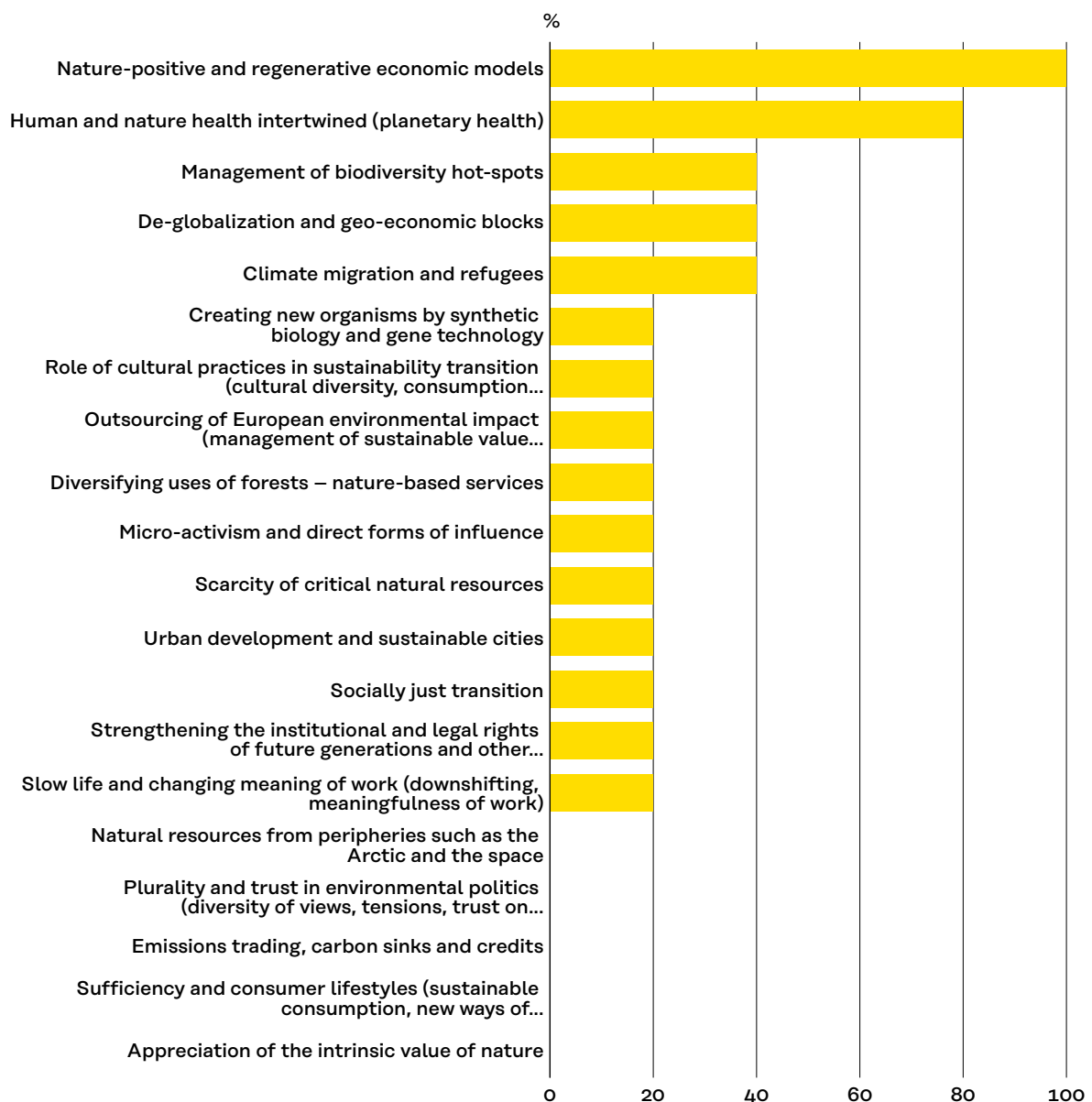


## 5. The most significant phenomena

### Top 3 phenomena based on individual values given: significant and require more attention and resources

1. Nature-positive and regenerative economic models (8,6) top priority required (av. 9,2)
2. Human and nature health intertwined (planetary health) (9,2) considerable attention required (av. 8,8)
3. Diversifying uses of forests – nature-based services (8,2) considerable attention required (av. 8,6)

**Figure 5. Based on choosing 5: Issues that were deemed important and seen to require more attention and resources**



## **Appendix 2: Interview questions for the second round of the Delphi process**

- 1.** When looking at the synthesised list of the most significant phenomena based on the first-round answers (slides 6-7 in the synthesis report), what is your own perception of the significance and the amount or attention required by these phenomena? To what extent do you agree or disagree and why?
- 2.** In your opinion, which one of the phenomena contains the most challenges, contradictions and varying points of view? Which ones have received too little attention?
- 3.** What kinds of relevant interconnections do you see between these phenomena?
- 4.** When looking at the phenomena that you find most significant and that require a lot of resources and attention, what are the key actions that should be implemented?
- 5.** Some phenomena had larger deviations in opinions (slide 8 in the synthesis report). Looking at these and reflecting on your own answers, what are the reasons for the varying opinions? Could you elaborate on your own responses?
- 6.** The first round contained some emerging issues and the respondents also added few new ones (slide 9 in the synthesis report). Could you please elaborate on your thoughts on these and add phenomena that you find interesting and relevant?
- 7.** The first round contained a question about which phenomena a sustainability and future-focused organisation should invest time and resources in within the next 10 years (slide 10 in the synthesis report). What would your recommendations be to an organisation like Sitra about how these future phenomena should be addressed?
- 8.** Any other reactions and comments.

**SITRA**

**EVALUATION**

The accountability for the contents of this report rests with the evaluation team, and the report's contents do not necessarily represent the views of Sitra.

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