

## Subject area III

### Threat constellations and solutions

#### Topic Insect decline 1

1. In English, summarize the **current** state of insect decline (Fig. 1) using **bullet points**.
2. List the **causes** identified in the studies in a language of your choice.

#### Text 1

*Experts agree: There is not THE ONE cause for insect decline - but agriculture plays a central role.*

##### **Lack of habitats due to intensive agriculture**

Habitat destruction, and in turn intensive agriculture, is considered by scientists to be the number one cause of **insect decline**. The intensive agriculture **threatens** the **life** of the insects regarding several points:

On the one hand, in recent decades more and more fallow land - such as meadows or orchards - has given way to building land or new arable land. The cultivation of monocultures such as corn or cereals is often more economically attractive than an extensively farmed area that is used exclusively for hay production, for example. But insects need precisely such structurally rich areas with a high diversity of plants and wild herbs because many wild bees, butterflies or beetles have more specific requirements than honey bees and may be dependent on very specific plant species for food supply or reproduction. Biotopes must be networked.

Meadows dominated by dandelions and daisies don't help, says Lars Krogmann, an entomologist from the State Museum of Natural History:

*"The greatest decline is found where the landscape is structurally impoverished. If you ever go for a walk in Germany on the weekend, you will hardly find wild herbs blooming anywhere. There's a trend toward grassing over the landscape."*

Only since an EU agricultural reform in 2013 has the so-called conversion of grassland been regulated, so that a conversion of permanent grassland into arable land is no longer possible without further ado. But it is important that the biotopes that still exist are interconnected. If they lie like islands out of a sea of cultivated fields, they are isolated: Insects can no longer migrate and bridge the distances. Pesticides and herbicides are used preventively.

There is an emerging trend to no longer spray specifically against certain pests or weeds - let alone to remove them mechanically. The effort hardly pays off in today's profit-maximizing agriculture. Instead, total herbicides such as glyphosate are used preventively before sowing to kill weeds. However, this also destroys herbs and flowering plants that insects could feed on. The active ingredient thus has at least an indirect effect on insects - although it is unclear whether alternatives to glyphosate would be better for insects.

As far as the direct effects of glyphosate on insects are concerned, glyphosate was even considered a comparatively insect-friendly herbicide in the past. However, there is now also evidence that glyphosate in high doses attacks the intestinal flora of honeybees and makes them more susceptible to disease. It is still unclear whether these results can be transferred to other insects.

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#### Text 1

##### Neonicotinoide harm insects

Neonicotinoids are used specifically to control insects and attack their nervous systems. According to Stuttgart-based entomologist Lars Krogmann, they are an important cause of insect decline:

*"Today, farmers use neonicotinoids preventively, even before damage by insects occurs. Neonicotinoids are used to dress seeds, which causes them to act throughout the plant and be absorbed by insects. Neonicotinoids have fatal effects on insects even in the smallest concentrations: They prevent the transmission of stimuli in the nerves. This leads to disorientation. The insects don't die directly, but they can no longer find their mates and egg-laying sites."*

Neonicotinoids first attracted attention in connection with bee mortality. But it has long been clear that not only bees are affected.

*"That's why we suspect that the dramatic decline in insects, especially in the last 15 years, is directly related to the use of neonicotinoids."*

France already banned neonicotinoids at the end of last year. Agriculture Minister Julia Klöckner has taken up this demand.

*"What harms the bee must be taken off the market",*

she said in April - a stance that is now also the consensus at the EU level: on April 27, the EU decided to ban three neonicotinoids for outdoor use. However, other neonicotinoids and substances with similar mechanisms are still in use.

And fields and meadows are also fertilized too much because the more fertilizer, the fewer wild herbs. It is by no means just about classic mineral fertilizers, organic fertilizers - i.e. liquid manure - also destroy the habitat for wild herbs. The entomologist Wolfgang Wägele points this out. He works at the König research museum and is one of those who have made a significant contribution to bringing the issue of insect mortality to the public.

