MEMORANDUM

Johanna Buchert, Hanna Haveri, Kaisa Hietala, Jaana Husu-Kallio, Jyrki Katainen, Jouko Pölönen, Olli Rehn, Leif Schulman, Mikko Spolander

NATURE SAFEGUARDS OUR ECONOMY

Reflections on the importance of nature for the economy and society

12 APRIL 2023

Sitra memorandum

Authors of the texts included in the collection: Johanna Buchert (Natural Resources Institute Finland), Hanna Haveri (Wellbeing services county of Päijät-Häme), Kaisa Hietala, Jaana Husu-Kallio (Ministry of Agriculture and Forestry of Finland), Jyrki Katainen (Sitra), Jouko Pölönen (Ilmarinen), Olli Rehn (Bank of Finland), Leif Schulman (Finnish Environment Institute), Mikko Spolander (Ministry of Finance)

Text editing: Reetta Räty

Working group at Sitra: Tatu Leinonen, Marja Järvenpää, Antti Koistinen, Rasmus Sihvonen, Antti Lehtinen

Layout: Marjo Pitkänen (PunaMusta Oy).

Nature safeguards our economy – Reflections on the importance of nature for the economy and society

ISBN 978-952-347-322-5 (PDF)
ISSN 2737-1034 (PDF)
www.sitra.fi/en

Sitra memorandums are insights produced to support our future-oriented work.

Table of Contents

Foreword

Parliamentary elections will take place in Finland in April 2023. This spring is therefore a particularly good time to discuss our country's future, well-being and economic operating conditions – including in the long term. Nature is the source of economic value chains, and the economy cannot function without nature.

Nature and biodiversity are disappearing at an unprecedented rate, including in Finland. To stop biodiversity loss, we must take swift action at all levels: in political decision-making, in business and in people's daily lives.

New hope came at the UN Biodiversity Conference, held in Montreal in December 2022, where new global targets for halting biodiversity loss were adopted. Achieving these objectives now depends on the actions of countries. In addition to public authorities, pioneering companies, central banks and state treasurers have also joined the conservation work. The direction is right; we now need more participants on board and more momentum. Stopping biodiversity loss is not only in the best interests of nature, people and the economy, but also a precondition for their well-being. Without nature, we will not survive.

The articles in this collection explore the significance that nature and natural capital hold for the economy and society. We thank the authors for their valuable contribution to this crucial social debate.

We hope that the contributions will stimulate new ideas and encourage diverse approaches to the topic of nature and the economy.

Helsinki, April 2023,

Lasse Miettinen
Director, Sustainability solutions

Outi Haanperä
Project Director, Nature and the economy

Summary

Without nature there is no economy. In 2021, the Dasgupta Review (*The Economics of Biodiversity: The Dasgupta Review*, Dasgupta 2021) commissioned by the UK Treasury drew public attention to the complete dependency of our economy on nature and the resources and services, or natural capital, it provides us.

Nature constantly provides us with a huge number of vital services, such as food, energy, water purification, medicinal plants, carbon sequestration and pollination of food crops. These are called ecosystem services. Nature is also extremely important for public health. Contact with diverse nature protects us from many diseases, such as allergies and asthma. Nature is also intrinsically valuable, no matter how much we benefit from it.

Nature and its biodiversity are disappearing at an unprecedented rate. About one million species are at risk of becoming extinct in the coming decades (IPBES 2019). In Finland too, biodiversity is continuing to decline (Hyvärinen et al. 2019; Kontula and Raunio 2018).

This collection of articles explores the importance of nature and natural capital for the economy and society. It consists of nine texts, the authors of which are prominent influencers in economics and society in Finland.

The wheels of the economy will not keep turning without nature

"Biodiversity loss puts the economy, the public finances and the well-being of the future generations at risk," writes **Mikko Spolander**, Director General of the Economics Department at the Ministry of Finance. "Because biodiversity does not have a price, it is the responsibility of the public authorities to guide and direct production and consumption to preserve biodiversity."

"One tool to combat biodiversity loss could be global or regional environmental taxes to finance measures that increase biodiversity," suggests **Olli Rehn**, Governor of the Bank of Finland.

"Problems caused by biodiversity loss will affect investments, their returns and the risks associated with them around the world," writes **Jouko Pölönen**, President and CEO of the pension insurance company Ilmarinen. "As the economy is heavily dependent on natural capital, long-term investors must therefore take biodiversity into account not only to safeguard nature but also to secure their own operations and, for example, the pensions of Finnish people."

Nature is the basis for well-being

In Finland, biodiversity is closely linked to forests, the food system and the waterbodies.

"Healthy aquatic environments are valuable from the point of view of both the national economy and the well-being of citizens," says **Leif**

Schulman, Director General of the Finnish Environment Institute. "We have damaged our water systems in many ways. Fortunately, there is much we can do to repair the damage. The most cost-effective way is to prevent damage, for example by cutting emissions from agriculture and forestry into waterbodies."

Biodiversity loss is also visible on our plates. "If we cannot curb biodiversity loss, we will not be able to achieve food security either. It is therefore important to increase awareness and knowledge among farmers and especially decision-makers about the links between food systems and biodiversity," writes **Jaana Husu-Kallio**, Permanent Secretary of the Ministry of Agriculture and Forestry.

"Safeguarding of biodiversity and the sustainable use of forests requires a reconciling and enabling approach that recognises the importance of the forest bioeconomy and biodiversity for Finland. There is a long list of ways to do this, and new ones are constantly being developed," says **Johanna Buchert**, President and CEO of the Natural Resources Institute Finland.

"Nature is also of enormous importance for public health: the progress of biodiversity loss will put the health of Finns at risk. Biodiversity loss exposes people to new contagious diseases, and a living environment lacking biodiversity may lead to allergies, asthma and different autoimmune diseases, says **Hanna Haveri**, Planetary Health Physician at the Wellbeing services county of Päijät-Häme. "Green areas in urban environments increase physical activity and perceived health. It is also important to preserve unmanaged natural areas close to residential areas."

Solutions from the economy for combatting biodiversity loss

At the UN Biodiversity Conference held in Montreal in December 2022, nearly 200 countries agreed on targets to halt biodiversity loss by 2030 and put nature on the road to recovery. Achieving the targets depends on national implementation.

