THE FINNISH NATURE PANEL

METHODS AND BENEFITS OF PROMOTING BIODIVERSITY IN AGRICULTURAL AREAS IN FINLAND

Summary and recommendations of the Finnish Nature Panel to support the planning and decision-making of nature policy

Aleksi Lehikoinen, Juha Aalto, Christoffer Boström, Johan Ekroos, Irina Herzon, Kari Hyytiäinen, Simo Häyrynen, Jaana Jarva, Jukka Jokimäki, Anna-Kaisa Kosenius, Janne S. Kotiaho, Mikko Kuussaari, Ilona Laine, Heikki Mykrä, Tiina Onkila, Tiina Paloniitty, Minna Pappila, Outi Silfverberg, Ilari E. Sääksjärvi, Lili-Ann Wolff and Susu Rytteri

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REPORT SUMMARY

The Finnish Nature Panel is an independent statutory scientific panel that supports the planning and decision-making of nature policy. The statements and reports of the Finnish Nature Panel are based on scientific evidence and multidisciplinary expertise.

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Report summary

Methods and benefits of promoting biodiversity in agricultural areas in Finland

Authors:
Aleksi Lehikoinen (Finnish Museum of Natural History Luomus), Juha Aalto (Finnish Meteorological Institute), Christoffer Boström (Åbo Akademi), Johan Ekroos (University of Helsinki), Irina Herzon (University of Helsinki), Kari Hyytiäinen (University of Helsinki), Simo Häyrynen (University of Eastern Finland), Jaana Jarva (Geological Survey of Finland), Jukka Jokimäki (University of Lapland), Janne S. Kotiaho (University of Jyväskylä), Mikko Kuussaari (Finnish Environment Institute), Anna-Kaisa Kosenius (University of Helsinki), Ilona Laine (Finnish Environment Institute), Heikki Mykrä (Finnish Environment Institute), Tiina Onkila (University of Jyväskylä), Tiina Paloniitty (University of Helsinki), Minna Pappila (Finnish Environment Institute), Outi Silfverberg (Finnish Environment Institute), Ilari E. Sääksjärvi (University of Turku), Lili-Ann Wolff (University of Helsinki) and Susu Rytteri (Finnish Environment Institute)

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The Finnish Nature Panel is an independent expert body that supports the planning and decision-making of nature policy. The role and tasks of the Finnish Nature Panel are laid down in the Nature Conservation Act. The statements and reports of the Finnish Nature Panel are based on scientific evidence and multidisciplinary expertise.

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INTRODUCTION

This summary by the Finnish Nature Panel, intended for decision-makers, presents a comprehensive outlook into the biodiversity of Finnish agricultural areas and the factors affecting it. The summary is based on the Finnish Nature Panel's report "Factors promoting and weakening farmland biodiversity in Finland"[1]. The main objective of the report is to increase understanding of the agricultural measures and land use that can best promote biodiversity and policy guidance that is necessary for implementing these measures. Based on the report, we are presenting research-based recommendations to support decision-making. The recommendations particularly concern agricultural policy measures that would increase the area and quality of habitats that are important for biodiversity. We also present recommendations to promote business activities that support farmland biodiversity and to increase and disseminate information related to farmland biodiversity.

The Finnish Nature Panel report systematically investigates the results of 318 peer-reviewed research publications on the biodiversity of agricultural environments in Finland, Sweden and the Baltic countries, where farming practices and conditions are similar. The report examines the impacts of land use, farming practices and agricultural landscapes on farmland biodiversity. Research data has been collected on five relatively well-studied groups of species: plants (106 articles), bees (51), butterflies (62), birds (81) and earthworms (19). These groups of species were selected for examination because they differ from each other in terms of their life cycle and habitat requirements, offering a comprehensive overview of the biodiversity of agricultural environments.

FARMLAND BIODIVERSITY IN FINLAND

Producing food is necessary. However, agriculture is one of the main causes of global biodiversity loss, as it has replaced natural environments in large areas[2]. Today, agricultural areas cover about 38 % of the Earth's land area[3]. Nonetheless, there are major regional differences in the practices, scale and biodiversity impacts of farming[4,5,6]. Around seven per cent of Finland's surface area is used as arable land[7], which is clearly lower proportion than the average in other parts of Europe. In many Central European countries, more than half of the land area is in agricultural use, and on average, continuous farmed areas are considerably larger than in Finland[8]. Still, the total arable land area in Finland – 2.3 million hectares – is equal to the arable land area of the Netherlands, for example. Agriculture also affects the state of nature outside agricultural areas, including the eutrophication of water bodies[9,10].

Traditional animal husbandry maintained and created a large amount of open, semi-natural habitats. In Finland, semi-natural grazed or mown grasslands and wood pastures are now called traditional rural biotopes. Alongside forests, traditional rural biotopes are among the most threatened habitats in Finland: 40 of the 42 habitat types of traditional rural biotopes are classified as critically endangered, and the remaining two are classified as endangered[11]. The surface area of most traditional rural biotope habitats has decreased by more than 90 % over the past 50 years. Traditional rural biotopes gave multiple species an opportunity to spread and form diverse communities[12,13]. Many species have found substitutive habitats in agricultural areas, as human activity has destroyed their original habitats. For example, in Southern and Central Finland, several bird species such as curlew and skylark originally nested in open peatlands, whose extensive ditching resulted in these birds having to find substitutive habitats in agricultural land[14].

Since the latter half of the 20th century, the change in agricultural production methods has been so rapid in Finland that organisms have not been able to adapt to the change, and consequently farmland biodiversity has declined. Examples of such changes include the strong regional concentration and specialisation of production systems, the increasing size of farms and field parcels, the transition of feed production and grazing from the use of semi-natural grasslands to the use of improved grasslands, subsurface drainage, and the increased use of pesticides, industrially produced fertilisers and concentrated feed[13,15]. The methods of modern intensified agriculture kill large numbers of animals that live in fields, including insects, birds and mammals[16]. A significant proportion of farmland species live in open, uncultivated habitats – especially in semi-

natural grasslands, but also at field margins and in fallow land, that is fields that are not currently in use[17,18]. Particularly the reduction and cessation of grazing and mowing of semi-natural grasslands have threatened many farmland species and habitats[11,19]. The main reason for the endangerment of species in agricultural environments is the overgrowth of open habitats, which has resulted in the threatened status of 639 species[19]. Farmers play a key role in halting the depletion of farmland biodiversity, as their actions can support threatened species as well as the abundant organisms necessary for the functioning of agricultural ecosystems. Society should create opportunities and incentives for food production methods that increase biodiversity.

