BENDING, BUT NOT BREAKING

From the coronavirus pandemic to strengthening Finland's crisis resilience

Bending, but not breaking – From the coronavirus pandemic to strengthening Finland's crisis resilience
Statement by a group of independent experts convened by the Finnish Academy of Science and Letters

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SUOMALAINEN TIEDEAKATEMIA
FINNISH ACADEMY OF SCIENCE AND LETTERS

SUMMARY

THE FINNISH ACADEMY OF SCIENCE AND LETTERS convened a multidisciplinary group of experts to present their views on Finland's crisis resilience based on the lessons learned from the coronavirus pandemic crisis, with the goal of a strong and resilient Finland. The statement looks further into the future, rather than focusing on the short-term recovery from the current crisis.

The current crisis may overshadow longerterm crises lurking in the background. Amid the challenges presented by the pandemic crisis, concerns about climate and the environment have received less attention, even though they are by no means disconnected from the current events. Extensive global changes in the environment and in the habitats of different species also expose people to the spread of viruses. Halting climate and environmental change is essential for the well-being of humans, the economy and nature. We must reduce emissions and increase carbon sinks until carbon neutrality is achieved and keep reducing emissions further thereafter.

The solid standard of education of the Finnish society and trust between the Finnish people allowed Finland to navigate the pandemic crisis relatively successfully. It is always worthwhile to invest in maintaining these characteristics. It is essential to encourage equality and equal opportunity in society, which also means that the citizens must feel that they are being kept up to date and getting heard. Much has already been done in Finland to ensure material security of supply. But ensuring mental security of supply is equally important. The securing of people's mental well-being makes crisis management easier, and education and the arts play a significant role in this. They act as a foundation that hope about a better future can be built upon. The experiencing and creation of art cultivates the creativity of both individuals and the society, which is important for a vibrant economy that recovers quickly from crises.

Communication plays a key role in crisis resilience: the information must reach large numbers of citizens, be clear and, above all, be understood. Interaction is essential for the people's sense of inclusion and participation. The environment we communicate in has undergone rapid changes, and the changes can be expected to continue. Communication needs to be designed with these facts in mind. Special measures are needed to eradicate disinformation and maintain confidence in researched, evidence-based information.

THE STATEMENT represents the perspective of the scientific community. The independent scientific community has a key role in understanding crises, surviving them and rebuilding society. During the pandemic crisis, cooperation between the scientific community and the state has been successful in many ways, but fast-paced cooperation between scientific advisors and decision-makers, in particular, needs to be improved to prepare for unexpected situations.

It is essential to keep up strong basic research across a wide range of

TUOMAS UUSHEIMO

disciplines, as there are a wide variety of potential crises and we cannot predict what kind of information will be the most important when the time comes. What we do know for sure is that up-to-date, reliable and research-based information is needed, whatever the crisis. This time, vaccine research was invested in quickly and generously, through international collaboration. Still, the pandemic crisis has once again shown that understanding human and community behaviour is essential to the management of any crisis, which means that the humanities and, more generally, versatile research, form the basis for controlled and effective decision-making.

The scientific community is international by nature, and it has demonstrated the strengths this brings by finding solutions to the global pandemic crisis. The world is tightly intertwined – economically, politically and environmentally – and these factors, in turn, are closely interconnected. Finland must take a more active role in international collaborations and boost its profile as a facilitator of coooperation. Because there are many types of crises, they all cannot be managed according to a single model. Instead, the most sustainable solution is a society that is adaptable and able to strengthen its creative potential through the joint efforts of science, government and industry, all working towards the goals of sustainable development. ■

INTRODUCTION

In spring 2020, Finland was plunged into a deep crisis by the covid-19 epidemic. This crisis, which has impacted the whole world, has also affected the well-being of individuals, various communities and society as a whole in Finland. Many have suffered losses in terms of their health, the economy and social relations. The virus cannot be stopped without strict restrictive measures and shared efforts. At the same time, we must ensure that both the society and individual people can continue to function.

In spring 2020, the Finnish Academy of Science and Letters convened a multidisciplinary group of experts, who were tasked with coming up with ways of further improving Finland's long-term crisis resilience. The scientific community plays an important role in understanding crises, coping with them and rebuilding society. From the per-

spective of the scientific community, in order to strengthen crisis resilience we will need research, action, hope, equality and cooperation.

To resolve the coronavirus crisis, as well as other crises, we need strong political will, practical measures, as well as genuine cooperation and debate between decision-makers, experts and public authorities. Crisis resilience requires that we build the new normal of our society together, even when it would be easier to turn a blind eye to the realities that differ from what you have personally experienced. People must take urgent action and society has to make its structures more flexible in areas such as education, science, the economy and decision-making. There is no single model for overcoming crises, but an adaptable and creative society offers the best chances of success.

Measures taken to control an individual crisis often have significant indirect effects that influence the overall well-being of the society in the long term. Crisis prevention is viable from both a social and a financial perspective, and it serves as a basis for good crisis resilience. In order for our society to better prepare for future crises and, in general, to prevent the emergence of social issues, lessons can be learned from the coronavirus crisis. By investing in advance in both crisis preparedness and in the fair and balanced maintenance of the basic services of society and the well-being of all citizens, it is possible to maintain hope for a better future. To have hope, we need concrete action for the future.

KAAPO KAMU

TO SURVIVE A CRISIS, WE NEED IN-DEPTH KNOWLEDGE OF DIFFERENT CRISIS TYPES

With the covid-19 pandemic, the acute phase of the crisis and its aftermath have both been the topic of much discussion. In the longer term, we must understand the nature of crises: what is meant by a crisis, what types of different crises are there, how to deal with them and how to prepare for them.

Crises can be predictable or unexpected, global or local, one-dimensional or multidimensional, fast or slow, easy or difficult to handle. Some crises impact our society more extensively than others. Crises affect groups and individuals in very different ways, both in our own country and on a global level. Risks, crises and solutions are becoming increasingly related and layered in nature. Our current operating environment highlights the need for multifaceted approaches.

The coronavirus pandemic can be defined as a crisis that is predictable but has unknown characteristics

The corona pandemic developed quickly, but the duration of the epidemic and its effects are still difficult to assess. However, compared to climate change, for example, the coronavirus pandemic is a short-term crisis that requires rapid decision-making and constant situation updates.