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##### Overfertilization

*"The spreading of slurry from animal husbandry is a massive problem. Here in the Eifel, we have farmers who lease out their meadows, so that slurry from Holland is spread there. In addition, we have ammonia from stables in regions with massive animal husbandry. Ammonia is dispersed through the air and then rains down on the soils. And so, fertilization takes place there as well, which you don't even think about. And the digestate from biogas production also contributes to overfertilization."*

Early sowing reduces the food supply for insects and birds. Other changes in the fields also contribute to this. In the past, for example, fields were plowed up in the spring and the seed was planted. As a result, some plants, herbs and others had grown. But now more and more people are already sowing seeds in the fall, says Hans-Günter Bauer from the [Max Planck Institute for Ornithology](#) in Radolfzell:

*"In the fall, the soil is already plowed up. Then the topsoil is already ready for the next spring. There is almost nothing left on it. There used to be a stubble field where some plants grew again, where insects and birds could get food. Now the seeds grow up very quickly in the spring, but there's nothing there before that."*

##### Intensification of fruit crops

In the Lake Constance area in particular, Bauer also observes another development:

*"In fruit growing, we have low-trunk orchards instead of high-trunk orchards as we used to. These apple orchards, which are typical today, also don't provide the abundance of insects that they used to."*

##### Agricultural policy and insect-friendly landscapes

Biodiversity researcher Peter Feindt of Humboldt University is certain:

*"The EU could spend your money much more on ensuring that insect-friendly landscapes are promoted and provided, and that more money is available for contract conservation, where farmers can voluntarily provide services for insect conservation."*

Other experts and environmentalists see it that way, too, and are calling for the EU to link direct subsidies to environmentally friendly management rather than to land size, as it was in the past. In fact, the EU Environment Committee formulated demands in this direction in February 2019. However, the subsequent and decisive vote of the EU Agriculture Committee in April 2019 did not follow this vote.

Misaligned incentives for flower strips. For many years, there was a trend in agriculture to use the land virtually to the last square meter. This has resulted in the disappearance of many hedges, margins and flower strips that were like oases in the agricultural landscape for insects. In the meantime, farmers who plant flower strips between their fields are being supported. But there are also undesirable developments, says Lars Krogmann:

*"Quite often non-native plants are used. So there is the paradoxical situation that measures for the planting of flowering strips are promoted, which do not directly help the native wild bees and other flying insects at all."*

(Paál & Weiss 2019)



## Topic Insect decline 1

### Light pollution

Too much **artificial light** at **night-time** also **harms** a number of **nocturnal insects** according to studies. As a result, some remain **unnaturally active for a long time** and then die of exhaustion; others avoid the light, they then no longer find their food, and at the same time pollination performance drops. "I assume that light is also an important factor in the decline of insects," says Max Planck researcher Bauer, but admits that it is still poorly studied how much increasing lighting contributes to insect decline overall.

[\(Paál & Weiss 2019\)](#)

### Infobox pesticides

#### Pesticides

...are active ingredients in plant protectant and biocides and are used to control pests. They are subdivided according to the "target of attack".

#### Insecticides

...directly control insects with poison.

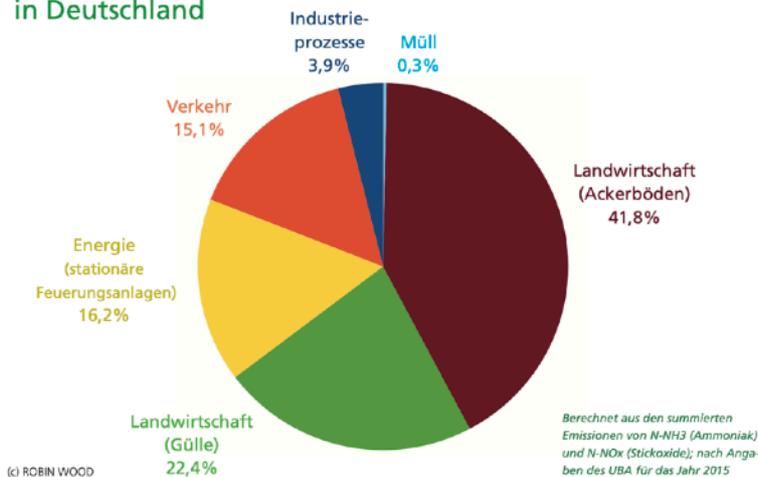
#### Herbicides

...are used against undesirable plants, e.g. in cereal fields, and cause damage to the ecosystem via the loss of food links. One of the best-known brand is glyphosate (banned currently for hobby gardeners, from 2024 on probably Europe-wide).

#### Fungicides

...are used against fungi.