Most of the ecosystems are founded on photosynthesising plants. The plant diversity of agricultural ecosystems has deteriorated, especially as a result of eutrophication, which means that the nutrient content in soil has increased[20]. Soil organisms that decompose dead organic matter, such as earthworms, maintain the nutrient and carbon cycles of ecosystems. For the functioning of ecosystems, it is essential to maintain the vitality of these groups of organisms. Phytophagous insects, such as bees and butterflies, are directly dependent on plant diversity. Similarly, the reproduction of many plants requires pollinating insects. The numbers of pollinators and plant species dependent on pollination have declined in many places in Europe[21]. The global phenomenon of large-scale insect decline[22] has not been observed in Finland[23] but, for example, the numbers of butterflies have declined in Finnish agricultural environments in the 2000s[24]. Insects are the most important food for young birds. The populations of breeding birds in agricultural environments have fallen significantly since the 1980s[25].

In Finland, the longest-term and most extensive monitoring data on farmland biodiversity are on the non-cultivated plants (or weeds)[26], birds[25] and butterflies[24]. These monitoring data have been used to create indicators on the development of the state of biodiversity in agricultural environments. The indicators can be used to monitor whether biodiversity targets are being met. The best-known indicators of farmland biodiversity are the numbers of birds and butterflies in agricultural environments. These indicators are included in the draft version of the EU Nature Restoration Law. The indicators are updated annually to the Luonnontila.fi website maintained by the Finnish Environment Institute. Both indicators have declined in the 2000s. This development is one indication of the decline of farmland biodiversity.

WHAT ARE THE BENEFITS OF FARMLAND BIODIVERSITY?

Biodiversity – life in all its forms – has intrinsic value. At the same time, however, combating biodiversity loss is about securing the existence and well-being of mankind itself. Our agriculture depends on the benefits people derive from nature, called ecosystem services. Maintaining soil fertility, the pollination of crops and the biological control of crop pests are examples of important ecosystem services for humans. The loss of farmland biodiversity weakens ecosystem services and poses a threat to agriculture[27,28] and, ultimately, the availability of food.

Maintaining soil fertility plays a key role in the long-term sustainability of farming. Soil fertility is often assessed based on the amount of organic carbon in soil, which is also positively linked to the diversity of soil organisms. A high level of organic carbon strengthens the water retention capacity and nitrogen content of soil[29]. Soil organisms maintain the nutrient and carbon cycle and the good structure of arable land[30,31]. For example, earthworms have an important role in the functioning of agroecosystems: they eat dead organic matter, also called debris, breaking it down into small pieces that are suitable nutrition for decomposer microbes[32]. They also mix debris into the topsoil. In turn, the soil microbes further break down the debris, allowing the carbon and nutrients stored in the debris to return to the soil and become building materials for plants[30]. The holes dug by earthworms are important routes for soil microbes and plant roots. These functions make earthworms keystone species of agricultural ecosystems, and the diversity of earthworms also maintains the diversity of other soil organisms and soil fertility[32]. Simplified crop rotation reduces the amount of organic carbon in soil, and intensified land use breaks up and compacts the structure of soil, resulting in the loss of soil fertility.

Approximately 75 % of the world's most important crop species benefit from pollination, with a combined yield of about 35 % of all agricultural crops[33,34]. Pollinators play a particularly important role in the production of berries and fruit. The crops of certain vegetables cultivated in Finland, such as courgettes and outdoor

cucumber, and field crops such as turnip rape and broad bean, are also dependent on insect pollination[35,36]. It has been estimated that the average economic value of insect pollination for Finnish agriculture is approximately EUR 50 million per year[37] and, globally, USD 235–577 billion per year[34]. Worldwide, pollinators and the pollination services they provide are decreasing, the strongest decline being focused on areas with the most intensive farming[6,34]. In Finland, the most important pollinator group is bees, which includes the domestic honey bee as well as wild solitary bees and bumblebees. There are no long-term monitoring data available yet on changes in their abundances to allow an assessment on changes in the availability of pollination services.

Finland has a national pollinator strategy and action plan[38], the main objective of which has been formulated in accordance with the EU Biodiversity Strategy[39]. The objective of the Finnish pollinator strategy is that, by 2030, 1) the reduction in the number and diversity of pollinators will have been halted, pollinator populations will have stabilised and be developing in a positive direction, and 2) pollination of natural plants and crops will have been secured by protecting wild pollinators and using farmed pollinators in a sustainable manner[38]. The abundance of bees is increased especially by increasing the abundance of flowering plants and the area of non-cultivated habitats.

The heterogeneity of landscapes in terms of crops and non-cultivated habitats maintains a diverse range of species and offers protection for the natural enemies of crop pests, thus preventing the mass occurrence of insect pests and reducing the need for pesticides[40,41]. Conversely, extensive monocultures attract pests but offer few habitats for their natural enemies. The EU Biodiversity Strategy aims to reduce the overall use of chemical pesticides – and their subsequent risk – by 50% and reduce the use of more hazardous pesticides by 50% by 2030[39]. Improving the farmland biodiversity and landscape heterogeneity will contribute to achieving this goal by enhancing biological control as the use of chemical pesticides decreases[40].

Measures promoting farmland biodiversity also have a mainly positive impact on the achievement of water protection and climate objectives[42,43,44]. For example, areas that are covered by vegetation throughout the year or during longer periods of time have the simultaneous effect of promoting biodiversity, soil fertility and carbon sequestration in soil, as well as reducing nutrient leaching in water bodies caused by erosion. Improved carbon sequestration reduces the greenhouse gas emissions of agriculture. In the 2020s, greenhouse gas emissions from agriculture accounted for about 13 per cent of Finland's total emissions[45]. Reducing nutrient pollution from agriculture can substantially improve the state of water bodies and generate opportunities for their recreational use[9,46]. Nutrient pollution can be reduced by measures such as wider non-cultivated strips at field margins as well as non-cultivated buffer strips and zones at the edges of water bodies, which also provide habitats for many species and therefore support farmland biodiversity.

The deteriorating state of the environment is one of the key vulnerabilities of the Finnish food system[47]. Other key vulnerabilities include dependence on imported production input, the concentration of power on trade and industry, producers not having room for manoeuvre in farming-related decisions, and the lack of change capacity of the actors in the food system[47]. Many measures that increase farmland biodiversity also simultaneously alleviate other vulnerabilities in the food system. Recently, the coronavirus epidemic, the increasing variability in weather and crop yields caused by climate change, hybrid influencing, regional conflicts and the risk of trade wars have made consumers and decision-makers recognise the risks to security of supply caused by the vulnerability of the Finnish food system[47]. Finland's General Government Fiscal Plan for 2025–2028 commits to ensuring the security of supply of a comprehensively sustainable food system[48].