More than half of the global economy is directly or fairly directly dependent on nature and the services it provides (World Economic Forum 2020). If no decisive action is taken to halt biodiversity loss, the cost will be immense.

"When the boundaries of nature are reached, businesses must recognise the need for change and be energised by it before change becomes an imperative. The capacity for change must be built into a competitive advantage that is difficult for others to copy," writes **Kaisa Hietala**, a corporate board professional.

"Because nature is the source and enabler of economic value chains, there must be a price for exploiting it. The market economy must be harnessed to strengthen nature. As long as there is no price for externalities, the burden on nature will appear cheap and strengthening nature expensive. We cannot afford this," summarises **Jyrki Katainen**, President of Sitra.

Mikko Spolander
Olli Rehn
Jouko Pölönen

Nature keeps the wheels of economy turning

MIKKO SPOLANDER, DIRECTOR GENERAL, MINISTRY OF FINANCE

Declining biodiversity leads to a path of fiscal stagnation

Biodiversity loss is endangering the economy, public finance and the well-being of the future generations. Because there is no price for biodiversity, it is the duty of public authorities to steer production and consumption to preserve biodiversity.

Much economic activity is directly linked to nature, and indirectly almost the entire economy lives and breathes in step with nature. We are now in a situation where we consume nature faster than it renews itself and non-renewable natural resources are not being sufficiently recycled. Our natural capital is dwindling.

More ecologically sustainable production and consumption requires that new production capacities and methods that overburden nature are replaced by new ones. The key question is how to make this transition in a way that does not exacerbate biodiversity loss and is fair to present and future generations.

More sustainable production and consumption requires research, product development, material-saving production methods and recyclable products. It is up to the private sector to find new ones.

In a market economy, prices drive consumer and business choices. Because there is no price for biodiversity, demand is limited only by the effort and cost of consuming nature. This leads to ecologically unsustainable economic choices. Natural resources are over-consumed and our common, valuable resources are being wasted.

The choices made by citizens and companies can be influenced by economic policy. It is the role of public authorities to integrate harmful externalities such as biodiversity loss into the investment, production and consumption decisions of people and companies and to ensure that the transition to a more ecologically sustainable economy takes place in an equitable manner.

The complex nature of biodiversity loss often precludes the use of broad-based steering instruments that have an impact on the entire economy. Decisions need to be made at a more local level (Ministry of Finance 2022c, pdf).

Measures aimed at preventing biodiversity loss must primarily be assessed in terms of their effectiveness. Given the budgetary constraints on public authorities, measures must be chosen according to the benefits they yield in relation to the necessary input. This also means assessing the extent to which public authorities themselves finance the transition through

measures such as investment subsidies, and the extent to which they create incentives and use them to steer the choices of other actors. The role of public authorities also involves setting an example for others in their own choices, investments, production, consumption and procurement.

Biodiversity loss, choices made by public authorities and economic policy decisions have a direct and indirect impact on the revenue and expenditure. Some will generate revenue, whereas others will increase expenditure.

More revenue is generated for public finances, at least for a while, if activities that are harmful to nature are penalised through taxation or parafiscal charges. Direct investment or investment subsidies granted for sites that safeguard biodiversity will in turn increase public expenditure. All the above will affect the entire national economy through different channels and therefore indirectly impact on the public revenues and expenditure. New investment can boost economic growth, while an increase in the overall tax rate can slow it down. Structural changes in production may increase structural unemployment but also create new sources of income (Ministry of Finance 2022b, pdf).

In the short term, measures aimed at mitigating biodiversity loss and adapting to it are likely to weaken public finance. However, changes in public revenues and expenditure must always be compared to a business-as-usual scenario. In that case, biodiversity and the preconditions for the economy and income generation would be significantly weakened in comparison to the current situation.

It is certain that inaction would lead to a decline of the economy and income generation and to deepening problems. At the same time, the opportunities offered by structural change in production and consumption would be missed.

In December 2022, the Ministry of Finance published its Strategy on Climate and Nature (Ministry of Finance 2022a). The strategy describes the preparation, starting points, principles and available tools for climate and nature. The Ministry of Finance's strategic tasks require it to build a sustainable society and to identify the drivers of change and related risks that shape the society. The strategy specifies how the Ministry of Finance shall also take the conservation of biodiversity into account in its preparation of economic policy, public administration and public finance.

Mikko Spolander is Director General of the Economics Department at the Ministry of Finance. The department produces reliable, justified and independent economic analyses, impact assessments and forecasts of the national economy and public finance to support decision-making.

OLLI REHN, GOVERNOR, BANK OF FINLAND

Stopping biodiversity loss is vital to our existence

Half of the global GDP is linked to natural resources. If we do not combat biodiversity loss, the cost will be massive.

Every now and then we receive a Christmas present that we had not asked for, but which we can immediately see is absolutely necessary. Such a gift was given by the UN Biodiversity Conference in Montreal in December 2022.

Almost 200 countries agreed to protect at least 30 per cent of the earth's land area, inland waters, and coastal and marine areas by the end of the decade. In addition, the signatory countries intend to restore the same proportion of degraded land and water ecosystems.

There is a demand for large-scale action: according to a 2019 UN report, species are now disappearing tens or even hundreds of times faster than on average during the last 10 million years (IPBES 2019).

Climate and nature-related risks have also made it to the agenda of central banks. When the European Central Bank renewed its monetary policy strategy in summer 2021, it also adopted an action plan to address climate change in monetary policy. Intertwined with biodiversity loss, climate change is a global challenge and one of the European Union's policy priorities. Governments and parliaments carry the primary responsibility for climate and environmental policy, but the ECB also seeks to contribute to the objectives set by the EU within its mandate.

Last year, biodiversity emerged as an increasingly prominent issue alongside climate change in the financial sector. In March 2022, the international Network of Central Banks and Supervisors for Greening the Financial System (NGFS), of which the Bank of Finland has been a member since 2017, published a report on the link between biodiversity loss and financial stability (NGFS 2022). Companies and households may face financial difficulties caused by biodiversity loss if their livelihoods are lost or habitats decline. On the other hand, a transition to practices that foster biodiversity may lead to losses, costs or bankruptcy for some companies. On a wider scale, these problems could cause instability in the financial markets.

