NORSUS
Norwegian Institute for Sustainability Research

NewTools
For sustainable food systems

NewTools framework development- proposal for scope, system boundary and category selection

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REPORT NO.
OR 05.24

YEAR
2024

ISBN NO.
978-82-7520-933-5

ISSN NO.
2703-8610

REPORT TYPE
Commissioned report

CONFIDENTIALITY
Open

NORSUS

PROJECT TITLE

NewTools

PROJECT NUMBER

3318

COMMISSIONED BY

NewTools, Norwegian Research Council grant no. 326888

REFERENCE

Consortium agreement NewTools

QUALITY CONTROL

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NUMBER OF PAGES

85

KEY WORDS

scoring system, sustainability, environment, social, food

PHOTO FRONTPAGE

Unknown

Preface

The ”NewTools project - Developing tools for food system transformation, including food summary scores for nutrition and sustainability” (2021-2025) is funded by the Research Council of Norway (Grant no. 326888). The 28 project partners also contribute to a varying degree through self-financing of own activities.

This report is from work package 3 (WP3) on developing scores for the environmental and social sustainability of food and describes the first part of the work towards a scoring system. The report contains the definition of the system boundaries of the framework and the environmental and social categories suggested to be included in the framework for further testing.

The authors would like to thank all partners in the project who have contributed by participating in surveys and workshops and who have provided valuable input to the report.

Summary

In the NewTools project, the aim is to develop a novel dynamic scoring system for nutrition and sustainability for food products. The goal of this report is to present the scope and system boundaries of the framework and the environmental and social categories suggested to be included in the framework for further testing. The following work has been done:

- The development of the scope of the NewTools WP3 score
- A literature review of the food system's contribution to environmental and social impacts,
- Two surveys enquiring about stakeholders' perspective of these impacts
- A workshop where these impacts and their relevance was discussed

Part A of the report contains background for the project, research approach on how the work with selection of categories was carried out and the scope, i.e. which parts of the food's supply chain should be included in a score.

Part B contains background information on environmental and social categories respectively, with a description of all categories, results from the two surveys and the outcome from the workshop.

To find a starting point for the development of a NewTools framework, a review of existing frameworks was carried out. Based on this review, the *Product Environmental Footprint* (PEF) was selected for environmental sustainability and the *Guidelines for social life cycle assessment of products* was selected for social sustainability. These two frameworks formed the basis for the development of two surveys that were sent out to partners and external stakeholders. The surveys contained questions about which categories should be included based on relevance to the food value chain, one survey was about social categories, and the other about environmental categories and which parts of the supply chain should be included in the scoring system. Both surveys had several categories that the respondents had to assess and also gave the opportunity to propose other new categories.

After the surveys were completed, a workshop was held for all partners in the project. The aim of the workshop was to inform about the results of the work on sustainability issues so far, and to have group discussions regarding the categories within social and environmental sustainability that were proposed by the respondents in the surveys.

Parallel to the surveys and the workshop, thorough work has also been done to review categories based on other sources such as literature and databases. The environmental categories were assessed based on severity and extent, contribution to the food system, trend, international agreements, and Norwegian and EU targets. In this work, more categories than in the survey have been included to expand the scope. For the social categories, it was not possible to make a similar assessment, as such information is not available. A social hotspot analysis was therefore carried out to identify the categories with the highest social risk.

Both the results from interaction with stakeholders, i.e. surveys and workshops, together with this review of environmental and social categories form the basis for the selection of the proposed categories that will be included in the further work in the project.

Correspondingly, for the scope of the supply chain, both results from the survey and from literature were used as a basis. It is proposed that the system boundary should include primary production up to and including retail, including primary packaging. The method on how to include packaging is not decided. Furthermore, it is proposed to include food waste from the time of slaughter or harvesting and food

production, but not at the wholesale and retail levels. The reference unit will be mass-based, 1 kg of product and the associated primary packaging, but the reference unit could easily be recalculated into an energy-based reference unit or other units, e.g., dry matter content.