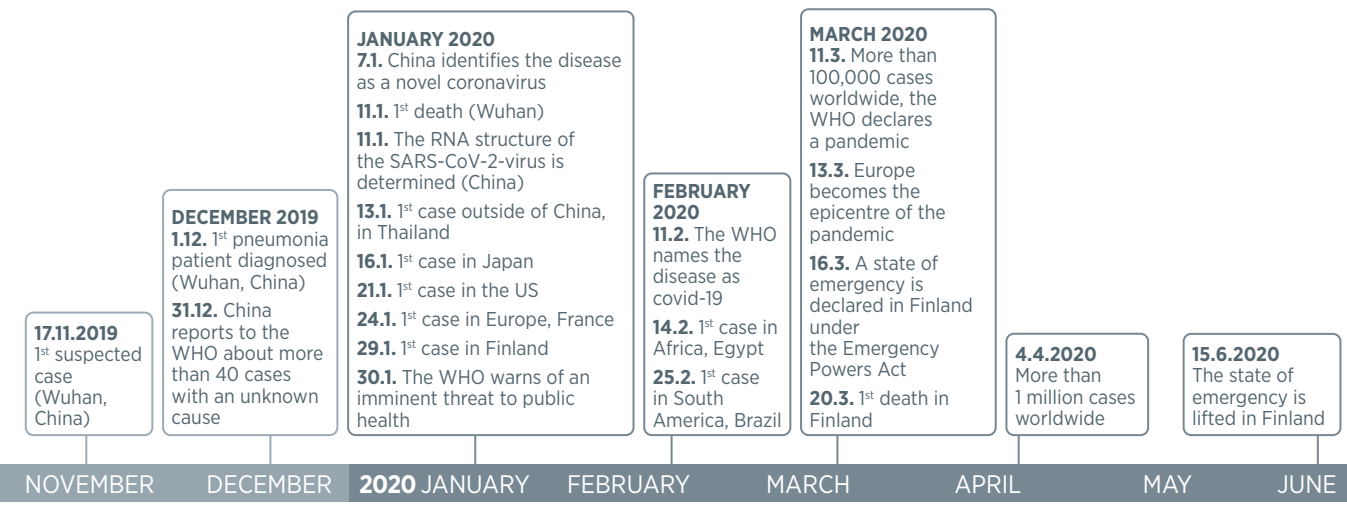
A crisis is often seen as a temporal continuum with a beginning, a middle and an end. From this perspective, preparation and preparedness take place in the pre-crisis period, urgent measures and crisis management in the crisis phase, and aftercare in the post-crisis period. In the case of an individual crisis, this progression does take place, at least in theory, which makes it easier to understand the course of the crisis. In reality, crises change, and their duration and effects are impossible to estimate accurately.

Coronavirus crisis aftercare has been discussed since the early stages of the pandemic, but the aftercare phase will not begin until the spreading of the virus has stopped

Crisis management is a learning process. Management of the coronavirus crisis has been developed in response to different situations. The balancing act between managing the crisis and maintaining the overall well-being of our society is highlighted when we have to react quickly while maintaining the society's general ability to function. The aftercare of the coronavirus crisis has been brought up at a very early stage of the pandemic, but as the crisis drags on, the aftercare phase cannot begin until the spreading of the virus has been halted.

The five Finnish university hospitals have played a key role in the management of the pandemic in Finland. They have combined research expertise with the practicalities of demanding patient work, such as maintaining maximum emergency room and intensive care capacity. Both the national security strategy and the new social and health care reform being discussed in the Parliament, the SOTE legislation, propose a coordinating role for the university hospitals in case of various crises and exceptional circumstances.

THE PROGRESS OF THE CORONAVIRUS CRISIS AND ITS MANAGEMENT UP TO FEBRUARY 2021:



The coronavirus crisis must be managed on a national level, but it is not possible without international cooperation

Humanity's biggest problems are global – climate and environmental change, geopolitical conflicts, extreme poverty and economic instability. The management of all of these requires better international cooperation and stronger institutions than currently exist.

From the very beginning, the scientific community acted swiftly and worked in close international collaboration to overcome the coronavirus crisis. Top political leaders have also sought to create international cooperation, but with varying results, as the political leaders in different countries were primarily focused on their own voters and areas of responsibility. The achievements of the global research community are considerable, especially in the development of a number of useful vaccines, but global cooperation at the political level is needed to overcome the global crisis.

THE CORONAVIRUS PANDEMIC IS LINKED TO THE CLIMATE AND ENVIRONMENTAL CRISIS

The most significant underlying factors in the development of the corona pandemic are the climate and environmental crisis and the loss of nature. Research-based information and observations about climate change and its harmful effects have been available for decades. There is a growing political will to resolve the climate crisis, but considering the gravity of the situation, there has not been enough action. The world is facing a crisis that threatens the future of humanity and the

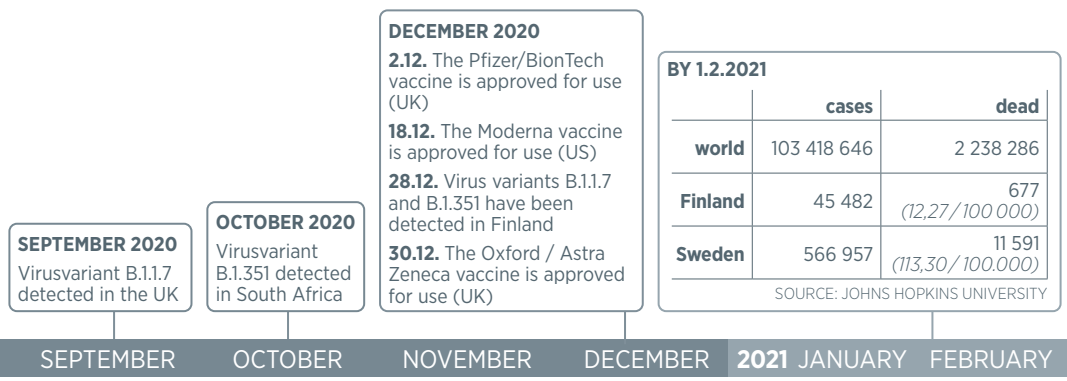


PHOTO: SARA VERTANEN

environment. The interconnected changes in our environment and climate have already had an alarming effect on the living conditions of humans and the diversity of nature, the decline of which in turn weakens humanity's ability to adapt to a changing climate.

Protecting the environment and nature also reduces the spread of viral diseases

Although animal viruses have always undergone mutations that have allowed them to be transmitted to humans, the increase in the number of domestic animals and humans and the narrowing of wildlife habitats increases the risk of zoonoses being born and spreading into pandemics.