### Stickstoff-Emissionen in Deutschland



[\(ROBIN WOOD e.V. 2016\)](#)

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## Topic Insect decline 2

You have already learned in the **text 1** about some **causes** of insect decline as well as **demands** to the **protection** of the insects.

**Present the measures** presented in **text 2** in the fight against insect decline and **evaluate** them in terms of **prospects of success** and **profitableness** and the options for action available to individuals. Also include text 3. You may also choose the language in which you complete the task.

### Text 2 (Paál & Weiss 2019)

Against the background of these findings, the EU ban on neonicotinoids was a correct step. But to protect the insects, further measures would be necessary, which are so far only partly reflected in the announced "action plan" of Environment Minister Schulze. In the meantime, scientists have also set out their demands in a 9-point plan.

#### These are the central demands:

- Less pesticide use and agriculture's extensification
- Support of agricultural and landscape ecological measures for the protection of flowering plants and wild herbs
- Promotion of organic farming
- Consistent scientific insect monitoring - also to see which measures bring which successes
- Education, including in schools: "We need to learn to appreciate the value of insects again," says Krogmann.

#### Away with the stone deserts and less meat

Of course, the construction boom in cities is also contributing to insect mortality - there are fewer and fewer green spaces. Anyone with a garden or balcony can do a lot for insects, says Lars Krogmann. "The area of all private gardens in Germany is many times greater than the area of all nature reserves!" Fewer rock gardens, fewer thuja hedges, less cherry laurel, fewer exotic plants in the garden - that would help.

During fall the motto is:  
"Don't clean up the garden!"

Fallen leaves and dead wood, as well as unmown meadows are important for the survival of the six-legged creatures! An insect hotel can help some species to compensate for the lack of natural nesting and overwintering sites. The own purchase behavior plays a determining role: Whoever buys **bio products supports a more sustainable agriculture**, which gets along less or in some cases even completely without spraying any poisons. And this also **helps the insects**.

Another tip: Eating little or no meat reduces the spreading of slurry on the fields - and thus overfertilization.

### Text 3 (Hauner 2021)

Slowly the awareness grows, how **complex** the topic "**insect decline**" is and how difficult it will be to stop this process. About half of the global economic output depends on an intact nature. Politicians have launched insect protection programs, but that is not enough, scientists criticize. The causes of species extinction must be tackled more intensively.

#### Ideas for more biodiversity

"When you talk to farmers, many now say: Biodiversity is a big issue. We have to take care of it," notes agricultural policy expert Peter Feindt. And there are definitely ideas and concepts for it. One example is the "Labiola" project in the canton of Aargau. With advice and money, it brings more biodiversity to farms. The farmers commit themselves for eight years to measures such as a rough pasture, a fallow, or they plant hedges and leave dead trees as a shelter for insects and other animals. There is a contract for each measure and also financial compensation to offset the extra work and any loss of yield. The success of the program is measurable and more and more are joining in. "It's something you have to see, understand and learn first," says Samuel Imboden, a farmer who has been with "Labiola" for some time.



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#### Insect decline 1

##### Task 1

The main factor is intensive agriculture, followed by the invasion of alien species and pathogens alike and urbanization

##### Task 2

- Due to intensive agriculture, more and more habitats are destroyed by monocultures. There is a lack of structurally rich areas with great plant diversity (grassing of the landscape)
- Use of pesticides that are often harmful to insects and destroy their forage plants (e.g., neonicotinoids).
- Overfertilization leads to the disappearance of wild herbs
- Habitats are isolated (sealing of areas, monocultures)
- Plowing in the fall and early seeding prevent regrowth of herbs and thus reduce the food supply
- Orchards provide fewer habitats for insects
- Flower strips are often planted with non-native plants and are thus useless for insects
- Direct investments are not linked to environmentally friendly measures
- Light pollution

#### Insect decline 2

- Ban on neonicotinoids as first step
- Less pesticide use
- Extensification of agriculture
- Promotion of agricultural and ecological measures as well as organic farming
- Monitoring (supervision) of measures
- Education (task of schools)
- Advice for farmers
- Contracts with farmers and compensation payments for additional expenses and yield losses

#### Danish example

1.
  - Regulation of the use of pesticides and fertilizers
  - Strict control with fines
  - Special tax on pesticides as opposed to subsidies in other countries, depending on the toxicity
2.
  - (Fig. 1) Increase in use of pesticides by 2012, then decrease to less than half
  - (Fig. 2) Despite the reduced use of pesticides, there were no yield losses
  - (Fig. 3) On the contrary, agricultural GDP was increased and food prices decreased in recent years
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Topic Insect decline 3

- Using text 3 and the info text, present the Danish model for reducing pesticide use in German or English.
- Evaluate Figures 1 - 3 and summarize the results in the other of the two languages. Include the info text.