Some of the measures that increase farmland biodiversity also improve the security of food production in Finland by reducing dependence on production input from abroad, such as industrially produced fertilisers, pesticides, sowing seeds and animal feed. Measures that increase the diversity of soil biota also improve soil fertility and mitigate nutrient leaching, which reduces the need for industrially produced mineral fertilisers. The EU Common Agricultural Policy (CAP) includes measures to improve soil fertility and biodiversity, such as a crop rotation requirement, soil cover during winter, green manuring grasslands, growing biodiversity crops and catch crops, and recycling nutrients and organic matter. Many of these measures are commonly used in organic production, and they should also be made more common in conventional production in order to recover the soil fertility of arable land. A proposed EU directive on soil health[49] would help improve the

ecological status and fertility of agricultural land if implemented. Increasing the heterogeneity of agricultural landscapes by diversifying crop rotations reduces dependence on pesticides, as it weakens the living conditions of plant diseases and pests and enhances biological control. The security of supply can also be supported by increasing domestic sowing seed production, which improves the success of sown plants in Finnish conditions and reduces the risk of invasive species. Reducing animal production and increasing grazing of ruminants would reduce dependence on imported feed grain and other concentrated feed. For example, in 2021, more than 700 million kilograms of raw materials for animal feed were imported into Finland[50], of which just under 130 million kilograms were genetically modified soya products[51]. At the same time, it would be important to promote the production of domestic legumes for human consumption and change diets to more plant-focused in accordance with the Nordic nutrition recommendations[52]. This would reduce the environmental hazards caused by animal production, and the decreased number of livestock combined with increased grazing could improve the welfare of farmed animals.

Biodiversity in the EU's Common Agricultural Policy CAP

The Common Agricultural Policy (CAP) of the European Union is the EU's agricultural subsidy system. The CAP includes a strategy for agricultural policy that will be updated in CAP reforms. During different periods of the CAP, there have been varying agricultural policy strategies and measures aimed at implementing them, which is why the vocabulary related to CAP has also varied over the years. In summer 2024, the ongoing CAP period and relevant vocabulary is 2023–2027. The purpose of the CAP measures is to enable practicing globally competitive agriculture in the EU in a sustainable manner. Below are some CAP measures aimed at promoting biodiversity.

The CAP is founded on conditionality requirements that farmers have to follow to receive agricultural subsidies. Conditionality aims to improve soil fertility and the state of the environment, for example by requiring protective plant-covered and unfertilised buffer strips along water bodies, minimum soil cover, meaning that one third of the arable land is covered by plants in winter, crop rotation, meaning that annual crops are switched to another at least every three years, and conducting laboratory analyses of soil type and fertility to determine the appropriate level of fertilisation.

Eco-schemes aim to improve the environmental impacts of agriculture and protect biodiversity. Farmers can receive support from eco-schemes for maintaining plant cover during winter and cultivating nature management grasslands, green manuring grasslands and biodiversity crops. Nature management grasslands can be old, diverse grasslands or newly-sown perennial grasslands that are mowed at least every two years. Green manuring grasslands are multi-species grasslands where the sown seed mixture contains at least 20% of a nitrogen-fixing plant. Biodiversity fields are sown with certain landscaping or meadow plants or plants benefiting pollinator insects, game or farmland birds. Farmers can be granted support from eco-schemes for nature management grasslands, green manuring grasslands and biodiversity crops for up to 25% of the eligible area.

Agri-environment schemes aim to reduce the environmental load caused by agriculture. When a farmer commits to measures that will reduce the environmental load of agriculture, an agri-environment payment compensates for the resulting costs and possible loss of income. Measures in the scope of agri-environment payments include perennial biodiversity strips, pollinator food plants, buffer zones, promotion of circular economy, catch crops and soil improvement and restoration crops. In measures involving pollinator food plants, at least two basic parcels must be cultivated with crop plants that provide food for pollinators. Buffer zones are uncultivated areas wider than buffer strips at the edges of water bodies. Their vegetation must be harvested annually by mowing or grazing. Catch crops are crops sown in a field after harvesting annual arable crops, allowed to grow for at least six weeks. Soil improvement and restoration plants are fast-growing species whose deep roots loosen soil.

Agricultural biodiversity and landscape management agreements are used to manage traditional rural biotopes and other semi-natural pastures not located on arable land. Management measures must maintain or promote contract areas' higher-than-usual nature values or landscape values. The contract areas must be managed annually by grazing or mowing.

Compensation for organic production promotes organic plant production, livestock production and the cultivation of open-field vegetables. In organic production, animals must have access to pasture during grazing season. Crop production is based on organic fertilisers and pesticides, biological control and crop rotation that maintains soil fertility.

The diversity of crop varieties and livestock breeds has declined due to increased productivity requirements[53]. The loss of biodiversity in organisms used for production poses a global threat to food security because it undermines the ability of agricultural ecosystems to adapt to various disturbances, such as diseases, pests and climate change[2]. The use of several different species and varieties of crops improves agricultural productivity and adaptability to changes in farming conditions[54]. Safeguarding the diversity of livestock and using breeds adapted to various kinds of conditions may reduce the adverse effects of food production on biodiversity. For example, native breeds of cattle are better adapted to grazing traditional rural biotopes than the current mainstream breeds used in meat and dairy production. Native breeds feed on many different plant species, including woody plants, are able to traverse varying terrain and do not need concentrated feed[55,56]. The importance of diversity in farm animals and crops is emphasised especially in crisis situations where the availability of external input decreases[57]. This may require adapting to challenges such as limited resources and severe weather conditions.

Biodiversity impacts human health and well-being in many ways. Our understanding of the link between biodiversity and human well-being has expanded significantly in the 2000s. Nature improves people's physical and mental well-being. Regularly spending time in nature reduces the likelihood of autoimmune diseases – such as allergies, asthma, diabetes and chronic inflammatory diseases – and the need for mental health and blood pressure medication[58,59,60,61]. Having a low level of contact with nature changes the microbiota of people's intestines and skin, which in turn may weaken the body's natural defences[58-60,62]. This alienation from nature is an issue in many environments, both in cities and in rural areas. For example, Finnish studies have linked atopic eczema in children living in rural areas to low biodiversity around the home and low microbe diversity on the skin[62]. Diverse agricultural environments increase the recreational use of areas and promote important contact with nature.