As the effects of climate change have been slow to influence our everyday lives, we have been too slow to act. At this point, in addition to research findings, concrete measures and strong political will are needed to reverse the trend. Stopping the increase in the concentration of carbon dioxide in the atmosphere and the resulting warming is central to combatting climate change. This requires stopping fossil fuel use quickly, removing carbon dioxide from the air and the achievement of climate neutrality.

Atmospheric carbon dioxide levels must be reduced significantly

From carbon neutrality (greenhouse gas emissions not exceeding the size of their sinks), we should move towards a more ambitious goal: significantly reducing the total amount of carbon dioxide in the atmosphere. Global crises do not recognize the borders between countries and continents. The most effective action citizens and politicians can take is to act as encouraging examples in their own countries and continents, and cooperative partners alongside other countries. This requires the courage to identify and implement the necessary processes of social and technological change, which may sometimes be extensive.

Climate change and other environmental changes, such as the loss of biodiversity, are in many ways interconnected and cannot be tackled one by one.

When approaching sustainable development as a whole, other long-term goals set by the international community must also be addressed. The most important of these are part of the United Nations Program for Sustainable Development (Agenda 2030). Most countries in the world, including Finland, are committed to working for these goals.

Building crisis resilience requires both financial investments and the reduction of human suffering

Immediate financial investments are needed to tackle climate and environmental crises. This can be shown most concretely by estimating future costs if no climate action is taken. It is therefore necessary to calculate not only the cost of taking climate action, but also the cost of doing nothing. As a solution to the climate crisis, environmentally

friendly investments and adjusting greenhouse gas emission prices have recently been proposed. However, not all costs can be measured using traditional economic indicators.

The costs of disturbing the balance of nature take the form of direct damage caused by repeated severe winds, droughts, wildfires and the melting of glaciers, and the consequent deterioration of living conditions for both humans and other organisms. As a result, people have to face illness, hunger, refugee flows, wars and many other forms of human suffering.

SOCIAL PREREQUISITES FOR STRENGTHENING CRISIS RESILIENCE

Our society must create continuity in terms of both governance and research. Flexible governance structures and operating models are a prerequisite for crisis resilience, as crises require the ability to respond quickly, boldly, creatively and reliably. During the different stages of a crisis, information and research based on different disciplines as well as strong cooperation between research disciplines, decision-makers and states is needed. Trust and interaction between different actors and individuals are the easiest to maintain during crises if their foundations are built patiently even when there is no sudden crisis. Research-based knowledge, interactive communication, social sensitivity, education, exercise and art form the prerequisites for crisis resilience.

Mental security of supply is crucial when ensuring crisis resilience

In Finland, the material security of supply arrangements guarantees the ability to maintain essential services, production and infrastructure in crisis situations. In addition to material preparedness, it is important to also have mental security of supply and to preserve mental well-being while facing and coping with crises. Mental security of supply is created and maintained by caring for communities and individuals. It is not enough to save people and take care of their needs during crises. Our society must – at all times – support the mental well-being of individuals, the people's trust in each other and ethical responsibility, lifelong learning, critical thinking and media literacy. Mental security of supply is one of the most important building blocks of the new and better normal.

In the past decades, the Finnish society has been quite stable and developed rapidly by many measures. Finland has been rated the most stable country in the world. Thanks to stability, most people trust the authorities and follow their instructions. Due to the absence of major crises in our recent history, the Finnish society is generally doing well. However, there is a downside when a crisis such as the coronavirus epidemic strikes: a significant number of Finns are not used to dealing with crises.

MAIJU POHJANHEIMO

Crisis resilience is built through shared exercises between scientists and decision-makers

In many parts of society, crisis preparedness is practised on a regular basis. It is good to remember that even the best preparation or significant resources will not help if political will or practical know-how is missing when a crisis hits. Resources are one thing, implementation is another – ultimately, how they are combined is what counts. Crisis resilience is built with the support of the scientific community and research data, but the decision-makers are responsible for taking action. Policy makers must help people focus their talent, skills and energy where they can best contribute to the overall well-being of society.

In Finland, the traditional compliance with the rules and consensus-seeking tendencies have helped us overcome the coronavirus crisis. However, we must take care to ensure that these features of our society do not prevent multifaceted discussion and the expression of

different opinions They must also not be allowed to stifle new ideas and their implementation. Valuing security excessively must not lead to a situation where Finland's strengths become weaknesses in terms of our society's crisis resilience.

THE ROLE OF SCIENTIFIC KNOWLEDGE IN CRISIS RESILIENCE

Science and the scientific community play a key role in Finland's crisis preparedness and resilience. Universities and research institutes have a role in The Security Strategy for Society, which presents the general principles of preparedness in Finnish society. Together, all actors, from the government to the citizens, form a so-called comprehensive security cooperation model that covers all of society.

To identify the right questions and answers, we need a broad perspective and a multidisciplinary approach

The expertise of one top expert, such as a state epidemiologist, or even one research institute, such as the National Institute for Health and Welfare of Finland (THL), is not enough to solve complex wicked problems, such as the coronavirus crisis. Instead, multidisciplinary, independent scientific research is needed to support all decision-making. In order to ensure this, it is necessary to have a collaboration group composed of unbiased top experts representing the relevant fields.

During the coronavirus crisis, various disciplines have provided essential information needed to understand the virus and its spread, and for the development of treatments. This has allowed us to assess the need and reasons for the application of restrictive measures related to the pandemic and analyse the overall situation from different perspectives. The effects of the corona crisis extend across different areas of life and scientific disciplines. The coronavirus crisis, like any crisis, must be viewed in relation to the environment, the economy, human well-being and the structures of our society, which inevitably overlap. To identify and answer the right questions in the context of crises, we must therefore aim for a broad understanding and a multidisciplinary approach. Crisis resilience requires that our trust in science is maintained and that the scientific community ensures the reliability of research data, even when results are needed quickly.

Scientific knowledge must fight false information using all available means

In the context of crises, a wide range of false news, misconceptions and conspiracy theories tend to spread around the world, especially in the form of rumours in the social media and also as deliberate misinformation. The demand for scientific expertise has been exceptionally visible in the media during the coronavirus crisis. The scientific commu-

nity has responded actively, by producing an unprecedented amount of research related to the coronavirus. The greatest public demand has targeted medical and economics experts. Humanities research has not been subject to the same levels of interest; it has been left behind. This must be corrected: an understanding of human activities and motivations is essential for successful improvement of crisis preparedness.