In the report, NGFS recommended that central banks should consider the financial stability risks of biodiversity loss in the financial sector's risk assessments and develop supervision accordingly. These recommendations have been well received.

When it comes to stopping biodiversity loss, the implementation is more complicated than theory. It is difficult to persuade a neighbour to give up

their livelihood or lifestyle for the common good, especially if there are no alternatives or incentives. It costs money, which in a debt-ridden world is being contested for more and more budget items. Technological advances offer no quick fix for biodiversity loss either. On the other hand, we know that more than half of the global GDP is linked to natural resources (World Bank 2022), so the cost of inaction would be enormous.

Much of the work is left to the countries themselves. The recent decision of the UN Biodiversity Conference does not contain country-specific targets and it is not legally binding. Getting it right is all the more important, as not all areas are equal in terms of biodiversity and not all solutions are equally cost-effective. Finnish decision-makers should also bear this in mind when weighing up the most effective measures.

The best solutions for halting biodiversity loss can be found through international co-operation. One approach is to impose global or regional environmental taxes on biodiversity-degrading activities to finance biodiversity-enhancing measures. This is one of the ideas put forward by Sir Partha Dasgupta, Emeritus Professor of Economics at the University of Cambridge, in his report on the link between biodiversity loss and the economy (Dasgupta 2021).

The decision of the UN Biodiversity Conference shows that the will to stop biodiversity loss is there, as, of course, it should be. After all, halting biodiversity loss is vital to our existence.

Olli Rehn is Governor of the Bank of Finland and a member of the Governing Council of the European Central Bank. He served as Vice-President of the European Commission between 2011 and 2014. As a Member of the European Commission, he was responsible for EU enlargement in 2004–2010 and for economic and monetary affairs in 2010–2014. Rehn served as Minister of Economic Affairs for the Finnish government from 2015 to 2016. Olli Rehn holds a degree of Doctor of Philosophy from the University of Oxford.

JOUKO PÖLÖNEN, CHIEF EXECUTIVE OFFICER, ILMARINEN

Biodiversity loss also concerns investors

The economy is strongly dependent on natural capital. Long-term investors must take biodiversity into account, not only to safeguard nature but also to safeguard their own activities.

Biodiversity on Earth is declining rapidly. Some animal and plant species are becoming extinct, whereas others are spreading uncontrollably. Biodiversity loss is as massive a challenge as global warming. Climate change is also accelerating biodiversity loss.

The UN Biodiversity Conference organised in Montreal, Canada, in December yielded some good news: the countries of the world finally committed themselves to protecting biodiversity and using natural resources sustainably.

Why does this matter to the financial sector? The global economy cannot function without natural capital and its biodiversity, as the economy is deeply dependent on nature: bakeries need grain, forestry companies need timber, and industry needs minerals. On the other hand, the economy has an impact on natural capital as well as biodiversity: if a factory discharges waste into a river, the environment is polluted and many species suffer or even die.

Although a significant part of economic value creation is based on services provided by nature, the benefits of nature, as well as the harm caused to it, are not yet priced properly. This leads, for example, to environmental pollution and wasting of natural resources. We are over-consuming our natural resources. We need to recycle these resources much more efficiently than we currently do. We are now depleting our natural capital, which means that we are eating up our capital.

Biodiversity loss is a systemic risk for the entire economic system. For example, pension companies reduce investment risk by diversifying investments widely across sectors and geographical areas but cannot fully protect themselves against the risks caused by biodiversity loss. That is why we need all market operators, such as financial institutions and asset managers, to work together to integrate biodiversity into business decision-making and to contribute to halting biodiversity loss. It makes economic sense to act decisively: doing nothing or procrastinating will be costly.

Fortunately, there is hope. Ordinary citizens, meaning business customers, as well as enterprises, public authorities and even the financial sector, are starting to understand the systemic risk of biodiversity loss. More and more customers are requiring companies to act responsibly. In the future,

biodiversity loss and the related financial impacts will become increasingly important to companies and, consequently, to investors.

Our task as a private pension company is to invest pension fund assets productively, securely and responsibly, so that we can pay out pensions now and in the future. To do this, we must take biodiversity into account in risk management and financial decision-making. Problems of biodiversity loss affect our investments and their returns and risks around the world. And on the other hand, the companies in which we invest can impact biodiversity through their activities.

At Ilmarinen, we have started working on biodiversity. We started by familiarising ourselves with the topic and finding out what methods investors have at their disposal. In October 2022, we published the Ilmarinen Biodiversity Roadmap (Ilmarinen 2022, pdf), in which we share our views and plans on the topic with others. We screened and analysed our preliminary listed investment portfolio. This will help us continue to identify the sectors and activities that are most heavily dependent on biodiversity or that have the greatest impact on biodiversity.

Now that the analysis is complete, we can design methods to better integrate biodiversity into our investment activities. These include enhanced due diligence and influencing the activities of our investees. In our experience, owners can influence companies and encourage them to change for the better – in this case for biodiversity. Companies benefit from responsible business practices and taking biodiversity into account.

We also aim to report on biodiversity risks and impacts in line with the best industry standards as they develop. We are constantly learning more about biodiversity and so are better able to reflect it in our work.

Market operators and public authorities are already doing a lot to promote biodiversity. The evolution of the available solutions is quick-paced, and, fortunately, they are becoming increasingly practical. The key is to create a common understanding of the importance of nature for society as a whole for well-being and for the economy. At the same time, we must learn how we can prevent biodiversity loss through our own choices and actions.

We cannot afford to over-consume natural resources. It is our responsibility to ensure that there will be enough nature, including for our children and grandchildren.

Jouko Pölönen is CEO of Ilmarinen Mutual Pension Insurance Company. He has extensive experience from different tasks in the financial sector. He holds a Master of Science in Economics and Business Administration and eMBA. In his free time, Pölönen enjoys outdoor activities such as skiing, hunting and golfing.