The project partners were invited to provide feedback to the draft version of the report. The authors received many useful inputs and comments, some linked to the content of the report and some of more general issues. Feedback to the content of the report was taken into consideration in the final version of the report. Other inputs will be addressed in the further work and dialogue with partners.

Contents

Definitions

The definitions below are based on how they are used in this report. In other contexts, the words may have somewhat different definitions.

Category	A category is a grouping of different emissions or social data into an impact on an important environmental or social theme.
Data	Data is information such as measurements or statistics used as a basis for calculation of indicators.
Food waste	Edible food waste consists of all useful parts of food produced for humans which are either discarded or removed from the food chain for other purposes than human food, from the time of slaughter or harvesting.
Indicator	An indicator measures the state or level of a category. An indicator can be quantitative or semi-quantitative. The indicators can be quantified in various ways, but preferably they should be product-specific. An indicator can be a calculated (characterized) value, such as CO_2 eqv. Or measured values for fossil energy use. Some indicators will not be possible to quantify at product level and then default values or national averages can be used.
Life cycle assessment (LCA)	An LCA is a systematic mapping and assessment of environmental and social impacts throughout the entire life cycle of a product or product system, from extraction of raw materials in nature until the product is disposed of (or food that is eaten) and possibly turned into new products (food packaging that is recycled) from “cradle to grave” or “cradle to cradle”. It is not only the material in the product or the product system that is examined, but also all input factors used for production, transport and maintenance.
Primary packaging	Primary packaging is often referred to as consumer or retail packaging. The main purpose of primary packaging is to protect and/or preserve, contain and inform the consumer.
Reference unit	A reference unit refers to the amount of product for which the score is calculated. In LCA terminology, this is called the functional unit. Common examples of food-related reference units are mass, energy or protein content of a product.
Scoring system	A system in which the application of an agreed scale is used as a means of estimating the degree of the sustainability impact of foods.

PART A

1 Background

This report documents the activities performed in work package 3 (WP3) of the NewTools research project funded by the Research Council of Norway. Folkehelseinstituttet (FHI) is the project owner. The project started in 2021 and will finish in 2025. The overarching aim of the NewTools project is to create tools for transformation of the food system, aimed at systemic changes promoting improved nutritional quality, lower environmental impact and ultimately, better public health. The project consortium consists of 28 partners from across the food system. Thirteen partners are "collaboration partners", including 6 research partners and 7 financing partners, of which six are companies producing or distributing food and one is a consumer organisation. In addition, the project has 15 "associated partners" representing, food industry and retailers, civil society, one additional research institution and government agencies. Finally, the project has a strategic advisory board and a scientific advisory board.

The overall aim of WP3 is to develop a novel, single-scale, dynamic scoring system for environmental and social sustainability[1]**.** Thus, environmental and social sustainability indicators will be translated into one summary score for the sustainability impact of foods. The application of this scoring system can contribute to the transformation of the food system in a more sustainable direction, through assisting procurement and consumers to make informed choices when purchasing food products by providing a single sustainability score.

This report describes the work of WP3 to define system boundaries and reference unit, review of the food system's contribution to environmental and social impacts, two surveys about stakeholders' perspectives on these impacts and a workshop where these impacts were discussed.

This report has been organized into two parts. Part A of the report contains background for the project, research approach on how the work with selection of categories was carried out and the scope, i.e. which parts of the food's supply chain should be included in a score. Part B contains background information on environmental and social categories respectively, with a description of all categories, results from the two surveys and the outcome from the workshop. Hence part A presents the result of the work conducted in part B.

[1] Consumer`s health and nutrition are covered by WP2

2 Methods and approach

The aim of the work described in this report is to propose the system boundaries and the environmental and social categories to be included in the NewTools-framework for further testing. Researchers in WP3 have reviewed existing food sustainability frameworks to determine whether they could form a basis for the framework being developed in this project. The research approach used is illustrated in Figure 1. Colour coding has been used to show the interaction between researchers, partners and external stakeholders.