FOCUS ON NON-CULTIVATED AREAS, ORGANIC PRODUCTION AND LANDSCAPE HETEROGENEITY

It has been widely studied how farmland biodiversity is impacted by agricultural production methods and by the structure of agricultural landscapes. The link between agricultural practices and the richness and abundance of farmland species is described in Table 1. **Based on robust evidence from several studies, variables promoting farmland biodiversity include semi-natural grasslands, non-cultivated arable land, field margins, the abundance of flowering plants, flower strips, organic production, the general heterogeneity of agricultural landscapes, the large size of non-cultivated habitats and the time passed since the establishment or restoration of a non-cultivated habitat (Table 1).** Various non-cultivated areas, organic production and landscape heterogeneity are therefore key to increasing biodiversity in agricultural environments. The development of diverse species assemblages may take several years or even decades of management, and the most valuable agricultural environments in terms of species diversity are environments managed by grazing or mowing. Organic production is a better alternative to conventional production for biodiversity, and those biodiversity benefits become highlighted in homogeneous landscapes dominated by fields. The heterogeneity of the agricultural landscape increases the diversity of all examined groups of organisms.

Table 1. Links between land use, production methods, cultivation activities and landscape features in agriculture and the number of species and abundance of individual plants, bees, butterflies, birds and earthworms. A positive link is indicated with green and a plus sign, and a negative link is indicated with yellow and a minus sign. Strong evidence of a link (++ or – –) requires that a clear majority of studies have demonstrated a similar connection. Limited evidence of a link (+ or –) has been observed if evidence is only found in individual studies or if there is high variance in the results of studies. The table also indicates if no positive or negative link has been observed in existing studies (0 on a grey background). Empty squares indicate that the link has not been researched. Abbreviations: NS = number of species, FP = flowering plants, AB = abundance. The table is based on the data in tables 1–14 of the Finnish Nature Panel report[1], which offers more detailed information on analysis methods and results of the literature review.

		Plants		Bees		Butterflies		Birds		Earthworms	
		NS	FP AB	NS	AB	NS	AB	NS	AB	NS	AB
LAND USE	Spring crops	0	0	0	0	0	0	+	+	0	+
	Winter crops	0		0	0	0	0	-	+		+
	Insect-pollinated crops	0		+	+	0	0				
	Semi-natural grasslands	++	++	+	+	+	+	++	++	+	
	Grazing of non-cultivated areas	++	0	0	0	-	-	+	+		+
	Mowing of non-cultivated areas	++		+		+	-				0
	Improved grasslands	+		0	+	0	0	++	++	0	++
	Non-cultivated areas	+		+	+	+	+	+	++	+	+
PRODUCTION METHODS AND CULTIVATION ACTIVITIES	Animal farms							+	-		
	Organic production	++	++	++	+	++	+	++	+	0	++
	Other env. friendly agriculture	+	+	+	+	0	0			0	0
	Tillage								- -	0	-
	High crop yield of field parcel	-		0	0	-	0	0	-		
	Use of pesticides	-			-			-			
	Fertilisers (artificial and organic)	-		0				-	-	0	+
	Crop species diversity				+	0	+	0	++		+
	Western honey bee hives				-						
LANDSCAPE FEATURES	Large field parcel size				-		-	-	+		
	Field margins	+		+	++	+	+	+	+	+	+
	Flower strips			+	++	+	+				
	Ditches	0		0	0			++	+		
	Trees and shrubs	-		+	+	-	0	+	+		
	Patches and groups of trees	+						+	0		
	Increasing distance to forest	0		0	0	0	0	++	+		
	Highly arable landscape	-		0	-	-	-	+	-		
	Highly forested landscape	+		0	+	+	+	0	-		
	Built-up areas	-		0	+	-	0	0	+		
	Road cover in the landscape	+			+			+	-		
	Water body cover in the landscape			0	0	-	0		+		
	Landscape heterogeneity	++	+	+	+	+	++	++	+		
	Flowering food plants abundant			+	++	++	++				
	Food plants for larvae abundant					+	+				
OTHER*	Large area of habitat	+		++	++	+	+				
	Restoration of habitat	+	0	+	+	-	-				
	Time since establishment	++			+	++	++				
	Vegetation height	0		0	0	+	+		++		

* These refer to non-cultivated habitats on farmland, such as a buffer strip, an non-cultivated area of arable land (fallow) or a restored semi-natural grassland.

Literature also highlights a number of explanatory variables where links to biodiversity have only been examined concerning few groups of organisms or in a limited number of individual studies, or where biodiversity outcomes vary widely between different studies. Therefore, there is limited evidence of the biodiversity impacts of these variables. Based on limited evidence, variables contributing to farmland biodiversity include improved grasslands in areas dominated by annual crops, the diversity of cultivated crop species, the mowing and grazing of habitats, insect-pollinated crops as compared to other crops, spring crops in grass-dominated areas, environmentally friendly farming methods supported by an agri-environment scheme, the amount of forest in a landscape, small-scale landscape elements such as ditches, shrubs and islets of natural vegetation, the abundance of food plants for butterfly larvae, and the amount of road margins in a landscape (Table 1). The impact of some factors on biodiversity may be contradictory as they impact different groups of species in different ways – subsequently, there may be only limited evidence of overall positive impacts. For example, intensive grazing of semi-natural grassland has a negative impact on butterflies because it reduces their food plants, although many other organisms benefit from grazing[20,63]. Though there is an immediate negative impact of grazing or mowing on butterflies due to the removal of vegetation, in the long term, such management prevents habitat overgrowth and is essential even for butterflies[64]. Most variables with limited evidence of positive biodiversity outcomes increase the heterogeneity of agricultural landscapes and the area of non-cultivated habitats, such as various margins and edge zones, which are important for farmland biodiversity. Farmland biodiversity decline is indirectly linked to the objective of maximising the agricultural yields in the short term, which is reflected in the large percentage of cultivated land in the landscape, large size of field parcels, frequent tillage of arable land, and widespread use of pesticides and mineral fertilisers. All these factors have a negative link to farmland biodiversity (Table 1).

ENVIRONMENTAL OBJECTIVES AND FOOD PRODUCTION CAN BE ALIGNED

An important question for promoting sustainability in agriculture is how biodiversity-promoting measures affect other agricultural objectives. The impact of different environmental measures on biodiversity, soil, water protection and climate objectives has been addressed in several earlier assessments[18,43,44,65,66]. According to these studies, measures promoting farmland biodiversity mainly have a positive impact also on soil fertility, water protection and climate objectives. For example, areas that are covered by vegetation throughout the year or during longer time periods simultaneously promote biodiversity, soil fertility and carbon sequestration in soil, and reduce nutrient leaching caused by erosion. Reducing diffuse pollution from agriculture brings significant additional benefits, such as enhanced water quality in coastal areas. Enhanced water quality consequently promotes coastal biodiversity, and measures reducing diffuse pollution also often include carbon sequestration benefits[10].