Leif Schulman
Jaana Husu-Kallio
Johanna Buchert
Hanna Haveri

Nature is the foundation of well-being

LEIF SCHULMAN, DIRECTOR GENERAL, FINNISH ENVIRONMENT INSTITUTE

Healthy aquatic nature enables our well-being

Finnish water bodies are in a worse condition than we would like to believe. Fortunately, there is a lot we can do to repair the damage. Healthy aquatic environments are valuable for both the national economy and the well-being of citizens.

Seas and lakes, rivers and streams, and ponds and springs are all part of our national identity. As the Finnish national anthem puts it: *No lake or shore more dear.*

We often assume that our waterways are clean, but only a seventh of the coastal areas of the Baltic Sea are in good condition. Our lakes are in many respects still in good shape but the deteriorating condition of Finnish rivers should set alarm bells ringing. Water bodies form interconnected entities: water from polluted rivers flows into the sea and sometimes into lakes.

Our streams are in a very poor condition. This is due to extensive drainage to enhance forestry. Moreover, large-scale land use has also resulted in the darkening of water bodies due to increased humus content. This poses a substantial threat to our lakes. Climate change increases the leaching of humus into water bodies. The construction of power plants has also significantly damaged habitats in running waters. Most of our native migratory fish populations have been destroyed.

The pollution of waterways is about much more than just polluting the landscapes described in the Finnish national anthem. The degradation of inland waterways is eroding our water resources. For example, the entire Helsinki region uses water from Lake Päijänne. If the lake deteriorates, it will become more difficult and more expensive to produce pure tap water.

A diverse aquatic ecosystem has resilience – the ability to resist change so that even if harmful discharges or invasive species are released into the water body, its condition will not deteriorate permanently. This is why the good condition of aquatic biodiversity also has economic value, in addition to the intrinsic value of biodiversity. The deterioration of aquatic environments is associated with the risk of a negative cycle. For example, the eutrophication of the Baltic Sea leads to anoxic areas in the seabed where the nutrients deposited in the mud are re-released into circulation. This will further accelerate eutrophication.

Because we want to preserve the health of our waters, we have set limit values for pollution. In approaching these values, new sources of environmental stress must not be allowed. For example, Finnpulp's bioproduct plant

project in Kuopio failed in 2019 because the ecological status of Lake Kallavesi was at risk of deteriorating too much. Therefore, the previous deterioration of a water body may restrict economic activity today and in the future. At the same time, it should be noted that vibrant crayfish and fish stocks, clean bathing waters, healthy summer cottage shores and beautiful lake and seascapes have manifold value for the national economy. As prerequisites for tourism and sources of both mental and physical well-being for the Finnish population, they both generate income and save money.

Although we must protect our water resources and aquatic ecosystems, we can still develop a wide range of industrial activities. But we must get used to making more careful choices within ecological limits. The most cost-effective way is to prevent damage, such as by retaining nutrients and humus in terrestrial ecosystems. It is also possible to repair existing damage, but this is usually more expensive and laborious than preventing them.

Nutrient emissions from agriculture can be reduced, for example by making the circular economy more effective and, in the right situations, by liming fields or spreading gypsum on them. Improving the condition of watercourses can be as simple as extending the buffer zones along streams and rivers. We can increase water levels in drained peatlands, and switch to paludiculture on wetlands and continuous cover forestry in the commercial forests on peatlands. Economically unproductive drainage should be abandoned.

Unfortunately, much damage has already been done, which means that remedial action cannot be avoided. Measures with a rapid impact include the removal of dams in running waters and management fishing in eutrophic lakes. Wetland bird habitats can be restored quickly by raising water levels and dredging gaps in reed beds.

Decades of degradation often require long-term repair work. For example, point source pollution in the Baltic Sea from wastewater is now largely under control, but because of continued excessive diffuse pollution from agriculture and forestry, improvements in the state of the sea are mainly only evident in the eastern Gulf of Finland.

Restoration work calls for innovations. Recent research shows that even a small measure such as submerging tree trunks in drainage ditches will retain nutrients and increase biodiversity (Vuori et al. 2021, pdf, link in Finnish). This simple measure would allow many landowners to contribute toward saving our waters.

Leif Schulman has served as Director General of the Finnish Environment Institute since the beginning of 2021. Before that, he was the head of the University of Helsinki's Finnish Museum of Natural History Luomus for ten years. By education, Schulman is Doctor of Philosophy (Ph.D.) in Biodiversity Science.

JAANA HUSU-KALLIO, PERMANENT SECRETARY,
MINISTRY OF AGRICULTURE AND FORESTRY

No food security without biodiversity

If we cannot halt biodiversity loss, we will not be able to achieve food security. It is, therefore, important to increase the awareness and expertise of farmers and, especially, decision-makers about the links between food systems and biodiversity.

There is a close link between the decline of biodiversity and our way of producing food. It is estimated that up to 80 per cent of biodiversity loss is linked to food systems – how food is produced and consumed. Global population growth poses a significant additional challenge to food production. At the same time, it challenges us to develop more sustainable food systems. In 2021, the UN Food Systems Summit (UN 2021) recognised the urgency of reforming food systems. Different countries, including Finland and the other Nordics, prepared pathways for developing their own food systems.

The UN's 2030 Agenda for Sustainable Development Goals (UN 2015), shows that if we want to eliminate extreme poverty from the world and safeguard prosperity in an environmentally sustainable way, all of the goals set by the 2030 Agenda – individually and collectively – have a role to play. In terms of natural resources, we must look at the numerous links between food, water, forest and energy. For example, if forests are cut down to provide land for food production, the water cycle is also affected.

Food security and biodiversity are also interdependent. If we cannot curb biodiversity loss, we will not be able to achieve food security. Poverty and lack of sufficient food will affect the use and management of the surrounding nature and natural resources - starting from the possibilities of combating soil erosion.

Not all threats to biodiversity are caused by humans, at least not directly. At the initiative of Finland, the UN International Year of Plant Health of 2020 (*IYPH2020*, IPPC) emphasised the significance of plant health for biodiversity. While an estimated 40 per cent of the world's agricultural crops are destroyed annually due to pests and plant diseases, their threat to wild plants is obvious. Good plant health promotes food security and environmental protection goals.