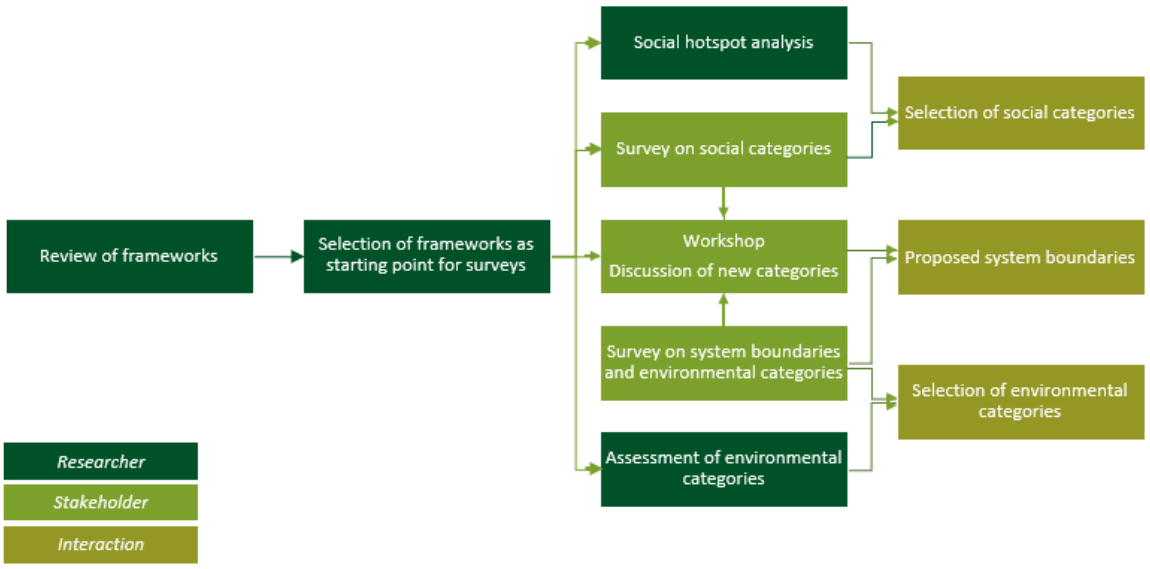

Figure 1 Description of research approach.

2.1 Review of existing frameworks

To find a starting point for the development of a NewTools WP3 framework, a review of established frameworks was carried out. Different kinds of literature were studied, both scientific articles, reports and food sustainability labelling schemes (e.g. Eco-score, EnviroScore).

The aim of the literature review was to identify scoring systems for the sustainability of food products that meet the following requirements: comprehensive and including both social and environmental sustainability, tested on real products; based on quantifiable indicators and being on a product level. In addition, the framework should be adaptable to both Norwegian food production and imported food. It would also be beneficial if they were described in detail so that they can be easily interpreted, and that they were developed through a consultation process by a wide range of stakeholders.

In a bachelor's thesis (Hassel, 2022), as part of the project, a review of existing sustainability labelling schemes in Norway, the Nordic countries and Europe has also been carried out. The labels were

assessed based on the SAFA framework (Sustainability Assessment of Food and Agriculture systems, FAO 2014). The thesis included the following Norwegian labels: Miljømerket Svanen, Nyt Norge, MSC, Ø-merket (label for organic products certified by Debio), Bærekraftsmerket for fish (label for organic fish products certified by Debio), Dyrevernmerket (from the animal welfare alliance) and Fairtrade Norge; Swedish labels: KRAV (label for organic products) and Sigill; Danish labels: Det røde Æ-merket (label for organic products) and Dyrevelfærdsmærket; European labels: EcoScore, EUs økologimerke, Aquaculture Stewardship Council and Soil Association. All the labels included the environmental dimensions of the SAFA framework, but only a few included the social dimension. In addition to the labels included in the thesis, there are several private labels such as the Swedish Coop`s sustainability declaration (Coop, 2022).