The confidence of Finns in science and scientists has remained high for years, and even increased slightly (Finnish Science Barometer 2019). However, a small number of people who have critical and unfounded opinions about science often have a lot of visibility and get heard in society. Different views are part of the scientific and public debate in a democratic society. It is still necessary to distinguish between different ways of interpreting the results of a study and arguments in which the claims of one or both parties are scientifically unsubstantiated, instead relying, for example, on rumours, personal opinions and false news. In these cases, there obviously cannot be a debate between two equally fact-based views.

Strong international cooperation is the cornerstone of improving crisis resilience

International cooperation is one of the strengths of the scientific community. In a small country like Finland, it is only possible to carry out a limited amount of research. In addition to our own, high-quality research, we must therefore make use of new results from around the world, share information and materials openly, and participate in international efforts to predict, understand, and manage crises. One way of contributing to the fight against the coronavirus pandemic, climate change and other international crises is through science diplomacy, which strengthens the networks formed by researchers from different countries and facilitates the implementation of ambitious top-level research projects.

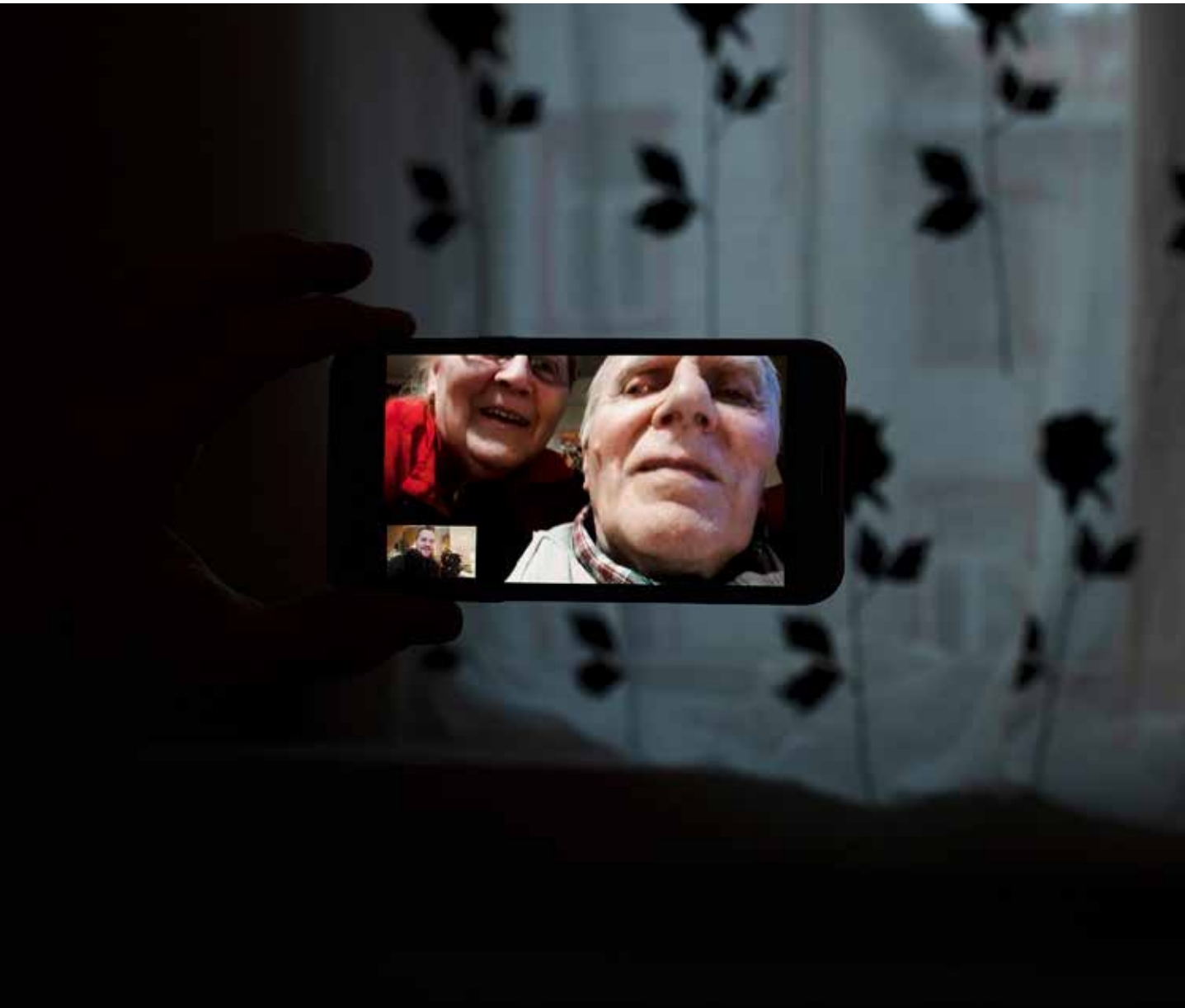
Science diplomacy can mean, for example, comprehensive multidisciplinary cooperation aimed at securing research activities that benefit the whole planet and humanity, even when the national aspirations of different countries conflict with each other or resources are lacking. Science diplomacy can also mean supporting international decision-making based on researched knowledge and facilitating research through diplomacy.

Independent scientific advice improves crisis resilience

The coronavirus pandemic has highlighted the importance of scientific advice in strengthening the sustainability and resilience of our society and in anticipating future developments worldwide. The pandemic has also revealed significant issues in our national scientific advisory structures. The existing permanent national scientific advisory mechanisms are both insufficient and ineffective in drawing on the expertise of the scientific community.

In Finland, a temporary covid-19 science panel was set up on short notice to support the state administration in planning aftercare measures for the coronavirus pandemic. Independence was emphasized when creating the science panel. The members were appointed on the basis of a proposal given by the scientific community and based on personal expertise. They did not represent their organization or their own interest groups. This was a perfect example of how the independent scientific community can provide support for decision-making in times of crisis. We must always be prepared to take such action. One of the key goals of academies of science is to promote research-based decision-making in the society. In the light of international comparisons, in addition to centralized scientific advisory mechanisms within the administration, academies of science also play an important role in national systems that provide scientific advice.

The Finnish Academy of Science and Letters is building a perma-



nent scientific advisory mechanism based on high-quality research, independent of institutional connections, representing the entire scientific community. As an independent actor, it can be a responsible organizer of scientific advice, drawing not only on its own members but also on other academies of science, the national scientific community, international networks and collaboration groups. Instead of the opinions of individual scientific advisors, scientific advice that strengthens the resilience of society is diverse scientific advice from the scientific community.