Taking care of pollinators is one of the clearest examples of the link between food production and biodiversity. According to the 2022 PÖLYHYÖTY report (Heliölä et al. 2022, abstract available in English), pollinators generate about EUR 50 million in economic added value for the

Finnish agriculture sector each year. Providing a safe habitat for pollinators is therefore also economically viable. The deterioration of pollination services could cause annual losses of nearly USD 600 billion to the global agriculture sector.

In traditional Finnish agriculture, livestock grazing has been an important practice that has contributed to biodiversity. Livestock farming has played a major role in the diversity of our agricultural environment and the Finnish countryside. Structural change has shaped grazing practices. Just one hundred years ago cattle spent the summers grazing freely in the forests. As a child in the 1960s, I remember fetching cows from the forest for milking. Traditional rural biotopes are species-rich habitats shaped by traditional livestock farming, where grazing and mowing have maintained a distinctive, diverse range of species. Compared to the situation at the end of the 19th century, less than one per cent of the traditional rural biotopes of the past remain. It is vitally important to provide farmers with better opportunities to maintain natural pastures and traditional rural biotopes.

The implementation of the CAP Strategic Plan in 2023 will introduce new measures to promote biodiversity. For example, support is given to the cultivation of pollinator food plants and the establishment of flower strips in field environments. Good old practices, such as fallowing will also be continued. One of the targets is to increase organic farming. It is essential to raise farmers' awareness of biodiversity management and create incentives for strengthening biodiversity. It is not easy to measure all the economic benefits, and they are not immediately quantifiable. By discussing and developing together, understanding of these issues will surely increase.

Food production always involves choices. We protect certain plants at the expense of others. Sustainable plant cultivation requires a wide range of knowledge and skills to balance environmental management and controlled non-management.

Knowledge of the different impacts of food systems, and also of how to measure economic success in more diverse ways, is something we decision-makers need even more desperately than farmers – worldwide.

Jaana Husu-Kallio has served as Permanent Secretary of the Ministry of Agriculture and Forestry since 2012. Before that, she was Director General of the Finnish Food Safety Authority Evira, to which she transferred from the post of Deputy Director-General of the European Commission DG for Health and Consumer Protection in 2006. By education, Husu-Kallio is Doctor of Veterinary Medicine.

JOHANNA BUCHERT, PRESIDENT AND CEO,
NATURAL RESOURCES INSTITUTE FINLAND

Finland must combine sustainable forestry and forest biodiversity conservation

Safeguarding biodiversity and the sustainable use of forests requires a willingness to reconcile different objectives. There is a long list of ways to do this, and new ones are constantly being developed.

More than three quarters of Finland's land area is covered by forests, and a third of the endangered species found in Finland live in forests (Hyvärinen et al. 2019, abstract available in English). Biodiversity must be strengthened so to meet national and global targets to halt biodiversity loss. At the same time, wood and forest-based industry and production, known as forest bioeconomy, plays a significant role in the Finnish national economy and in the intended transition away from a fossil-based economy. We must therefore pursue a harmonious reconciliation of the goals set for forest biodiversity and forest bioeconomy. Research, the development of monitoring data and management of spatial data play an important part in this.

Data on the Finnish forest resources has been collected through the National Forest Inventory (*NFI*, Natural Resources Institute Finland, link in Finnish) for over 100 years, and we are particularly well aware of the extent of the Finnish tree stock. The NFI, carried out by the Natural Resources Institute Finland (Luke), measures a number of variables that affect biodiversity. According to the NFI, several structural traits important for biodiversity, such as the amount of deadwood and deciduous trees, have developed favourably in southern Finland in the 2000s (Korhonen et al. 2020, link in Finnish). However, the level of nature management in reforestation areas has not improved since the early 2000s, despite recommendations (Siitonen et al. 2020, link in Finnish). The goal of the NFI and several other research projects is to continuously improve the ways of observing and measuring diversity. It is expected that the ongoing inventory of forest undergrowth all across Finland will lead to the introduction of new biodiversity indicators as part of the NFI.

In addition to the current NFI and reports on the assessments of endangered species and habitats, we need more detailed monitoring of biodiversity based on statistical sampling. This is expensive and labour-intensive, but research data and clear indicators suitable for different environments are the only means to assess and predict the impact of different measures. We also

need a better understanding of the coexistence of different species and of the impacts that our actions have on species interactions.

One effective way to safeguard biodiversity is to strengthen the nature management of commercial forests as a complement to the network of protected forests. Increasing the number of mixed forests and old, mature deciduous trees contributes to biodiversity and the survival of the biota dependent on different tree species in commercial forests. Mixed stands also often reduce the risk of forest damage. In addition to protecting forest areas and leaving deadwood in the terrain, we may need complementary measures to protect endangered species. We also need new types of tools and funding models that take better account of natural values and, thus, can be used to steer landowners to take targeted nature management measures. Increasing the knowledge and skills of forest owners will provide a good basis for voluntary forest biodiversity conservation. There is also a need to better identify key biotopes to preserve particularly important habitats.

Effective communication of the latest research findings into forest management recommendations is an important channel of influence. The Finnish forest expert company Tapio will update the guidelines on the ecological sustainability of forest management during 2022–2024. Luke has supported this work by preparing a synthesis report on the ecological impacts of nature management measures in commercial forests (Koivula et al. 2022, abstract available in English). Luke is also involved in the development of quality monitoring for nature management. In addition, the European Commission will issue general voluntary recommendations for more natural forest management, which require further specifications at national level.

Forest bioeconomy is important for the Finnish national economy, which is why we must be able to combine the well-being of nature and safeguarding ecosystem services with resource-efficient and sustainable raw material production. Ideally, we will have a comprehensive and interconnected network of conservation areas and ecological sites in commercial forests that promotes biodiversity – and more intensive forestry in other areas to sustain the timber production required by the forest bioeconomy. To ensure this, we need a coordinating and enabling approach that recognises the importance of the forest bioeconomy and biodiversity for Finland. Only by pooling national resources will we be able to meet our responsibilities regarding these global challenges.

Doctor of Technology, Professor **Johanna Buchert** has served as President of the Natural Resources Institute Finland (Luke) since 2018. Prior to this post, Buchert served as Executive Vice President for Research at Luke and held various research and management positions at VTT Technical Research Centre of Finland.