Text 3 – Optimize pesticide use

The country is a prime example of completely industrialized agriculture. Despite this, it has been possible to massively reduce the use of pesticides and fertilizers. How do farmers achieve this? Through strict control and tight policies. Every use of pesticides and fertilizers is regulated. Farmers keep meticulous lists. At any time, the authorities could inspect. Violations become expensive. It is not only absolute transparency that leads to change. Money is also a means of exerting pressure. There is an extra tax on pesticides. In other countries, however, pesticides are sometimes even subsidized by taxes. Zurich agricultural expert Robert Finger has studied the Danish model on behalf of the federal government. He says: the Danes have good arguments for making pesticides expensive. This is because social costs such as environmental damage and effects on human health have not yet been priced into pesticides, says the expert.

(Hauner 2021)

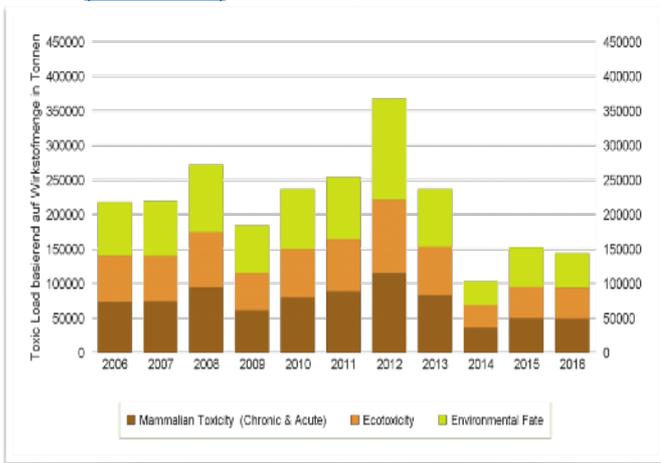


Fig. 1: (Neumeister 2019)

The danish model (Neumeister 2019)

Pesticide reduction has a long tradition in Denmark (Neumeister 2007 [1]) and since the 1980s, there has been a tax on pesticides. However, this tax had hardly any steering effect. Therefore, the tax model was changed in 2014: the more problematic a pesticide is for humans and the environment, the more expensive it is (PAN Germany reported in ePB No 1 2013). In economics, this is called "internalization of external effects" - it can also be called pricing in societal costs. For example, herbicides containing the active ingredient prosulfocarb became more than twice as expensive. This active ingredient is so volatile that it can ruin organic farms even at great distances through drift as their products must be pesticide-free [2]. Pyrethroids also became much more expensive because, among other things, they are highly toxic to aquatic organisms. The new tax model led to a sharp reduction in the calculated toxic load of pesticides, the so-called national "toxic load" in Denmark.

The Toxic Load Indicator (TLI) is a numerical quantity. It is based on 15 parameters that represent the toxicity of pesticides to human health and the environment.

For the graphic below, the Toxic Load Indicator was determined for each active substance sold (Bekämpelsesmiddelstatistic 2013; 2016) and multiplied by the quantity sold.

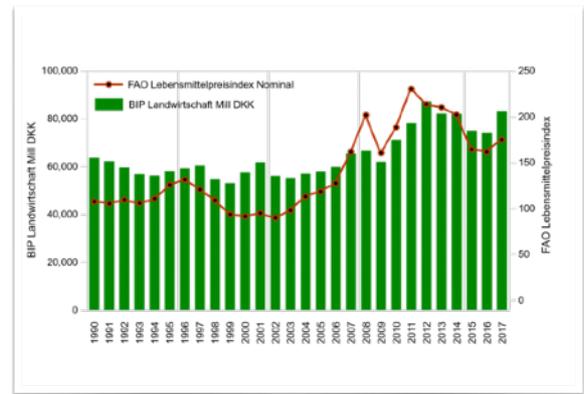


Fig 3: (Neumeister 2019)