BUILDING CRISIS RESILIENCE THROUGH MULTILATERAL STRENGTHENING OF COMMUNICATION CAPABILITIES

During crises, huge decisions have to be made quickly. The government must communicate these decisions openly, clearly and in real time. The scientific community supports decision-makers by providing them with relevant and up-to-date research results and views based on the best scientific knowledge. Both decision-makers and the scientific community must ensure that the information is both accessible and comprehensible.

JYRI PITKÄNEN

During the coronavirus crisis, the most important information in Finland has been provided in Finnish and Swedish, but also in the most common foreign languages, sign language and plain language. This practice should be developed further. In addition, it is necessary to examine how the citizens have interpreted the messages they received. In some cases, people have understood the recommendations and regulations differently than the decision-makers had intended. For example, the recommendation to isolate people above the age of 70 was repeated several times at the early stages of the crisis, and many understood it to mean that they should stay inside at all times. The use of face masks has also caused a great deal of confusion, and the difference between recommendations and regulations has not been clear.

Changing communication environments critically impact communication in times of crisis

Recently, communication environments have changed radically. Types of media that have traditionally been separated have become intertwined, which is especially evident in the symbiotic relationship between traditional media and social media. In addition to different types of media, communication genres, media logics and media actors have also become mixed. Communication researchers refer to this new communication environment as a hybrid media system.

In crisis situations, communicators now have to adapt their messages to the demands of a changed media system. The system directs

the content and forms of communication towards emotionally charged simplifications and attractive click headlines, which has an impact on, for example, the way that instructions on how to act are received. It is difficult to find room for in-depth analyses and research-based information. Instead, the winners may be various information epidemics, in which erroneous and misleading information spreads rapidly and globally – like biological viruses.

There are also people in Finland who offer false information and have their own regular readership. The management of social media services, such as Facebook or Twitter, now have great power over content shared in the media system.

Questioning scientific knowledge and spreading disinformation can lead to a lack of trust between the different actors of our society. This would be particularly damaging to our ability to cope with crises and build long-term crisis resilience. At the individual level, the effects of lost trust are reflected in changes in behaviour that harm both the individual and others.

We cannot carry out crisis communication and the building of crisis resilience only on the terms of the strongest

In public discussion, political parties, strong trade unions, people representing economic interests and researchers often get to have their say on current topics. The voices of these groups are valuable and should be heard, but they should also be supplemented by those who are heard less frequently. It should not be an occasional event that quieter citizens also get their voices heard in public. Interactive communication means that the voices of different groups of people are systematically included in the communication system. Public debate on the terms of the strongest is an unsustainable model.

The media play a key role in providing scientific information about the coronavirus. However, the delivery of information ultimately takes place orally and through various encounters, for example during client work or volunteer work, or between family and friends. Social and healthcare workers, civic actors and even individuals have a major responsibility for disseminating information relevant to the society's crisis survival.

The flow of information to every person living in Finland is also slowed down by a lack of information acquisition skills or social and economic resources. Not everyone has a smartphone, a computer, an internet connection or digital skills, which are needed to obtain information. As the crisis progresses and ends, it is important to look at whether citizens have been consulted and how things can be done better during future times of crisis, as well as in between the crises. To achieve effective communication, it is not enough to do it well and comprehensively, with justification and clarity. Effective communication is always interactive.

HENRIK DUNCKER

The understanding of communication content – not just the accessibility of messages – is crucial during a crisis

Crisis management depends, to a large extent, on whether citizens, businesses and other actors behave as expected. In a time of crisis, it is not enough for messages to get delivered, they must also be understood as intended. If the messages are misunderstood, even the best recommendations will not lead to the desired result. In terms of the end result, it does not matter whether the misunderstanding is due to people's incomplete comprehension or language skills or poor communication. It is also important that the information reaches all citizens at the same time.

The simultaneous delivery and comprehensibility of the informa-

PHOTO: SUVI LAINE

tion to be shared is very important, both to guarantee people's fundamental rights and to prevent the adverse effects of crises. Between times of crisis, it is important to educate and train all parties involved in communication to understand today's changed communication environments and practices of communication, as well as to be critical of different forms of communication and shared information. It is therefore worth looking for opportunities to increase the teaching of media and communication skills and critical communication literacy, starting from primary school. Crisis resilience is built through communication education and the development of diverse communication capabilities.

SOCIAL SENSITIVITY

A crisis will inevitably cause change and uncertainty among the population. The resulting effects on society cannot be managed completely. However, a crisis can also open the door to positive change that gives us an opportunity to reform societal structures and operating models. Efforts must be made to take advantage of this positive change and to build a new normal based on flexible and change-resistant structures. Accepting and capitalizing on change requires social sensitivity, which refers to the ability to predict rapid and slow changes, to listen to silent signals and different groups and individuals, and to form new patterns of behaviour.

Social sensitivity also means understanding the importance of hope during crises. Sensitivity is the ability to interact genuinely, the ability to research the right things, to stop and listen and to boldly embrace new ideas. New ideas, practices and innovations also help secure the economy.

Crisis resilience must ensure that equality is maintained in our society

Both globally and in Finland, the coronavirus crisis has been estimated to have affected vulnerable people more than others, and their number is growing due to the increase in, for example, mental health problems. The additional suffering and additional costs caused by the crisis should be kept to a minimum. This is not just a question of individuals' choices and experiences, but of the fundamental principles of a constitutional state. A healthy mind is an important part of the crisis resilience of an individual, and thus also of the society.

If the global pandemic continues, it is predicted to lower life expectancy, at least momentarily, and to create an upward trend in the number of people suffering from hunger and poverty, which has been successfully reduced for decades. This must be prevented in the name of human, social and economic sustainability, and we must prepare for future crises so that we will not have to compromise the equality of citizens.

While managing crises, we must avoid destroying other people's living conditions

During the coronavirus crisis, the disease has spread mostly through human encounters. There are universal motives for these encounters, such as care, treatment, and rescue activities. In addition, there are social motives, such as the innate need of people to interact with each other, the organization of the necessary joint activities and the maintenance of order. The economic motive is to produce, transport and buy goods that meet basic needs. Not all motives behind these encounters are equally necessary – some can be abandoned or at least reduced. However, avoiding infection is not of an absolute value, and so it must be viewed in the context of other values. While managing crises, we must avoid destroying other people's living conditions

Survival requires physical interaction, but on the other hand, physical interaction can result in a death under these exceptional circumstances. Once a life-threatening disease has spread among humans, it is crucial how often you encounter others, who you encounter, and in what the context is.