No single framework was found that included both social and environmental sustainability and at the same time met the requirements described above in this section. Therefore, two frameworks were chosen, one for environmental sustainability and one for social sustainability, both based on life cycle assessment methodology (LCA):

I. Environmental framework: *The product Environmental Footprint* (PEF) developed by the EU (European Commission, 2018)

   PEF is recommended by the EU and based on international standards ISO 14040-44 (ISO, 2006). The framework has been applied, tested and improved with strong involvement from industry and other stakeholders.

II. Social framework*: Guidelines for Social Life Cycle Assessment of Products and Organisations 2020*, developed by the United Nations (UNEP, 2020, 2021)

   For social sustainability, the UNEP guidelines for social life cycle assessment (S-LCA) appeared to be most relevant for a food product system. These guidelines have been thoroughly developed with a wide range of contributors and have been updated in 2020.

LCA has become the dominant method within sustainability analyses due to the system approach, which makes it possible to assess entire value chains and not just single processes. The EU has chosen to use LCA as the basis for their sustainability initiative Product Environmental Footprint (PEF) and there are many LCA studies of food. LCA has also some weaknesses, for example the analysis requires good quality input data, biological processes are inherently variable and methods to assess certain impact categories adequately such as biodiversity, are still needed, but these challenges will apply to all methods that aims to quantify sustainability.

In NewTools, LCA has been chosen as the foundation for the framework and selection of categories and associated indicators. However, category and indicator selection has not been limited to include only LCA methodology-based indicators. For example, it has been possible to suggest categories through the surveys and workshops.

2.2 Interaction with stakeholders

An important part of the project is dialogue with project partners and other interested parties. The project has developed and implemented a framework for cooperation (*Rammeverk for samhandling I NewTools-prosjektet)* with given principles and detailed guidelines for this cooperation. The

framework stipulates that cooperation and transparency are important principles. Feedback from project partners have been received in different ways, e.g., in project meetings such as the start-up meeting and the yearly meetings. In addition to feedback and discussion in such meetings, the most important channels for feedback for WP3 regarding the goals of this report, has been two surveys, one for social sustainability in autumn 2022 and one for environmental sustainability and system boundaries in winter 2023, and a workshop held in May 2023. Questionnaires and invitations as appendices in this report.

The two surveys were sent to the partners in the project (food industry companies, agricultural organizations, consumer organisations, non-governmental organisations (NGO), authorities, research institutions) and other relevant stakeholders outside the project. The surveys contained questions about which categories should be included based on relevance to the food value chain, one survey was about social categories, and the other about environmental categories and which parts of the supply chain should be included in the scoring system. Both surveys had several categories that the respondents had to assess and gave the opportunity to propose other new categories. Results from the surveys regarding environmental categories and system boundaries are summarized in sections 6.2.1 and regarding social categories in section 7.3.1 .

After the surveys were completed, a workshop was held for all partners in the project as part of interaction in the project. The aim of the workshop was to inform about the results of the work with sustainability issues so far, and have group discussions regarding categories within social and environmental sustainability that were added and proposed by respondents in the surveys, regarding environmental categories see section 6.2.1 and regarding social categories see section 7.3.2 .

The project partners were invited to provide feedback to the draft version of the report. The authors received many useful inputs and comments, some linked to the content of the report and some of more general issues. Feedback to the content of the report was taken into consideration in the final version of the report. Other inputs will be addressed in the further work and dialogue with partners.

2.3 Selection of categories and indicators

The final proposal for categories to be included in the project for further testing was based on slightly different processes for environmental and social sustainability.

For environmental sustainability, an assessment was made of a number of categories based on its severity and extent, its contribution to the food system, trend and finally national and international agreements and targets. Based on an overall assessment of these elements, results from the survey and discussion at the workshop, several categories for environmental sustainability were proposed. All the environmental categories that were included in the survey and that had an average score from respondents of 4 or more (4 - quite relevant, 5 - very relevant), were included. The issues that were added and proposed by respondents in the surveys were discussed at the workshop and included if considered relevant. In addition, other environmental categories were also included because they were considered important according to the literature review.