Another essential question in the planning of agri-environment measures is whether a sufficient amount of domestic food production can be maintained if a larger proportion of arable land is directed towards the use of measures aiming to halt the loss of farmland biodiversity. Hyvönen et al.[7] assessed how the current level of food production could be maintained in land use scenario that promotes biodiversity and fully meets the objectives for agriculture in the EU Biodiversity Strategy (Scenario WAM2)[7]. According to the assessment, it would be possible to maintain the current scale of food production even if the area for organic production was increased to 25 % of Finland's arable land by 2030, while directing approximately 28 % of arable land to promote biodiversity by increasing different types of fallow lands, biodiversity fields, nature management fields and non-cultivated field margins and biodiversity strips. The scenario assumes that the currently decreasing trend in the consumption of red meat that started in 2018 will continue.

Compared to conventional production, organic production has positive impacts on biodiversity, but the yield per unit area is typically lower than in the conventional production. Organic production does not allow using non-organic mineral fertilisers, which is why the crop rotations of organic farming to a large extent rely on nitrogen-fixing plants, that is, leguminous plants such as clover, unless manure is available for fertilisation. Organic animal production requires grazing of ruminants, which may mean that milk production from organic dairy cows is lower than that of dairy cows in conventional production. Consequently, in order to maintain a certain level of production, organic production requires a larger land area than conventional production. For

this reason, organic production has been criticised from the perspective of biodiversity – it could have negative biodiversity impacts if the need for more land led to clearing new arable land or outsourcing production inputs, such as importing feed. It has been estimated that increasing the share of organic production to 25 % of all arable land in line with the objectives of the EU Biodiversity Strategy[39] is ambitious, but it could be possible in a way that is not in conflict with food production or other measures that aim to promote biodiversity[7]. In organic production, crop yields could be improved by strengthening advisory services (especially farms that have recently switched to organic have low yields), developing plant varieties that are more suitable for organic production (most of the currently used varieties are best adapted to conventional cultivation) and improving the availability of organic nutrients, especially in areas where the availability of manure is restricted. It is important to consider organic production as one element of the food system, as the greatest benefits of increasing organic production will be realised as part of a sustainability transition where people's diets become more plant-based, the amount of food waste is reduced and the productivity of agriculture is improved simultaneously[67].

The current number of production animals cannot be maintained sustainably. Especially pig and poultry farming, but also dairy farming to some extent, are heavily dependent on grain and other concentrated feed, production of which reduces the arable area that can be used for food crops, weakens biodiversity, increases agricultural emissions and is dependent on imports of production inputs, which undermines the security of supply in the Finnish food system. Reducing the import of animal feed would also alleviate biodiversity loss caused by the Finnish food system in the countries where the feed is produced. More than one billion kilograms of grain is used as feed on farms annually[68]. In addition, the utilisation of Finnish grains in the feed industry is more than 100 million kilograms larger than what is utilized in the food industry each year (610 million kilograms as feed and 440 million kilograms as food products on average between 2013 and 2022)[69]. The number of grazing animals and grazed areas have decreased rapidly in Finland. For example, the share of grazing dairy farms decreased from 87% in 2010 to 72% in 2020[70]. The number of cattle on farms that graze is on average smaller than the cattle number on farms without grazing, which means that the number of cattle grazing in Finland is considerably lower than the percentage of farms with grazing would suggest[71]. Increasing the share of ruminants on pasture can enhance the biodiversity of several species groups, especially if grazing is targeted at traditional rural biotopes and other semi-natural grasslands, and additional biodiversity measures are implemented on field pastures.

When planning changes, another aspect to keep in mind is social sustainability. Major social transitions, such as the sustainability transition in agriculture, have a significant impact on the vitality of rural communities. The sustainability transformation is essential for the well-being of rural areas, but changes can also increase uncertainty about the future amongst farmers, and cause fear of losing income or other aspects that are important to farmers' cultural identity[72]. An emphasis on doomsday scenarios instead of the opportunities created by the transition may act as fuel for the polarisation of society, weakening the chances of a successful transition[72].

A successful sustainbility transition in agriculture requires incentives for social and ecological sustainability to support rural communities and to guarantee that the benefits and disadvantages of the transformation are distributed in a socially fair way[73]. To reinforce social sustainability, society must take robust measures to involve the new and old generation of farmers in environmental measures[74]. The generation shift in agriculture is a critical stage in the realisation of the sustainability transition. Agricultural and educational policies should enhance opportunities for the younger generation of farmers to adopt new, more sustainable cultivation methods and other means of agriculture that increase sustainable natural capital[75]. The food system requires reforms in order to improve the status of farmers, production and business opportunities and income levels while adopting more sustainable production methods[47]. These reforms accompanied by the recognition of farmers' central role, and improving their position make it possible for farmers to better take biodiversity into account in their work.

THE AGRICULTURAL SUBSIDY SYSTEM NEEDS CHANGES

Finland joining the EU involved the introduction of an agri-environment scheme, one of the key objectives of which is to preserve and promote biodiversity in agricultural environments[76,77]. The scheme has also accounted for a significant share of farmers' earnings from the outset[44,78]. Some measures of the agri-environment scheme that have been successful in their objectives on biodiversity include traditional rural biotope management[79], nature management fields[80,81] and biodiversity fields[82]. However, the effectiveness of many measures has been weak, and the scheme has not been sufficient to halt biodiversity loss in agricultural environments[44].

The target level of many measures has been set too low for it to be effective [83]. For example, the crop rotation requirement and minimum soil cover aim to improve soil fertility. According to the crop rotation requirement, an annual crop has to be changed every year on at least one third of the arable land area of each farm. The same species of annual crop may be grown in the same area for a maximum of three consecutive years. The target level of the crop rotation requirement reflects the status quo in Finland, so that it is met on most farms even without this requirement[83]. The minimum soil cover requirement means that farms are required to maintain one third of their arable land covered with vegetation over winter. In addition to genuine vegetation cover, acceptable covers include stubble as well as light or no tillage, which reduce carbon sequestration compared to the genuine vegetation cover.

The agricultural subsidy system has been updated approximately every six or seven years as part of the revised rural development programmes. Rural development programmes include aims to minimise the environmental impacts of agriculture and promote other aspects of sustainability. However, their sustainability impacts remain modest due to the strategies' short-term nature, unambitious sustainability targets and rigid requirements for measures[47]. Short-term reforms of the agricultural subsidy system create uncertainty for producers, which may undermine their commitment to biodiversity measures. By contrast, involving producers in decision-making that impacts them would increase their motivation towards efforts to protect biodiversity[84]. It is possible to avoid situations where a short-sighted change in subsidy requirements threatens both farmers' livelihoods and the fulfilment of biodiversity objectives, if subsidy requirements are based on a carefully planned strategy for the long-term promotion of farmland biodiversity. That strategy should be created in cooperation with relevant stakeholders in a multi-actor network that includes producers.