Crisis resilience is founded on hope, which creates a sense of relevance

During a crisis, our everyday lives change. Interaction is a basic need, and crises in which social interaction structures are shattered, like during social distancing, have a serious negative influence on well-being. The changes have been difficult in the case of the coronavirus crisis: jobs have been lost, the health care system is strained, distance learning has not been a suitable solution for everyone. The list of negative effects is long.

In public discussion, the post-crisis period has often been described as a new normal. However, both new and normal can mean very different things to different groups of people and different individuals.

To solve any challenging situation, action must be taken, not just hoped for. Hope, however, is an important perspective and concept that allows us to maintain a sense of relevance. The Finnish Climate Change Panel has stated that environmental and climate education should be based on methods that address difficult and negative issues, yet gravitate towards hope. It is understandable that many may feel frustrated when talking about hope, because, for example, the state of the environment may seem hopeless. Yet maintaining hope plays an important role when people experience frustration and disappointment towards political decision-making and decision-makers. Hope plays a key role in overcoming any crisis.

Crisis resilience is built on a developing economy that also increases human capital

In addition to the GDP, our economy needs to introduce new indicators to measure citizens' well-being from a climate and environ-

MAARIT HOHTERI

mental perspective, without losing jobs. The challenge is to reconcile economic growth with non-linear environmental change and to reduce the high levels of uncertainty in economic forecasts. However, immediate economic investments aimed at improving the state of the climate and the environment are questions that impact the future of humanity. Indeed, new indicators of well-being that include both social and environmental criteria have been developed around the world for a long time.

When talking about economic development, we must also discuss inequality. One significant change over the last decade has been that major organizations, such as the OECD and the IMF, have noted in their reports that inequality is detrimental to social and economic development. However, this does not particularly apply to Finland, because the situation here is exceptionally good when viewed from a global perspective. For example, a report published by the OECD in 2019 identifies four key objectives for economic policymaking: environmental sustainability, increasing prosperity, decreasing inequality and the flexibility and resilience of the (economic) system.

Society must therefore invest in human capital, not only in economic well-being.

To promote the development of the economy and general well-being, people need access to support throughout their lives

The need to find a balance between the economy and other areas of life is emphasized in crisis situations. Balance is, in general, an essential goal in terms of the functioning and resilience of a society. For example, people do not have money if they do not have health, but they also would not have adequate healthcare without a functioning economic system.

The situation is similar with regard to climate change. If climate change progresses at the current pace, it will affect the structures of our economy in a way that will be detrimental to all of humanity. The economy must be developed in an environmentally sustainable way. Economic incentives and restrictions are needed to protect the climate and the environment. We must set a clear price for causing pollution, which will then influence the choices of states, companies and other actors. In addition, the implementation the various recommendations and commitments must be closely monitored. As stated earlier, Finland, for example, must make an increasingly concrete commitment to achieving carbon neutrality by 2035. Therefore, strong guiding measures are needed in economic policymaking, in addition to changing attitudes.

To promote the development of both the economy and general well-being, people need to have access to support throughout their lives. Our society should support and educate people so that they can do new things, in addition to creating concrete opportunities and incentives to do these things. Development requires innovation. The emergence of new innovations can be encouraged through a variety of economic incentives, especially when a large number of different actors need to be mobilized to come up with ways to promote sustainable development. For example, business subsidies should be targeted so that they can only be received by actors committed to the principles of sustainable development.

MENTAL SECURITY OF SUPPLY: EDUCATION AND CULTURE

The corona crisis offers an opportunity to set a new direction for our education system. Even an excellent education system must constantly adapt to changing circumstances. In order to improve crisis resilience, it is important to reinforce lifelong learning mechanisms. Culture also has an important role in supporting well-being. For example, art in its various forms makes it possible to imagine the future in a way

that science cannot do. Human behaviour is often based more on feelings, emotions, and experiences than knowledge in itself. This should be considered more often, both in decision-making and in the scientific community.

Crisis resilience is built through education – and it must be increasingly equal

Education must support equality and the experience of a meaningful life. The diversity of the Finnish population must be considered in all education and training. Educational equality must be pursued, so that a wide variety of minorities can be equally involved in education and employment.

According to statistics, the socio-economic background of a child has a significant impact on school success. In particular, passing or failing secondary education has been found to have significant consequences for human well-being and economic well-being. Well-educated citizens are key to mental security of supply and economic reforms.

The coronavirus pandemic highlighted the strengths and weaknesses of distance learning: the new teaching model was introduced without delay, but it was not suitable for everyone. From now on, efforts must be made to train teachers in distance learning skills, to study how distance learning works best and what are the best ways to develop it. In order to guarantee equal education, growing inequality must be addressed. Cooperation with families must be intensified, as the involvement of carers in their children′s schooling and cooperation with the school is reflected in the pupils′ school performance. The perceptions of both the students and their carers about themselves as learners can be developed. In addition, they can be encouraged to set higher learning goals for themselves and to acquire more education.

To find new perspectives and ways to survive crises, we must question existing thought patterns and norms

Art has several roles in a nation's crisis resilience. The various forms of art – such as literature, visual arts, music, dance – support people and their humanity and produce well-being. In this context, art can be defined in a broad sense, encompassing a wide variety of different forms of culture produced by professionals in our society, as well as one′s own personal making and experiencing of art.

In the midst of crises, we need to get used to living in uncertainty, where staying in balance requires flexible ways of thinking and behaving. Art increases the flexibility of citizens by providing surprising perspectives. This is also the reason art should be increasingly offered as a part of education in different fields and at all levels. It improves mental security of supply and the creativity needed for personal, social and economic recovery from crises.

To find ways to cope with a new crisis, as well as new perspectives,

we must question existing thought patterns and norms. Art can challenge and confuse. It can also inspire other citizens to imagine alternative futures and even think about the difficult ethical choices associated with them. Art and science have been emphasized both in early childhood education and later education. We should also improve access to art for adults, and the importance of the arts as a part of lifelong learning should be recognized.

Through art, we can examine different visions of the future in a deeply human way

Art helps us structure the world in new ways. It prepares people to react and anticipate. For example, a person may be unsure about something – for instance, getting vaccinated for the coronavirus – without

being able to justify it consciously. Indeed, people's internal feelings have a significant impact on how different decisions or information are received in society.

Art tunes the imagination and invites to imagine, thus allowing us to examine different futures in a deeply human way. It is good to seek to reduce the power of one-sided truths and single-issue movements by highlighting larger entities and building bridges between different parts of society and "different realities" through the power of many disciplines, including the arts.