For social sustainability, it was not possible to make a similar assessment based on severity and extent, contribution to the food system, etc., as such information is not available. A social hotspot analysis was therefore carried out to identify the most important categories, see 7.2 and 7.4. The categories from the social hotspot analysis that had similar content to the categories in the S-LCA

guidelines were linked to the categories there. However, not all categories could be matched. For the final selection of social categories, the average score of the survey and the hotspot analysis was used. Categories with a total score of 3 and above were included for further testing in the project, see Table 3. In addition, as similar for environmental sustainability, issues that were added by respondents were assessed and included if considered relevant.

In addition to the above-mentioned selection process, the categories are also aligned with various international frameworks such as CSRD (Corporate Sustainability Reporting Directive), ESSR (European Sustainability Reporting Standards[2]), SAI platform (Sustainable Agriculture Initiative Platform[3]) and the SAFA (Sustainability Assessment of Food and Agriculture systems, FAO 2014) guidelines which is operationalised by the SMART tool (Sustainability Monitoring and Assessment Routine tool). However, it is not possible to achieve full harmonisation because some of the mentioned systems are adapted to reporting at farm or business level. The categories are also aligned with several UN sustainability goals.

The categories and indicators proposed in this report do not exclude that other categories may be included at a later stage if new knowledge indicates that they are relevant. For some indicators it may be difficult to obtain sufficient product specific data to calculate some of the indicators. In such cases, average figures for a country can be used. If data is available, a manufacturer or importer can provide specific data for their product. If data is not available at all, the indicator can still be included as a placeholder and work will be continued on the development of a measurable indicator.

[2] https://ec.europa.eu/finance/docs/level-2-measures/csrd-delegated-act-2023-5303-annex-1_en.pdf
[3] https://saiplatform.org/

3 Scope

This section describes the suggested scope of the NewTools framework, e.g., how much of the value chain of a food product should be included and how to handle packaging and losses in the chain etc. Based on literature and established frameworks as well as the survey, the scope of the NewTools framework has been proposed, see sections 3.1, 0, 3.2 and their subsections.

The NewTools framework will include food items consumed in Norway including imported food products as defined by the project.

3.1 Survey for the framework basis

In the survey for environmental categories there were also questions related to the scope of the framework. The results of the survey are summarized in Table 1. Questions that had an average score from respondents above of 4 or more (4 – partially agree, 5 - completely agree) were taken into account. The survey was distributed to 54 stakeholders and 35 responses were received: food and feed industries and organisations (16), farmers and workers organisations (4), authorities and county governors (7), consumer organisation (1), non-governmental organisations (NGO; 4) and university and research institutes (3). The respondents agreed on whether the framework should be based on science. Furthermore, there was an equivalent score for the categories to address all major local, regional and global environmental issues, and that packaging should be included. The other questions, i.e., limiting the number of indicators to max 10; base the framework on existing scoring systems; include food waste in retail had a score below 4 and were disregarded.

Table 1 The questions included in the survey and the average score from respondents (completely agree (5), partially agree (4), don't know (3), somewhat agree (2) and not agree (1) and standard deviation of the responses (N = 35).

Questions *What is important when choosing indicators to be included in environmental sustainability? You must answer as a representative of your organisation.*	**Average score of the responses**	**Standard deviation of the scores**
Categories must be based on science	4.9	0.3
Categories must be based on other established scoring systems	3.2	1.2
Categories must be limited to a maximum of 10 environmental categories to simplify the system	3.3	1.6
The categories must include all important local, regional and global environmental issues that can be linked to food production	4.2	0.9
The categories must include food waste at wholesalers and retail	3.5	1.6
The categories must include environmental impacts from packaging	4.5	0.6