HANNA HAVERI, PLANETARY HEALTH PHYSICIAN,
WELL-BEING SERVICES COUNTY OF PÄIJÄT-HÄME

Biodiversity loss also threatens human health

Biodiversity loss exposes people to new contagious diseases, changes in the immune system and endangers food production.

Just a few decades ago, shy, little Willow tits peeking through the window were a familiar sight in gardens when I was a child. Sheltered by the dense fir trees of the surrounding esker ridges, the little birds dug their nesting places in decaying trees. You could catch a glimpse of a spider under the drooping Pussytoe flowers. Now the nearby woods are narrow patches squeezed between clusters of small houses. The tiny Willow tits grew tired of the roar of construction machinery, the newly introduced Common lupines outgrew the Pussytoes, and the spiders were forced to make room for new predators.

Over billions of years, Earth has experienced five waves of extinction, with species loss proceeding slowly over tens of thousands of years. The sixth and most aggressive mass extinction has been triggered by humans: in less than 50 years, population sizes of vertebrate wildlife populations have globally decreased by an average of almost 70 per cent (WWF 2022, pdf). Moreover, one in nine Finnish species is on the verge of extinction. More than a third of these species live in forests.

The consequences of biodiversity loss are not easy to detect in a welfare state. Food is always available and the same annoying weeds keep invading the lawn. But as biodiversity loss progresses, everyone's health will be threatened, including in Finland. The battle for living space is narrowing the range of species. That's why pathogens need a new target, which more often than not is us humans. The shrinking of natural habitats is increasing the encounters between wildlife and humans. Already two out of three infectious diseases in humans are transmitted from animals (Nuorti and Sironen 2022, abstract available in English). Covid-19, which brought the world to a halt, is a dramatic example of a viral disease that was transmitted to humans from animals, probably bats.

The main drivers of biodiversity loss are construction, forestry and food production. Most of the world's arable land is used for food production of animal origin. One of the key measures for slowing down biodiversity loss is to adopt a more plant-based diet, which also helps to reduce lifestyle-related morbidity. Both climate change and biodiversity challenge the security of food production.

According to Economist Sir Partha Dasgupta, the lack of economic value in nature leaves us unmotivated to take action to halt biodiversity loss (Dasgupta 2021). The benefits of nature to humans, or ecosystem services, are perhaps valued most in food production. Of all our crops, 70 per cent are dependent on pollinator insects, meaning that the reducing number of pollinators reduces the availability of food and causes global losses that correspond to almost nine times the Finnish state budget (IPBES 2016). Healthy nutrition is a prerequisite for human life, but safeguarding ecosystem services has been neglected in policy-making.

Almost 80 per cent of Finns live in an urban environment, and research shows that concentrating housing in urban areas is justified from the perspective of both nature and health (Finnish Institute for Health and Welfare 2022). In 2022, the UN declared access to a clean, healthy and sustainable environment a human right. Urban forests protect against air pollution and balance the effects of changing weather patterns. Green spaces increase physical activity and perceived health. The quality of nature makes a difference. Well-managed nature has been generally considered a suitable environment for vulnerable groups, such as people with physical disabilities and elderly people. A diverse forest has potentially greater benefits for human well-being compared to an efficiently managed one (Simkin et al. 2020). Under pressure from dense urban development, it is also important to preserve contiguous untreated natural areas close to people.

Humans are home to more than one thousand different species of bacteria. In a healthy ecosystem, there is a balance between multiple microbial species. The microbial contacts in the environment shape our body's responses to external factors. A living environment lacking biodiversity may lead to allergies, asthma and autoimmune diseases, where the body attacks itself (Haahtela et al. 2017, link in Finnish). Instead of artificial materials, green elements in a built environment will alter the human microbiota and may therefore boost our immune system (Roslund et al. 2020). But in terms of biodiversity the most important thing is actual nature.

There are scientific grounds for preserving both nearby forests and remote natural areas. The Willow tit is simply one of the thousands of victims of human activity. On a superficial level, the disappearance of the Willow tit from among the Finnish bird species would be insignificant. But the reality is that the extinction of just one species can trigger the collapse of an entire ecosystem. Humans are unwittingly participating in a game of Russian roulette as pathogens seek better hunting grounds. The fight against biodiversity loss is also a battle to safeguard human health.

Hanna Haveri is a specialist in neurology and the first planetary health physician in the world. She has been actively observing nature since childhood and has witnessed human-induced changes in biodiversity through beekeeping, for example. In terms of research, she is particularly interested in the role of biodiversity loss in the emergence of diseases.

Kaisa Hietala

Jyrki Katainen

Solutions from the economy for combatting biodiversity loss

KAISA HIETALA, PROFESSIONAL IN CORPORATE BOARD WORK

The most powerful competitive asset for business is its capacity to change

When the boundaries of nature are reached, businesses must recognise and embrace the need for changes before it becomes an imperative. The capacity for change must be built into a competitive advantage that will be difficult for others to copy.

I often come across the term 'dual challenge' in the business world. This refers to a situation where a sector is struggling to cope with the crossfire of growing demand and increasingly stringent sustainability requirements. There are plenty of interested buyers for current products, but at the same time growing criticism of production methods, raw material sources or poor repairability of the products.

We consumers still want to consume, but could we do it less at nature's expense?

The ongoing population growth creates the need for more food production, a growing middle class ramps up its consumption, and governments invest in infrastructure such as electricity networks and transport routes. At the same time, the increasing biodiversity loss sets limits on how much we can draw on nature to meet growing demand.

The business world pays close attention to its customers and the surrounding society. The solutions for achieving more sustainable operations are known in theory, but what should we do in practice?

The scale of the challenge we face is systemic. We have been taken by surprise by companies' direct or indirect dependence on nature.

'Susformation' is a new term to describe a major change that companies are undergoing, with nature as the driving force. Uncertainty and lack of control are the key words in susformation, as the human ability to control nature is marginal.

The complexity of the challenge is illustrated by the fact that new solutions require systemic changes across the entire value chain. For example, we are currently studying how the traditional value chain will work if, after the installation of solar panels, electricity consumers also become private electricity traders, or if an electronics manufacturer would like to have products that are about to be decommissioned returned to them for raw material in their own production process.