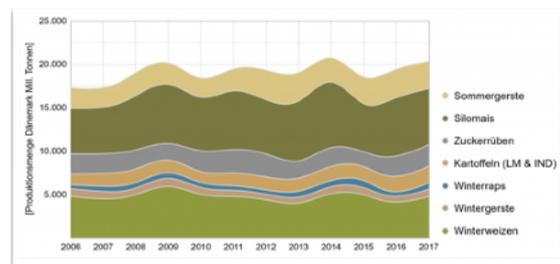
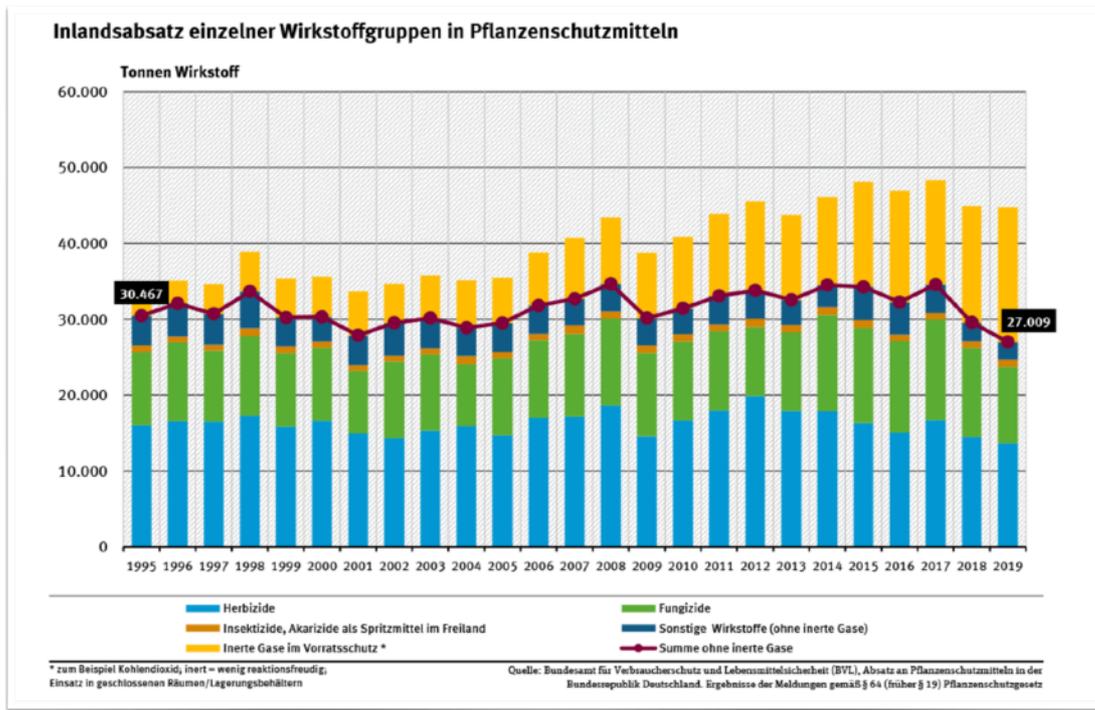


Fig. 2: (Neumeister 2019)



Topic Insect decline 4

1. The **figure** shows the development of the use of crop protection products in Germany. Summarize the **essential content**. You can choose the language yourself.
2. In the WDR contribution ("Agrarwirtschaft ohne Pestizide"), the problems associated with abstaining from pesticides or reducing them greatly are presented and contrasted with the advantages. **List the respective arguments in German in the table** ([WDR 2017](#)).
3. Get to your own **assessment** regarding the use of **pesticides** in agriculture. More info can be found here: ([NABU e.V. o.J.](#)).



Source: Fig. 1: (Federal Office for Consumer Protection and Food Safety (BVL), sales of plant protection products in the Federal Republic of Germany. Results of the reports in accordance with Section 64 (formerly Section 19) of the Plant Protection Act)



### Topic Insect decline 4

#### Task 1

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#### Task 3

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#### Task 2

Advantages and disadvantages of not using pesticides in agriculture.

Fill in the table!