3.2 Reference unit

All quantitative input and output data (that makes up the environmental and social impact) collected for a food product needs to be calculated in relation to a reference unit. The reference unit for food products is usually a unit of mass or volume and this is the proposed reference unit in several studies and is also in the Product Environmental Footprint Category Rules (PEFCR) for food and feed (Hietala et al., 2022), the newly developed framework EnviroScore (Ramos et al., 2022) and the proposed Danish guidelines for carbon footprint of food products. The two last mentioned frameworks are based on PEF methodology. The reference unit can also be based on raw edible content, energy content, protein content or weighted together with a nutrient density index taking into consideration several nutritional aspects or economical value (Berardy et al., 2019; Sonesson et al., 2017). Another consideration is that the weight of the food changes when cooking/preparing and thus can change the ranking of environmental categories of food products (Hallström et al., 2022). The use of other different reference units can also change the ranking between foods. The reference unit should also include the food waste along the supply chain up to and including retail to be consistent with the system boundaries (see section 3.3 and 3.5).

Since the framework is still under development, a decision has not been taken on what will be the final reference unit. Further in the project, several options for reference units will be explored and what consequences different units have. While the work is in progress, **a mass-based reference unit of 1 kg of product and the associated consumer primary packaging will be used**. The reference unit could easily be recalculated into other units, e.g. energy-based or dry matter content.

There are benefits and drawbacks with a reference unit based on mass. Benefits are that this reference unit is easy to understand and to communicate to consumers. It also allows for comparison between food products. Another possibility for a weight-based reference unit of 1 kg product is to use the weight of the food product as it is marketed at retail. A challenge with a weight-based reference unit will give products with high water content a good score on sustainability. However, such a product may have a low nutritional score. A decision must also be made as to whether the unit must be the same for both the nutrition score and for environmental and social sustainability. This will be considered and tested in the further work.

3.3 Supply chain

The scope of the framework is to include environmental and social impacts for a food product through its value chain, with **the proposed system boundary from primary production up to and including retail**, see Figure 2. That includes all input factors used for production of ingredients (farm level/primary production), manufacturing of a food product, transport and maintenance throughout the entire life cycle of the food product. For food, the use stage is less relevant because the food product is consumed. Nevertheless, there are some environmental and social impacts linked to the consumer stage, such as transport, energy use, handling of packaging and food waste. Also, food safety with respect to a food item's impact on human health is relevant, but outside the system boundaries. As circular bioeconomy is developing with use of waste and by-products, this topic is highly relevant and should be discussed how to be handled in the project. The proposed system boundary has been chosen as less is known of what happens with a food product after it leaves retail and data on transport and food waste at product level is scarce. It can also be argued that it is logical to have the same system

boundaries as when the consumer buys the food product and not include future impacts that may occur later. Nevertheless, it is suggested to include the recyclability of the packaging material, but as an average value at material level, based on the recycling information on the packaging.

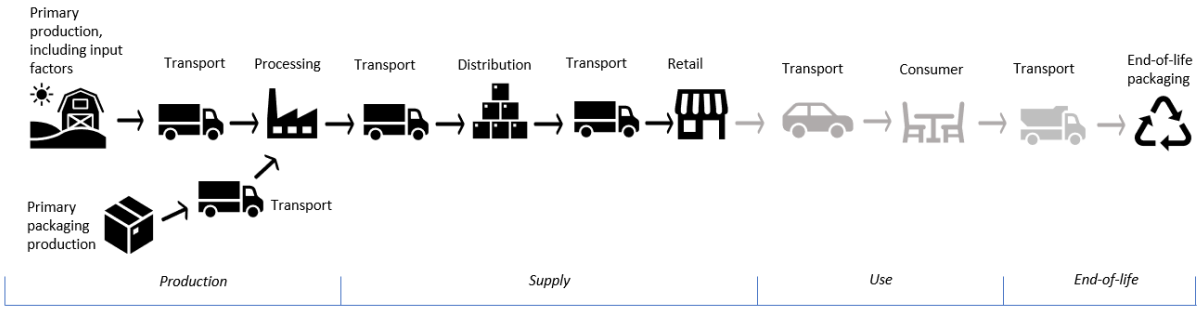

Figure 2. Proposed system boundary for the NewTools framework for environmental and social sustainability.