An example of a counterproductive change to the subsidy requirements on the national level is a recently introduced changes to the requirements for the subsidy to manage traditional rural biotopes and their eligibility for the payment. Under it, all areas larger than a hundred square metres, which are not deemed to benefit from management or the vegetation of which is not deemed sufficient for animal feeding, are excluded from the area eligible for the subsidy[85]. Traditional rural biotope areas often consist of a mosaic of habitats, including areas with lush vegetation as well as forested, bare or rocky areas. It has turned out that the current interpretation of the sufficiency for animal feeding and the benefits of the management excludes whole habitat types of traditional rural biotopes as well as recently restored sites from being eligible for the subsidy, and thus threatens the continuity of management at several important sites. About 17% of the traditional rural biotope areas previously covered by the subsidy, reviewed by spring 2024, have been excluded from the subsidy for the current contract period[86]. Some of the areas have been excluded due to ecological factors, such as inadequate biodiversity values or management[86]. The new interpretation seems to have weakened farmers' confidence in the subsidy system and also led to discontinued management on areas other than those excluded from the eligibility due to the fragmentation of the overall pasture and the overall payment becoming too small to motivate farmers enter the contract[87]. Although the reason for the change may have been the need to improve the equality of beneficiaries with clear, uniform guidelines on eligibility criteria, the change has led to a worse situation in terms of biodiversity, contrary to the purpose of the subsidy. The aim of the national Helmi programme is to increase the area of the managed traditional rural biotopes in Finland by 18,000 hectares by 2030 compared to 2019. By the end of 2023, the framework of the programme has resulted in 3,063 additional hectares of the managed traditional rural biotopes[88]. In 2023, the applications of agricultural nature and landscape management contracts covered a total of 31,757 hectares[86]. In 2019,

contracts covered over 33,000 hectares. If, as traditional rural biotope inspections progress, 17% of the surface area gets excluded from the scope of the subsidy, as has been the case until now, the stricter conditions for the subsidy will exclude some 5,400 hectares of traditional rural biotopes that have previously been managed. Agri-environment payments are the main means of ensuring the continuity of the management of traditional rural biotopes, including those restored in the Helmi programme. For this reason, the changed requirements for agri-environment payments will also make it more difficult to achieve the objectives of the Helmi programme.

In addition to increasing the area of traditional rural biotopes, the objective must be to improve also their quality to make it possible for threatened species to thrive. The ecological quality of managed traditional rural biotopes has deteriorated dramatically in recent decades, for example as a result of eutrophication[11,20]. The Finnish agri-environment payment scheme currently encourages supporting the high quality of traditional rural biotopes in principle, as sites deemed to have high national or regional value are entitled to a higher management subsidy per hectare than other traditional rural biotopes. Additionally, a one-year clearance subsidy can be applied to improve the quality of sites. However, the scheme has not been successful in adequately maintaining the quality of traditional rural biotopes. At especially valuable sites owned by the state, specific actions have been conducted to conserve threatened species, for instance. The new interpretation of the eligibility for the subsidy does not allow this anymore. This is, for example, one reason for the uncertainty of the future management of remaining wooded meadows[87]. The complexity of management and the level of adequate payment are also affected by the location of the site. In archipelago, for example, challenging circumstances may increase the costs of management making fixed payment level inadequate to support the management of these valuable sites. Clearance subsidy is also low compared to the workload at sites with a lot of trees or shrubs to clear. One way to improve the quality of traditional rural biotopes could be to develop a results-based management payment scheme[89]. Currently, subsidies are not granted to traditional rural biotopes that are left ungrazed to protect a threatened species, for example. In a results-based payment scheme, compensation would be paid for improving the quality of the habitat of an threatened species even if it means leaving unmanaged patches, in which case the manager would be financially rewarded – not punished – for meeting the nature conservation objectives of the payment scheme. Business activities that promote the management of traditional rural biotopes, such as meat production on natural pastures, also need to be developed. In Sweden, meat production on natural pastures had increased the area of managed traditional rural biotopes by 40,000 hectares by 2012[90].

Grazing of traditional rural biotopes is promoted also by the conservation of native breeds of cattle, sheep and horse[84]. An inbreeding limitation for native finncattle breeds is set to enter into force from the start of 2025[91]. The limitation is formulated in such a way that it threathens the preservation of diversity in the breeds, the livelihood of producers and, consequently, the future of the traditional biotopes grazed by the native cattle breeds by excluding a significant number of breeding stock from the scope of the subsidy. Breeding stock that exceeds the inbreeding limitation is immediately excluded from the eligibility for the subsidy, which will likely entail a rapid reduction in the number of finncattle when the subsidy is no longer available. The limitation is founded on good objectives, but a sufficiently long transition period should be reserved for its introduction so that it does not lead to the uncontrolled loss of genetic diversity.

RECOMMENDATIONS OF THE FINNISH NATURE PANEL FOR IMPROVING THE STATE OF FARMLAND BIODIVERSITY

Farmland biodiversity can be enhanced with several measures that support increasing the area and improving the ecological quality of habitats. The measures should be introduced with adequate transition periods which enable a socially fair transition. Nature Panel's recommendations may also be utilised in the next CAP strategic plan, which will enter into force in 2028.

Increasing the area of habitats that promote biodiversity

Farmland biodiversity in Finland is highly dependent on traditional rural biotopes and other semi-natural vegetation as well as non-cultivated arable land, which includes fallow land, buffer zones, nature management fields and biodiversity fields. Without a significant increase in the area of traditional rural biotopes, the negative trajectory of farmland biodiversity cannot be turned around, as the majority of threatened species in the agricultural environment depend on traditional rural biotopes. The area targets of the Finnish Nature Panel's recommended actions for increasing the areas of these and other important habitats are summarised in Table 2.

A larger share of the CAP subsidies should be directed towards supporting production methods that promote biodiversity, such as organic production. The biodiversity benefits from organic production are greatest in areas dominated by annual crops, which is why increasing organic production should be targeted especially at the western and southern parts of Finland. According to the EU Biodiversity Strategy, at least 10 % of agricultural land must have high diversity landscape features by 2030[39]. Many landscape features that increase diversity, such as field and road margins, are currently excluded from the Finnish strategic plan and should be included into it. Increasing the size of arable parcels through subsurface drainage is subsidised in Finland, which further reduces the number of field margins important for many species and makes the landscape more homogeneous. The subsurface drainage subsidy can be considered harmful to biodiversity, and removing the subsidy should be considered in order to avoid a situation where the removal of the margins of open ditches is subsidised on the one hand and the establishment of biodiversity strips to compensate for the loss of such margins is subsidised on the other.