	Positive	Negative
Health risk		
Biodiversity and environment		
Income for food		

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#### Topic Insect decline 4

##### Task 1

The use of herbicides was highest around 2012 and has since decreased, which is also essentially the reason for the overall reduction in crop protection products. In contrast, the use of fungicides increased, while insecticides remained more or less constant. The use of other gases tended to decrease. There has been a sharp increase in the use of gases for stock protection.

##### Task 3

Complete elimination of pesticides difficult. Yield losses must be compensated by a nutritional turnaround, i.e. reducing meat consumption.

##### Task 2

Advantages and disadvantages of not using pesticides in agriculture.

Fill in the table!

	Positive	Negative
<b>Health risk</b>	Reduction in the risk of cancer	Growth of fungi and bacteria, in turn, can lead to the production of toxins, proliferation of parasites
<b>Biodiversity and environment</b>	Biodiversity is likely to return	-
<b>Income from food</b>		Yield losses are to be expected. Food prices would rise

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1. In German or English, give a recap of the **most important decisions of the Future Commission** and explain their special significance.
2. **Evaluate the resolutions**, but now in the other of the two languages. Include figures 1 - 6 (demands of Scientists for Future).

The **Commission on the Future of Agriculture** included more than 30 representatives from the fields of agriculture, business and consumers, the environment and animal welfare, and science. The establishment of the commission was a key outcome of the agricultural dialog launched by the German government at the end of 2019.

A change in agriculture toward more climate, environmental and animal protection is necessary - and a task for society as a whole. Ecological action must be translated into economic success and given appropriate financial support. This is the central message of the final report of the "Commission on the Future of Agriculture", which was handed over to Chancellor Merkel today. (.....)

The presentation of the final report was a "significant day in the history of agriculture in Germany," Merkel said. Future political decision-makers will no longer be able to ignore this report. It provides answers to the question of what is ecologically appropriate and reasonable for each side - for example, with regard to consumption and nutritional behavior. It also develops temporal perspectives.

The pressure to adopt the report by consensus has had "its constructive effect," Merkel said. The cornerstone for this, she said, was the willingness of the commission members "to also see the world through the eyes of others for once." "We need a comprehensive transformation process for more sustainability, which must be vigorously pursued. This will not be possible without additional money," Merkel underscored. (....) Domestic agriculture is systemically important, but agriculture and rural areas are facing structural and economic changes, some of them serious. In concrete terms, the task is to reconcile climate and environmental protection with food security and the preservation of economically viable agriculture in Germany. The task of the independent expert commission chaired by Peter Strohschneider was therefore to go beyond the day-to-day business and develop long-term recommendations and guidelines for the transformation process of the agricultural and food system.



For more information on agricultural policy, see the appendix under Basic Information on Agricultural Policy.

#### Key findings of the final report

The Commission emphasizes that the necessary transformation requires adequate financial support, including a gradual change in the Common Agricultural Policy (CAP). The transformation process is a task for society as a whole. In concrete terms, the report sets out objectives and guidelines as well as possible courses of action.

Among other things, recommendations are made for

- more efforts to **increase climate and environmental protection**, including the expansion of agricultural greenhouse gas sinks (peatlands and humus), the creation of stable agricultural-ecosystems, and regional economic and farm nutrient cycles.
- the **reduction in the consumption of animal products, the improvement in animal welfare and a more environmentally friendly spatial distribution of animal husbandry** (if necessary with a further reduction in animal numbers).
- the **increase in market transparency** of agricultural products, for example through labeling and certificates.
- the **promotion of different operational business models** as well as regional and direct marketing channels.
- the **fair structuring of purchasing relationships** of agriculture with downstream sectors (for example, mills, dairies and sugar factories) and trade.
- a **targeted state funding** of the societal demands on agriculture. For example, through the **restructuring of the area-based direct payments** of the First Pillar of the CAP in the course of the next two funding periods (by 2034 at the latest).
- **Planning security for companies** for example for investments. (....)

[\(Federal Government 2021\)](#)



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However, the expected annual economic **costs** of a radical **transformation** of **agriculture** would be **far below** the costs that would arise **in relation to environment and health** if the status quo were to continue unchanged. Overall, in the opinion of the CCL, the transformation can go hand in hand with a **fair social** burden-sharing and overall economic **savings**.