Susformation requires companies to reform their business models throughout the value chain. Traditional roles are changing, and new operators emerge at the nodes of intersecting value chains. Companies must have the

curiosity to explore other parts of the value chain and the courage to expand into new fields. This often requires new partnerships and value redistribution.

From a business perspective, the biggest missing element in the transition is the failure to determine the value of nature through traditional economics. What is the value of a cubic metre of clean water saved in the production process or a hectare of forest that acts as a carbon sink? How is the ecological value that is either consumed or accumulated by a company reflected in its balance sheet?

There is no market or legislation for natural capital or ecosystem services, nor is there a counterpart from which businesses either take from or give to. The national accounting system does not allow for the measurement of or trading in natural capital. Without an understanding of how and by whom this capital will be managed in the future, the systemic change of susformation cannot be solved.

To support decision-making, companies, policy-makers and society need multidisciplinary research on reconciling the economy and nature in the same accounting system. Modelling natural capital is difficult, but it offers an opportunity to develop and reform economics. These reforms will provide a basis for future accounting and balance sheet calculations, including in the business world. Companies need to identify and measure their own natural footprint so that it can be included in their risk surveys, investment decisions and strategic growth objectives.

Many companies feel at a loss when faced with susformation. Traditionally, we have viewed nature as a tool: a source of raw materials, a service provider and sometimes a waste treatment plant. The scale, complexity and slowly advancing nature of the ongoing transition are atypical for the challenges that the business world has become accustomed to solving. To navigate this uncertainty requires more leadership from the business sector than ever before.

This leadership is not measured in market shares but in the ability to create a culture powered by change. The need for change must be recognized and embraced before it becomes an imperative.

The ability to change must be built into a competitive advantage that will be difficult for others to replicate. It can be used to create new products, value creation models and ways of working. It encourages the development of new technologies and supports efforts to reduce waste and return resources to circulation.

The capacity for change also reinforces a culture where partnerships and working in ecosystems create better conditions for coping with uncertainty and thriving.

Kaisa Hietala is a professional in corporate board work specialised in combining environmental and climate challenges and business. She is a board member at the oil company Exxon Mobil, the mining company Rio Tinto and the packaging giant Smurfit Kappa Group, Chair of the Board of Directors at the Finnish fertilizer company Tracegrow Oy, and a member of the Supervisory Board of the University of Oulu. Hietala served on the Board of Directors of Kemira Oyj between 2016 and 2021 and as Executive Vice President for renewable products at Neste from 2014 to 2019.

JYRKI KATAINEN, PRESIDENT, SITRA

Nature is the foundation of a strong economy

Nature is the source and enabler of economic value chains. Therefore, we must establish a price for exploiting it. The market economy must be harnessed to strengthen nature.

Our economy is completely dependent on nature. At any given time, our economy relies on nature for a wide variety of both tangible and intangible benefits: food, materials, energy, plant pollination, water purification, carbon sequestration, recreation, health benefits – and numerous other ecosystem services. Nature is the source and enabler of economic value chains.

The benefits provided by nature are mostly free, which is why we have exploited nature beyond its breaking point without so much as a second thought. As Sir Partha Dasgupta, Emeritus Professor at the University of Cambridge, noted in his ground-breaking report (Dasgupta 2021), we, meaning humanity, have been bad asset managers. We have grown wealthy – accumulated physical and human capital – by relentlessly consuming our shared natural capital.

We cannot continue on this path. Our demand for services provided by nature exceeds nature's carrying capacity. Because our economy is dependent on nature, by causing a collapse in natural capital we also eradicate the foundation of future economy and well-being.

Strengthening natural capital is an economic issue, and nature policy is also economic policy. And not just economic policy: halting biodiversity loss will in future be reflected in all policy areas.

It is clear that biodiversity loss will not be solved by nature conservation alone – although conservation work is important and necessary. If we were to protect 30 per cent of all land and sea areas worldwide, 70 per cent of nature would remain unprotected. Whether we use this 70 per cent in a sustainable or unsustainable way will have an enormous impact on nature and the services it provides.

I believe that the market economy is an important force that can be harnessed to strengthen nature. If we try to solve biodiversity loss with public budgets alone, we will fail. Private capital is also needed.

Many companies have already recognised that combating biodiversity loss and enhancing biodiversity are challenges that need solutions. These challenges are becoming an issue on the scale of climate change. That is why we need new thinking and co-operation to develop solutions that work. The market economy needs smart rules and a goal to work towards.

What can policy-makers do in practice? Here are five concrete ways to promote biodiversity.

Taxation is an effective tool to steer markets. By implementing a large environmental tax reform in Finland, in the range of billions of euros, sustainability could be promoted in a manner that is effective from the perspective of the national economy.

Pricing externalities should be promoted to create fair competition. As long as there is no price on externalities, burdening nature will appear cheap and enhancing nature expensive. We cannot afford this. It is to the advantage of responsible companies that unfair competitive edge cannot be obtained by harming nature.

The circular economy has the potential to reduce the environmental pressure of our activities. Public authorities can promote the circular economy, for example through economic steering instruments and by setting circular economy criteria for public procurement.

Establishing a more progressive **regulation** in key market areas, such as in Europe, can have a broad impact. Companies operating globally need to comply with the EU regulations if they want to sell their products in the EU. Once companies have adapted to EU regulation, it can often be profitable to offer products that comply with the same stricter regulations in other markets, as well. For example, the reform of the EU's sustainable product policy will set requirements for product sustainability, upgradeability, repairability and recyclability.

We also need new tools for decision-making to make the link between nature and the economy visible. The answer to this is **ecosystem accounting**, which is a part of the EU's statistical regulation currently under preparation. Ecosystem accounting is an extension of national accounting that allows us to measure the state of natural capital and the services ecosystems provide people. For example, it could be used to assess the annual monetary value of a specific ecosystem service or the loss of value due to ecosystem degradation – and how the consumption of natural capital undermines the operating conditions of the economy. It is essential that this tool is deployed ambitiously. We need ecosystem accounting to sustainably maintain our natural capital.

For our economy to continue to thrive, it needs to become nature-positive: an economy that not only reduces the pressure on nature but turns our activities as a whole into nature-enhancing ones.