To improve overall crisis resilience, we need a comprehensive approach

To succeed in crisis management, we need to know how to use the available information to influence people's behaviour. People often change their behaviour slowly, even when there is a wealth of information available, as the climate crisis has shown. On the other hand, during the corona crisis, even some major changes have happened quickly. People only understand each other to the extent that their mental content is shared, thanks to culture, education, and teaching. Humans are not only rational beings, but also beings controlled by their bodily sensations, emotions. A crisis situation creates uncertainty, which makes people act, but only within the limits of their bodily sense of security. When people are unable to clearly distinguish between their own feelings or imagination and the events of reality, their behaviour follows their bodily sensations.

Emphasizing generalist, broad-based expertise and general knowledge in higher education helps us train researchers who are able to act flexibly in a variety of situations. A flexible and agile approach helps in crisis situations that require quick and unexpected solutions, even when the crisis is something new and unknown. Even in the scientific community, creating new ways of working takes time. It takes about five years to train a new generation of researchers. The investment of a few months in general studies is ultimately a short period of time when considering the long-term crisis resilience of a society.

Comprehensive crisis resilience is only possible through a comprehensive, multidisciplinary approach. It is important to focus on identifying the challenges involved and reinforcing concrete policies. This means, for example, supporting interdisciplinary, needs-based research and increasing relevant general studies at all levels of education. The improvement of generalist skills also means that researchers can understand and value research in other fields and achieve interdisciplinary collaboration more quickly, if necessary, even in crisis situations. ■

PEKKA HANNILA

SEVEN OBJECTIVES THAT STRENGTHEN FINLAND'S CRISIS RESILIENCE

1. Finland must take a more assertive approach to international cooperation and commit itself to proactive cooperation in the fields of politics, the economy, science and resolving the environmental crisis.

The global corona pandemic taught us how closely and irreversibly the world is intertwined – economically, politically and environmentally. In scientific research, international cooperation was shown to be a crucial cornerstone of success. The best cooperation practices are also applicable to political activities.

2. Finland must take more effective action to improve the climate and the environment.

We have committed to carbon neutrality by 2035, when emissions will be as high as carbon sinks. After this, the emissions must be reduced further in the coming decades. Achieving these goals is essential for the well-being of people, nature and the economy. We need to be more ambitious in our pursuit of comprehensive climate and environmental goals and make immediate financial investments to achieve them. In the longer term, Finland must be climate neutral.

3. Education needs to be reformed at all levels to promote diversity and wide variety of skills.

A high general level of education improves crisis resilience and reduces inequality; having a wide range of knowledge facilitates career changes and employability and, especially for researchers, promotes the emergence and implementation of multidisciplinary projects, as it provides a basis for understanding and valuing other fields. Special attention must be paid to the quality of education. Experiencing and creating art improve people's well-being and creativity.

4. Communication capabilities must be developed, and more education should be provided in this filed.

The coronavirus crisis highlighted the changing requirements of our communication environment and the importance of understanding these requirements for successful communication. In the future, crisis communication plans must better account for the changes in our communication environment, and new forms of media must be utilized more effectively. A clear plan must be created to eradicate disinformation. Education that promotes critical communication and media literacy needs to be added to education, starting from primary school.

5. Economic incentives must encourage stronger commitment to the principles of sustainable development.

Innovative collaboration between companies and researchers was a hot topic during the corona pandemic. Other current and future crises must be addressed with a joint strategy between the government, researchers and businesses to achieve sustainable development. Citizens as consumers must also be encouraged to commit to the implementation of this strategy.

6. A scientific advisory mechanism based on the expertise of the independent scientific community must be established in Finland. This will improve our crisis resilience and ability to act quickly when necessary.

The coronavirus pandemic has shown that the current national scientific advisory arrangements are inadequate. The potential of research networks has also not been used to the full extent. There is a specific need to develop rapid-response independent scientific advice mechanisms that make extensive use of up-to-date and high-quality research data. Effective scientific advice is based on continuous interaction, which guarantees both trust and the preparedness to channel the best know-how of the scientific community in support of the government and other parties in the event of a crisis.

7. The share of Finland's GDP that is directed to research, development and innovation must be increased to 8% by 2035

The robust education and excellent organizational skills of Finns provide a good foundation for a more positive development path. Bold financial investments by both the private and public sectors will create the conditions for a more dynamic culture of research and innovation. The 4% target proposed in previous visions is not sufficient to maintain international competitiveness and stabilize sustainable development. Bold additional investments in national development and innovation activities are also needed to increase productivity.

One of the most important teachings from the coronavirus pandemic is how, with exceptionally large investments, scientists were able to rapidly develop vaccines against a severe virus. The input of other fields of research has also been necessary from the outset. To strengthen crisis resilience we need, among other things, research into people's behaviour, aspirations and motivations – and their consequences. This research must be secured permanently in case of future crises. ■

GROUP OF EXPERTS

THE FINNISH ACADEMY OF SCIENCE AND LETTERS convened a group of experts consisting of ten experienced scientists who are academics of science and recent presidents of the Academy. They represent a wide range of disciplines and have in-depth experience of interdisciplinary collaboration and participation in societal debate. The group was chaired by Anna Mauranen, the president of the Finnish Academy of Science and Letters. The group worked from June 2020 to January 2021.

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COLLABORATION PARTNERS | As part of the working process, experts from outside the group were consulted on the key themes of the statement. In addition, the experiences of civil society actors were mapped through discussions with almost 30 different parties. We would like to extend warm thanks to every participant; without them, the statement would be missing many important aspects. We hope that the discussions will continue.

SOURCES

Asma S, Lozano R, Chatterji S, Swaminathan S, Marinho MF, Naok Yamamoto N, Varavikova E, Misganaw A, Ryan M, Dandona L, Minghui R, Murray CJL (2020). Monitoring the health-related Sustainable Development Goals: lessons learned and recommendations for improved measurement. *Lancet* 395, 240–246.

Aula, Pekka (2021). Sosiaalisessa mediassa soi valetiedon calypso. In Hetemäki I, Kuusisto A-K, Lähteenmäki M & Väliverronen E (ed.): *Hyvä ja paha tieto*. Gaudeamus, 126.

Brooks D, Boeger E & Hoberg W (2019). *The Stockholm Paradigm: Climate Change and Emerging Disease*. University of Chicago Press.

Chadwick A (2013). *The Hybrid Media System: Politics and Power.* Oxford University Press.

Clarke B., Sheridan S., Woods, K (2010). Elements of Healthy Family-School Relationships. Teoksessa S. Christenson, A. Reschly (ed.): *Handbook of School-Family Partnerships.* Routledge: New York and London, 61–79.