(Federal Government 2021)



Fig. 2: (Hagedorn et al. 2021: 18)

**Demands of Scientists4future Germany**

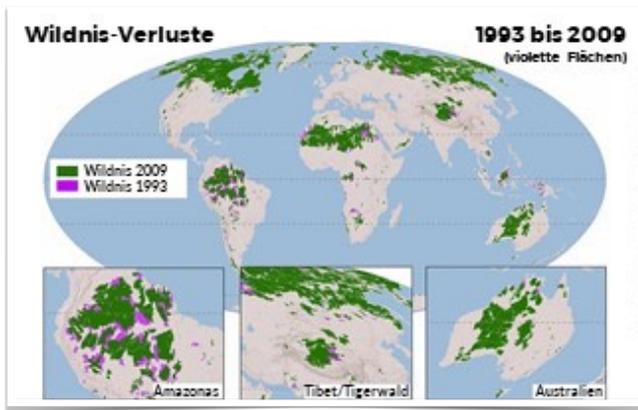


Abb. 1: (Hagedorn et al. 2021: 37)

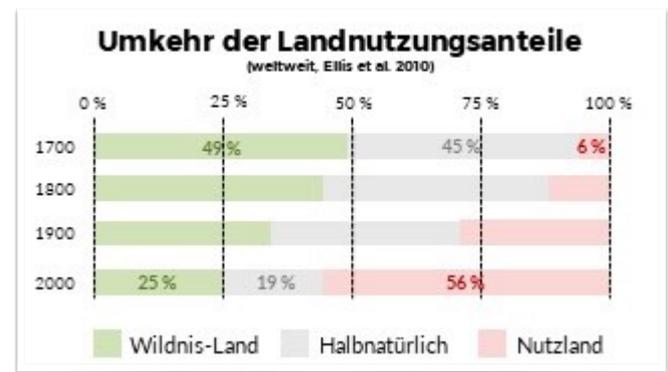


Fig. 3: (Hagedorn et al. 2021: 34)

**Umsteuern bei Subventionen**

Wir fördern...

- zu viel Gülle
- zu viele Pestizide
- zu viel Agrarfabriken
- zu wenig Familienbetriebe
- zu wenig Natur- und Biodiversitätsschutz!

Fig. 4: (Hagedorn et al. 2021: 56)

**Sofortiges Umsteuern bei Subventionen**

58 Mrd. € Subventionen (30 % des gesamten EU-Budgets) → Landwirtschaft **Dies verändert unsere Welt.**

80 % davon → 20 % reichste Landwirte/Agrarfirmen  
20 % davon → 80 % kleinere Bauern

Nur ein Bruchteil dieser „Gemeinsamen Agrarpolitik (GAP)“ fördert Maßnahmen, von denen Verbraucher, Landwirte und Umwelt gleichermaßen profitieren.

Fig. 5: (Hagedorn et al. 2021: 65)

**Kosten einpreisen!**

Bodenerosion, Bodenverschlechterung, Flächenverbrauch, Düngeschäden im Grundwasser und in Naturschutzgebieten, Pestizidfolgen, Lebensraumfragmentierung, etc.:

All dies gibt es nicht umsonst.  
Nur zahlen nicht wir, sondern unsere Kinder!

**Naturverbrauchsteuern einführen!**

Fig. 6: (Hagedorn et al. 2021: 66)

Source: (Hagedorn et al. 2021)



## Subject area III

### Threat constellations and proposed solutions

#### Proposed solution to the AB Future Commission

##### Task 1

- Transformation process is a task for society as a whole and requires financial support
- Gradual conversion from GAP
- Increasing climate and environmental protection
- Reduction of the consumption of animal products, reduction of the animal population, attention to animal welfare
- Increasing market transparency
- Regionality, direct marketing
- Fair purchase conditions for agricultural products
- Targeted state funding through restructuring of direct payments
  
- Planning security for companies
- The costs of transformation are much lower than the burdens of maintaining the status quo. This means that the transformation also has economic advantages.

##### Task 2

##### Possible reasoning:

##### Transformation is necessary and urgent because...

- The wilderness areas are decreasing more and more (Fig. 1 and 3)
- Overuse of habitats and climate change are major causes of species extinction (Fig. 2).
- Past subsidy policies have benefited large farms and supported environmental pollution due to manure and pesticides (Fig. 4 and 5)
- Costs of environmental degradation were not taken into account as external costs, but had to be borne by the general public (Fig. 6)

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