Producers' influence in developing their own activities should be reinforced so that they can, if they so wish, focus even more on producing biodiversity values and ecosystem services in addition to food. Measures promoting farmland biodiversity must also support producers' economic livelihoods.

Recommendations of the Finnish Nature Panel:

- **Increasing the share of non-cultivated areas in all arable land.** The area of non-cultivated arable land could be even doubled without compromising the current amount of food production. The maximum limits for non-cultivated arable land per farmer should be removed from the subsidy scheme so that farmers could, if they so wish, focus on providing ecosystem services by letting a higher proportion of their fields lie fallow.
- **Increasing the area of traditional rural biotopes to the 60,000 hectares required for halting endangerment.** The current interpretations of area eligible for subsidy, area not benefitting from management, and area of minor fodder production, as well as other recent changes made to the requirement for the subsidy to manage traditional rural biotopes seriously hamper any efforts to grow the area of traditional rural biotopes managed with agri-environment payments in Finland. The changed subsidy requirements are not fully ecologically appropriate.
- **Increasing organic production, especially in areas dominated by arable crops.** The aim is to increase the share of organic production from the current 15% to 25% of all arable land in line with the EU Biodiversity Strategy. Increased demand for organic products should be supported with a wide range of methods. These could include a fixed-term VAT exemption for organic production and public bodies setting an example by using more organic products.
- **Increasing landscape elements that promote biodiversity.** To achieve the target area of field margins and other permanent biodiversity strips, a new subsidy measure should be established to obligate farms receiving agri-environment payments to establish permanent non-cultivated biodiversity strips at the margins of fields in return for appropriate compensation. In addition, increasing the width of buffer strips from the current three metres would contribute to achieving the target. Discontinuing the subsidy for subsurface drainage should be considered due to its undermining impact on biodiversity. The maintenance of shrubs and trees in arable landscapes should be increased.

Table 2. Area targets for the agri-environment measures promoting farmland biodiversity by 2030; Finnish Nature Panel recommendation. The area target for traditional rural biotopes by 2030 is based on the findings of the Red List of Habitats in Finland[11]. The target for organic production by 2030 is based on the EU Biodiversity Strategy[39]. The area targets for arable land and all the situational data from 2022 are based on the agricultural survey (scenario WAM2) by Hyvönen et al.[7] where the targets have also been assessed to be feasible from the perspective of food production adequacy.

Measure		Situation in 2022	Target by 2030 proposed by the Finnish Nature Panel
Increasing the share of non-cultivated biodiversity areas	Nature management grasslands	53,000 hectares	230,000 hectares
	Diversity plants	24,000 hectares	80,000 hectares
	Buffer zones	43,000 hectares	60,000 hectares
	Soil improvement plants	3,000 hectares	100,000 hectares
	Green manuring grasslands	16,000 hectares	60,000 hectares
Increasing the share of small-scale landscape elements	Open ditches	92,000 kilometers	100,000 kilometers
	Field margins	40,000 hectares	90,000 hectares
	Buffer strips	7,000 hectares	7,000 hectares
	Flower strips	less than 2,000 hectares*	28,000 hectares
Non-cultivated biodiversity areas and small-scale landscape elements on arable land in total**		**188,000 hectares (8 % of arable land area)**	**655,000 hectares (28 % of arable land area)**
Increasing landscape heterogeneity by diversifying crops	Catch crops	121,000 hectares	400,000 hectares
	Cultivated pastures	51,000 hectares	80,000 hectares
	Oil plants	44,000 hectares	70,000 hectares
	Legumes	46,000 hectares	80,000 hectares
	Pollinator insect plants	106,000 hectares	210,000 hectares
	Total amount	**368,000 hectares (16 % of arable land area)**	**840,000 hectares (37 % of arable land area)**
Increasing the area of traditional rural biotopes		33,000 hectares	60,000 hectares
Increasing the share of organic production		15% of arable land area	25% of arable land area

* There are currently few flower strips, probably less than 2,000 hectares, but their exact surface area is not known.

** Does not include the kilometres of open ditches.

Improving the quality of agricultural habitats

Most of the funds in the agricultural policy are tied to subsidies that maintain the total area of cultivated land but do not support biodiversity or ensure the maintenance of soil fertility required by high production levels.

The specialisation in agricultural production and the regional concentration of production on either livestock or arable undermine the heterogeneity of agricultural landscapes and the production resilience, which is why diversifying production is important. Promoting farmland biodiversity requires more grazing and a simultaneous reduction in the total number of livestock. The focus of Finnish livestock production should be shifted from increasing production volumes to improving sustainability, which could be achieved by such means as increasing the share of organic and natural pasture products.

There is a need for a strategy promoting farmland biodiversity to improve the long-term approach of agricultural policy targets and measures. As a result of the more long-term approach of the strategy, there would be increased trust in the continuity of the targets and the subsidies promoting their achievement, which would enable producers to focus on promoting biodiversity.

Recommendations of the Finnish Nature Panel:

- Improving the ecological quality of non-cultivated arable land and traditional rural biotopes with results-based subsidies. Finland should develop a results-based form of subsidy for the promotion of biodiversity. The subsidy would include ecological objectives and flexible means of achieving those targets, with a potential for regional targeting. Nature management measures should be adapted case by case based on ecological understanding, taking into account the different needs of different locations and species.
- Defining the terms of compensation for agricultural nature and landscape management contracts based on ecological factors. To redefine the terms of compensation, a transdisciplinary working group should be set up between stakeholders, including representatives from producers, researchers, relevant officials and supervisory bodies. The working group would aim to bring ecological understanding and the realities of production to the centre of the evaluation process of agricultural nature and landscape management contracts. The national coordination group for traditional rural biotopes should work toward these goals.
- Increasing diversity in crop rotations, cultivated plants and farmed animals. Crop rotations would need to be more diverse to increase the heterogeneity of agricultural landscapes and halt the deterioration of soil fertility. The annual crop rotation requirement should apply to a greater share of the areas cultivated with annual crops instead of the current requirement of a third of that area of each farm. A long-term strategy and related measures should be developed to promote the diversity of crops and farmed animals. The strategy work should be founded on a combination of extensive knowledge base of researched data and producers' expertise in the practical aspects of agriculture.
- Reducing the overall use of chemical pesticides – and their subsequent risk – by 50 % and reducing the use of more hazardous pesticides by 50 % by 2030 in line with the EU Biodiversity strategy.
- Introducing a grazing obligation with adequate transition period, considering economic and social sustainability. Grazing and its benefits could be significantly increased by including an obligation for cattle and sheep farms to graze their animals for part of the year in order to receive animal subsidies. The attractiveness of natural grazing that promotes the management of traditional rural biotopes should be improved through support measures that make it an economically competitive alternative to cultivated pastures.
- Turning the trend of deterioration in the ecological state and fertility of soils towards recovery. The soil improvement measures included in the conditionality of CAP – such as the crop rotation requirement and minimum soil cover – should have higher target levels to turn the trend of biodiversity, carbon storage and fertility loss of arable land towards recovery. In addition, incentives for voluntary measures to improve soil fertility and biodiversity, such as green manuring

grasslands, biodiversity crops, catch crops and the recycling of nutrients and organic substances, should be more effective. In order to improve the ecological state of soil, Finland should support the EU legislative proposal on soil monitoring and apply it in agriculture and forestry in a manner that suits Finland's regional conditions.