3.4 Packaging

The contribution of packaging to the overall environmental impact in food supply chains is debated. Packaging protects the food product and can result in less food waste (Verghese et al., 2015), but also lead to packaging waste that has induced legislation (e.g. EU waste directive) and research on the topic (Tua et al., 2017). Packaging can have as little as 2% of the environmental impact of food products but can also contribute to up to 30%. In general, packaging's environmental impact will make up a larger proportion when the impact from the food itself is lower. Experience from other projects shows that the environmental impacts associated with packaging applies to type of material used, the share of recycled material that is included, and the proportion of the material that is recycled, or incinerated with energy recovered. Packaging is included in several food scorings system, e.g. Enviroscore, Ecoscore, PEF and the proposed Danish carbon footprint. Results from the NewTools WP3 survey show that stakeholders want packaging to be included in the framework. Considering all input, it was decided to **include primary packaging. The method on how to include packaging is yet to be decided.**

3.5 Food waste

Several studies have shown that food waste causes large environmental impacts. In the stage of primary production of the framework, food waste is included by focusing only on output of products with commercial value. In the stage of food manufacturing, food waste is included by including all inputs and outputs from the production. Regarding food waste at wholesale and retail stage, the survey results indicated that stakeholders slightly disagreed whether food waste should be included for or not. During the consultation of this report, feedback suggested to also include waste generated at consumer stage. To be consistent with the system boundaries it is however proposed to include food waste up to and including retail. Consumer food waste is not included because it can be perceived as unfair that a producer is held responsible for this food waste. Studies show that it is the planning of purchases and meals that is the most important cause of food waste among consumers and not primarily product quality and shelf life (Stensgård, Prestrud, & Callewaert, 2020). Thus, **it is recommended to include food waste from the time of slaughter or harvesting, food manufacturing, wholesale and retail stages in the framework**.

4 Proposed category and indicator selection

Using the PEF and UNEP guidelines as a starting point and based on literature review, questionnaire, workshop, the preliminary selected categories are presented in Table 2 and Table 3 also contains suggestions for the associated indicators and units and what methods should be used to calculate the indicators.

Table 2 Preliminary selection of environmental categories and indicators

Category	Indicator	Unit	Method
Climate change	Radiative forcing as Global Warming Potential (GWP100)	Kg CO_2eq	Bern model - Global warming potentials (GWP) over a 100-year time horizon (based on IPCC 2021)
	Carbon sequestration and carbon emission from land use	Kg CO_2eq	Not yet identified
Eutrophication	Eutrophication, terrestrial, Accumulated Exceedance (AE)	mol N eq	Accumulated Exceedance (Seppälä et al. 2006, Posch et al., 2008)
	Eutrophication, marine. Fraction of nutrients reaching marine end compartment	Kg P eq	EUTREND model (Struijs et al., 2009)
	Eutrophication, freshwater. Fraction of nutrients reaching freshwater end compartment	Kg N eq	EUTREND model (Struijs et al., 2009)
Acidification	Accumulated Exceedance (AE)	mol H+ eq	Accumulated exceedance (Seppälä et al. 2006; Posch et al, 2008)
Biodiversity[4]		Potential species lost	Not yet identified
Particulate matter	Impact on human health.	Disease incidence	PM method recommended by UNEP (UNEP 2016)
Ecotoxicity	Ecotoxicity	Comparative Toxic Unit for ecosystems (CTUe)	USEtox model, (Rosenbaum et al., 2008) (III, Interim)
Photochemical oxidant formation	Tropospheric ozone concentration increase	kg NMVOC eq	LOTOS-EUROS model (Van Zelm et al., 2008) as implemented in ReCiPe 2008
Energy use	Cumulated primary energy demand	MJ	

[4] Biodiversity is not included in PEF, different methods will be tested to assess suitability for the framework.