Daszak P, Olival KJ, Li H (2020). A strategy to prevent future epidemics similar to the 2019-nCoV outbreak. *Biosafety and Health* 2, 6–8.

Deem S, Brenn-White M (2020). One Health – the Key to Preventing COVID-19 from Becoming the New Normal. *Molecular Frontiers Journal* 04, No. 01n02, 30–35.

Dweck C. S. (2000). *Self-theories: Their role in motivation, personality, and development.* New York, NY: Psychology Press.

European Academies Science Advisory Council (EASAC) (2020). *Towards a sustainable future: transformative change and post-COVID-19 priorities.* https://easac.eu/publications/details/towards-a-sustainable-future-transformative-change-and-post-covid-19-priorities/

Fisher D, Teo YY, Nabarro D (2020). Assessing national performance in response to COVID-19. *Lancet* 396, 653–656.

Fund for Peace (2020). *Fragile States Index. Measuring Fragility, Risk and Vulnerability in 178 Countries.* https://fragilestatesindex.org/

Global Health Security index (2019). *Building collective action and accountability.* www.ghsindex.org

Haahtela T (2020). Planeetta vastaanotolla. *Duodecim* 2020; 136: 353–5.

IPBES (2020). *IPBES Workshop on Biodiversity and Pandemics. Workshop Report*. https://ipbes.net/sites/default/files/2020-10/20201028%20IPBES%20Pandemics%20Workshop%20Report%20Plain%20Text%20Final_0.pdf

Jeynes W (2011). *Parental involvement and academic success.* Routledge: New York and London.

Jones KE, Patel NG, Levy MA, Storeygard A, Balk D, Gittleman JL, Daszak P (2008). Global trends in emerging infectious diseases. N*ature* 451, 990–994.

Karma P (2012). *Tieteellinen tutkimustyö ja sen vaikutukset Helsingin ja Uudenmaan sairaanhoitopiirissä. Arviointiraportti HUS:iin liittyvän tieteellisen tutkimustyön vaikutuksista erityisesti potilaiden hoitoon.* HUS julkaisuja 2012.

Kiljunen P, Yhdyskuntatutkimus Oy (2019). *Tiedebarometri 2019 - Tutkimus suomalaisten suhtautumisesta tieteeseen ja tieteellis-tekniseen kehitykseen.* Tieteen tiedotus ry.

Knuutila A & Laaksonen S-M (2020). Viraali vihaisuus ja tahmea nauru: tunteet ja algoritmit digitaalisessa vaalikamppailussa. In Borg S & Kestilä-Kekkonen E & Wass H (ed.): *Politiikan ilmastonmuutos: eduskuntavaalitutkimus 2019*. Oikeusministeriön julkaisuja 2020:5.

Krammer F (2020). SARS-CoV-2 vaccines in development. *Nature* 586, 516–527.

Laaksonen S-M (2020). Viestinnän infrastruktuurit: kuka päättää, mistä verkossa keskustellaan? In Rönni T (ed.): *Kuka maailmaa hallitsee?: Vallan umpisolmuja avaamassa*. Gaudeamus, 105–120.

Lee EC, Wada NI, Grabowski MK, Gurley ES, Lessler J (2020). The engines of SARS-CoV-2 spread. Fighting SARS-CoV-2 requires a clear framework for understanding epidemic spread. *Science* 370, 406–407. https://science.sciencemag.org/content/370/6515/406

Mattila M (ed.) (2020). *Eriarvoisuuden tila Suomessa.* Kalevi Sorsa-säätiö. https://sorsafoundation.fi/wp-content/uploads/2020/09/Eriarvoisuus2020_web3.pdf

OECD (2021). *OECD Science, Technology and Innovation Outlook 2021: Times of Crisis and Opportunity*. OECD Publishing, Paris. https://doi.org/10.1787/75f79015-en

OECD (2020). *Beyond Growth: Towards a New Economic Approach, New Approaches to Economic Challenges*. OECD Publishing, Paris. https://doi.org/10.1787/33a25ba3-en

Ratinen I, Kinni A, Muotka A, Sarivaara E (2019). *Kohti ratkaisukeskeistä ilmastokasvatusta.* Suomen Ilmastopaneeli, report 9/2019. University of Lapland.

Sioen GB, Daszak P, Kone B, Wannous C, Watanabe C, Pongsiri M, Suzán G, Morse A, Jaakkola JJK, Bowen K, Boeckmann M, Dida GO, Harris F, Gatzweiler F, Ma W, Ebi KL (2020). *COVID-19, A Global Health Concern Requiring Science-Based Solutions And Local Action.* Policy Brief, Future Earth Health Knowledge Action Network. https://futureearth.org/2020/06/26/policy-brief-covid-19-a-global-health-concern-requiring-science-based-solutions/

The Lancet COVID-19 Commissioners, Task Force Chairs, and Commission Secretariat (2020). Lancet COVID-19 Commission Statement on the occasion of the 75th session of the UN General Assembly. *Lancet* 396; 1102–1124.

Tiililä, U (2020). *Humanistin näkökulma: kun maskista tulee merkki.* Olenhumanisti.fi. https://olenhumanisti.fi/humanistin-nakokulma

Tirri K & Kuusisto E (2019). *Opettajan ammattietiikkaa oppimassa.* Helsinki: Gaudeamus.

Turvallisuuskomitea (2017). *Yhteiskunnan turvallisuusstrategia.* Valtioneuvoston periaatepäätös 2.11.2017. https://turvallisuuskomitea.fi/yhteiskunnan-turvallisuusstrategia/

United Nations (2015). *Transforming Our World: The Agenda 2030 for Sustainable Development*. https://sdgs.un.org/publications/transforming-our-world-2030-agenda-sustainable-development-17981

Watts N et al. (2020). The 2020 report of The Lancet Countdown on health and climate change: responding to converging crises. *Lancet* 396, 1–42.

World Health Organization and Secretariat of the Convention on Biological Diversity (2015). *Connecting global priorities: biodiversity and human health: a state of knowledge review.* https://www.who.int/globalchange/publications/biodiversity-human-health/en/

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The **Bending, but not breaking** statement invites us to discuss ways of improving crisis resilience at the individual, community and societal levels. There are many types of crises, and they cannot be overcome by following a single model. The most sustainable solution is a society that is able to adapt and strengthen its creative potential through the joint efforts of scientists, government and businesses.

In spring 2020, the Finnish Academy of Science and Letters convened a multidisciplinary group of experts to present their views on Finland's crisis resilience, with the goal of a strong and resilient society. This statement is an invitation to join the discussion, created based on the work done by the group and representing an independent scientific perspective.

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