Jyrki Katainen has served as President of Sitra since 1 January 2020. His main aim has been to lead the future-oriented work at Sitra in such a way that Sitra will be able to generate new ideas to aid policy and decision-makers in society and private companies and to try and test new approaches. Before his appointment at Sitra, Katainen was European Commission Vice-President for Jobs, Growth, Investment and Competitiveness. Prior to that, he has held the positions of Prime Minister of Finland and Minister of Finance.

References

Dasgupta, P. 2021. The Economics of Biodiversity: The Dasgupta Review. HM Treasury. Retrieved on 31 January 2023.

Finnish Institute for Health and Welfare (THL) 2022. THL's Morbidity Index 2019: Large regional differences in morbidity. Retrieved on 31 January 2023.

Haahtela, T., Hanski, I. et al. 2017. Luontoaskel tarttumattomien tulehdustautien torjumiseksi. Duodecim 133. Retrieved on 31 January 2023.

Heliölä, J., Kuussaari, M. et al. 2022. Status and monitoring of pollinator populations and the economic value of pollination for agriculture in Finland: Final report of the PÖLYHYÖTY project. Finnish Environment Institute. Finnish Environment Institute. Retrieved on 31 January 2023.

Hyvärinen, E., Juslén, A. et al. (eds.) 2019. The Red List of Finnish Species 2019.. Ministry of the Environment & Finnish Environment Institute. Retrieved on 31 January 2023.

Ilmarinen 2022. Ilmarinen Biodiversity Roadmap (pdf). Retrieved on 31 January 2023.

IPBES 2016. The assessment report of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services on pollinators, pollination and food production. Potts, S. G., Imperatriz-Fonseca, V. L. and Ngo, H. T. (eds.). Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. Retrieved on 31 January 2023.

IPBES 2019. Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. Brondizio, E. S., Settele, J. et al. (eds.). Secretariat of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. Retrieved on 31 January 2023.

IPPC. IPPC and the International Year of Plant Health. Retrieved on 31 January 2023.

Koivula, M., Louhi, P. et al. 2022 Talousmetsien luonnonhoidon ekologisten vaikutusten synteesi. Luonnonvara- ja biotalouden tutkimus 60/2022. Natural Resources Institute Finland. Retrieved on 31 January 2023.

Kontula, T. and Raunio, A. (eds.) 2018. Threatened Habitat Types in Finland 2018. Red List of Habitats – Part 1: Results and Basis for assessment. Finnish Environment Institute and Ministry of the Environment. The Finnish Environment 2/2019. Retrieved on 31 January 2023.

Korhonen, K. T., Ihalainen, A. et al. 2020. Metsien monimuotoisuudelle merkittävien rakennepiirteiden muutokset Suomessa vuosina 1980–2015. Metsätieteen aikakauskirja 2020-10198. Retrieved on 31 January 2023.

Ministry of Finance 2022a. Ministry of Finance Strategy on Climate and Nature paves the way to a cleaner, thriving Finland. Retrieved on 31 January 2023.

Ministry of Finance 2022b. Virkamiespuheenvuoro (Contribution by the officials of the Ministry of Finance). Taustamuistio: 39 Hiilineutraaliustavoitteen vaikutus julkiseen talouteen. Retrieved on 31 January 2023.

Ministry of Finance 2022c. Virkamiespuheenvuoro (Contribution by the officials of the Ministry of Finance). Taustamuistio: 42 Luontokadon torjunta. Retrieved on 31 January 2023.

Natural Resources Institute Finland. National Forest Inventory (NFI). Retrieved on 31 January 2023.

NGFS 2022. Central banking and supervision in the biosphere: An agenda for action on biodiversity loss, financial risk and system stability. NGFS Occasional Papers. Retrieved on 31 January 2023.

NGFS. Network for Greening the Financial System. Retrieved on 31 January 2023.

Nuorti, P. and Sironen, T. 2022. Environmental changes increase the risk of emergence and spread of new infections and pandemics. Suomen Lääkärilehti (Finnish Medical Journal) 45-46 Retrieved on 31 January 2023.

Roslund, M., Puhakka, R. et al. 2020. Biodiversity intervention enhances immune regulation and health-associated commensal microbiota among daycare children. Science Advances 6. Retrieved on 31 January 2023.

Siitonen, J., Punttila, P. et al. 2020. Talousmetsien luonnonhoidon kehitys vuosina 1995–2018 luonnonhoidon laadun arvioinnin sekä valtakunnan metsien inventoinnin tulosten perusteella. Luonnonvara- ja biotalouden tutkimus 69/2020. Natural Resources Institute Finland. Retrieved on 31 January 2023.

Simkin, J., Ojala, A. and Tyrväinen, L. 2020. Restorative effects of mature and young commercial forests, pristine old-growth forest and urban recreation forest – A field experiment. Urban Forestry & Urban Greening 48, 2020-126567. Retrieved on 31 January 2023.

United Nations (UN) 2015. Transforming our world: the 2030 Agenda for Sustainable Development. Retrieved on 31 January 2023.

United Nations (UN) 2021. UN Food Systems Summit. Retrieved on 31 January 2023.

Vuori, K-M., Leppänen, M. et al. 2021. Puupohjaisilla uusilla materiaaleilla tehoa metsätalouden vesiensuojeluun ja vesistökunnostuksiin – PuuMaVesi-hankkeen loppuraportti (pdf). Retrieved on 31 January 2023.

World Bank 2022. Securing Our Future Through Biodiversity. Retrieved on 31 January 2023.

World Economic Forum 2020. Nature Risk Rising: Why the Crisis Engulfing Nature Matters for Business and the Economy. Retrieved on 31 January 2023.

World Wildlife Fund (WWF) 2022. Living Planet Report 2022 – Building a nature-positive society (pdf). Almond, R. E. A., Groote, M. et al. (eds.). Retrieved on 31 January 2023.

SITRA

SITRA MEMORANDUM 12 APRIL 2023
Sitra memorandums are insights produced to support our future-oriented work.

ISBN 978-952-347-322-5 (PDF)
www.sitra.fi/en

SITRA.FI
Itämerenkatu 11–13
PL 160
00181 Helsinki
Phone 0294 619 991
@SitraFund