Supporting business activities that increase farmland biodiversity

Supporting farmland biodiversity has to be economically attractive to producers. Financial incentives should be directed to products that maintain biodiversity and, on the other hand, there should be reduced support for products that weaken biodiversity. A higher producer price for methods supporting biodiversity compared to conventional production would be an important incentive for farmers and improve the chances of meeting biodiversity objectives. Good examples of economic incentives for a positive impact on nature include the price premium that Valio pays for milk from grazing dairy cattle, and independent certifications (Organic, natural pasture meat, Welfare Quality and ELVI), which require grazing livestock, among other things.

Measures promoting farmland biodiversity must also take into account the overall sustainability of the food chain. Increasing the heterogeneity of agricultural landscapes requires promoting the diversity of farms and production methods. In the food sector, power has become concentrated on a small number of large operators who have vast influence on producers' activities in determining producer prices and through contract production[47]. Farmers' possibilities of influencing their farming practices should be promoted, taking the needs of the local ecosystem into account. Reversing the trend of specialised farms and regions in order to increase the variability of landscapes requires that financial incentives be reallocated to small and local food business operators[47]. In addition to the state, important motivators for farmers' and consumers' responsible choices include the food industry, stores, restaurants and municipal catering services. Short food chains, such as processing food at farms and direct sales at or near farms, should be promoted.

Efforts should be made to steer the demand for food in a direction that requires less cultivated land by encouraging the consumption of more plant-based products, and less animal products, which are more sustainably produced. In addition to benefiting nature, a plant-based diet improves people's well-being, which is why bodies such as the Finnish Institute for Health and Welfare recommend supporting a plant-based diet[92]. Promoting the production and marketing of natural pasture meat can improve the status of endangered traditional rural biotopes and associated species, as the certificate for natural pasture meat is the only one in Finland to tell consumers reliably that the food they buy supports the maintenance of traditional rural biotopes and other semi-natural grasslands. In addition, unlike other production methods, the production of natural pasture meat requires that the animals are fed domestic feed, which raises the level of self-sufficiency of the food produced. Certain animal breeds, such as native breeds, are particularly well suited to grazing on natural pastures and should therefore be supported.

Recommendations of the Finnish Nature Panel:

- **Promoting the opportunities for cultivating plant-based foods and increasing their share in diets in line with nutrition recommendations.** Increasing the cultivation of legumes in Finland and using legumes to replace animal products in people's diets. The role of the food industry and commerce in increasing the production and demand for plant-based food should be reinforced. Promoting the dietary change by marketing, offering consumers easier sustainable food choices in stores and restaurants and lowering the price of plant-based products. One concrete way of lowering the price would be to temporarily declare these products VAT-exempt or decrease the current VAT level compared to other products.
- **Creating incentives for the production and marketing of natural pasture meat and native breeds.** People’s awareness of natural pasture meat and the meat, milk and wool of native breeds would have to be improved to increase consumers' willingness to pay for these sustainably produced specialty products.

- **Improving the profitability of products that increase biodiversity, and promoting the truthfulness of communications.** Transparent certification criteria, production chains and production processes are necessary to improve the reliability and truthfulness of marketing.
- **Improving the availability of domestic biodiversity seed mixtures.** A programme should be established for the domestic production of seeds for establishing flower strips and biodiversity fields. The aim would be to develop business operations that help to increase the use of native plant species, improve the establishment success of biodiversity plants and reduce import dependence and the risk of spreading invasive species. The long-term objective should be self-sufficiency in the production of domestic seed mixtures.
- **Developing the management of non-agricultural semi-natural grasslands.** Areas outside agricultural production, such as solar power parks, road verges and power lines, could be managed in the same way as traditional rural biotopes, maintaining high biodiversity values. Long-term management of sites is important for the creation of a high-quality habitat. As the need for restoration and management of semi-natural grasslands increases, business activities providing landscape management services must be developed and supported.

Improving and disseminating information on farmland biodiversity

Effective policy measures for improving the state of farmland biodiversity require disseminating relevant information widely in the society and continuously improving the quality of advice and supervision. Information on the importance of biodiversity and competence in nature management should be included in the vocational education of farmers and other actors working in agriculture, as ultimately, farmers' know-how and attitudes are crucial in fostering farmland biodiversity. In addition, broader communication targeted at the general public strengthens awareness among producers, food industry actors and consumers about farmland biodiversity and the measures that promote it, as well as their significance for Finnish food production. The biodiversity impacts of production should be made more transparent to consumers through legislation.

Recommendations of the Finnish Nature Panel:

- **Strengthening knowledge about biodiversity and resulting ecosystem services among the authorities who are responsible for agricultural advice and oversight.** The benefits of biodiversity, such as pollination, biological pest control, soil fertility, carbon sequestration and water management, must be strongly highlighted in advice and supervision. The local and regional special features of agriculture and their impacts on measures that best promote biodiversity should also be considered in advice and supervision.
- **Increasing focus on biodiversity in the curricula of agribusiness education.** Curricula at different levels of education should include instruction on the management of farmland biodiversity. Teachers' ability to teach about biodiversity at all levels of education should be strengthened.
- **Communicating the biodiversity impacts of agriculture and the links between farmland biodiversity, food production and human well-being.** The biodiversity impacts of different production methods and sectors and agricultural practices should be communicated to consumers in a clear, knowledge-based and transparent manner. Communications should support consumer choices that promote farmland biodiversity and the transition to a more plant-based diet.
- **Offering advice to ensure that long-term fallow land with potential for the development of diverse meadow species are not afforested.** The afforestation of fallow land or set-asides, which has been subsidised in Finland, may be in conflict with the conservation of farmland biodiversity. Especially long-term fallow lands characterized by low agricultural productivity are important for meadow species and should hence not be afforested.

- Maintaining and strengthening the monitoring of farmland biodiversity to assess the impact of measures taken. Reductions in funding for monitoring should be halted to ensure the longevity of well-functioning monitoring networks that deliver high-quality monitoring data also in the future.

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