Category	Indicator	Unit	Method
Fossil resource use	Abiotic resource depletion – fossil fuels (ADP-fossil)	MJ	CML 2002 (Guinée et al., 2002) and van Oers et al. 2002
Land use[5]	LANCA	Pt, dimensionless	Soil quality index, LANCA
Freshwater use	User deprivation potential (deprivation-weighted water consumption)	m^3 world eq	Available WAter Remaining (AWARE) as recommended by UNEP, 2016
Animal health[6]	Use of antibiotics Mortality rates for livestock and fish species	Gramme antibiotics pr tonne food product. Mortality %	It is possible to also include other pharmaceuticals or health-related chemicals used in animal husbandry and aquaculture, e.g. growth hormones and delousing agents. Mortality rate from Animalia
Fishing method	Indicator not decided		The negative effects of fishing methods will be taken into consideration.
Circularity	Indicator not decided. Example: Fertiliser self-sufficiency rate	%	The choice of method and indicator will be further assessed.

[5] Alternatively, land use in m^2 could be an option.

[6] Animal health is proposed as an indicator of environmental sustainability, and animal welfare is included in social sustainability. In further work, the suggested indicators be assessed and whether there is overlap between them.

Table 3 Preliminary selection of social categories and indicators.

Category	Indicator	Unit	Method and data source
Freedom of association and collective bargaining	Collective bargaining coverage rate	%	Generic data ILOSTAT or specific data from interviews or websites
	Trade union density rate	%	
	SDG 8 Fundamental labour rights are effectively guaranteed	-	Generic data SDG dashboards or specific data from interviews or websites
	ITUC (International Trade Union Confederation) Global Rights Index	-	Generic data ITUC Global Rights Index or specific data from interviews or websites
Child labour	SDG 16: Percentage of population aged 5-14 involved in child labour	-	SDG dashboards or specific data from interviews or websites
Fair salary	Average monthly earnings by agriculture/aquaculture compared to earnings from other economic activities	-	Generic data ILOSTAT or specific data e.g. price to the farmer as a share of the price in retail for individual products.
Working hours in accordance with current regulations	Share of employed working 49 or more hours per week	%	Generic data ILOSTAT or specific data from interviews or surveys
Forced labour	Proportion Living in Modern Slavery	-	Generic data Global Slavery Index or specific data from interviews or surveys
Equal opportunities and discrimination	Female average monthly earnings by agriculture/ aquaculture compared to average earning from agriculture/ aquaculture	-	Generic data ILOSTAT or specific data from interviews or surveys
Health and safety for workers	Reported occupational accidents in agriculture/aquaculture, per 1,000 employees	no	Generic data from Statistics Norway or specific data from interviews or surveys
	Sickness absence rate	%	Generic data from Statistics Norway or specific data
Sexual harassment	Percentage of sexual harassment in agriculture, forestry and fishing		Statistics from The Norwegian Directorate for Children, Youth and Family Affairs or specific data from interviews or surveys
Conditions for farmers, fishermen and small businesses	Access to agricultural input Global Food Security Index Share of fishermen in small-scale fisheries		The choice of indicator will be further assessed

Category	Indicator	Unit	Method and data source
Mental health	Hospital Anxiety and Depression Scale (HADS-D)	-	Surveys or interviews
Access to material resources	Not yet identified		Not yet identified
Access to community services such as health services and education	Not yet identified		Not yet identified
Migration of jobseekers	Recruitment procedure to ensure wages, working hours and HSE		The choice of method and indicator will be further assessed
Cultural heritage	Subsidies for safeguarding cultural heritage	NOK	Subsidies (mill NOK per year) for special measures in agriculture (SMIL) and selected cultural landscapes in agriculture (UKL) or
Safe and secure living conditions	Pesticide use per hectare of cropland	Kg/ha	Our world in data or specific data from interviews or surveys
	Disaster risk management	-	Global Food Security Index
	Food safety	-	Global Food Security Index
Local employment	Percentage of workforce hired locally	-	Not yet identified
	Percentage of spending on locally-based suppliers	-	Global Competitiveness index or specific data from interviews or surveys
Public commitments to sustainability issues	Sustainability and adaptation	-	Global Food Security Index
Animal welfare	Dairy cattle and suckler cow: share on pasture	%	Norwegian Dairy Herd Recording System or specific data from interviews or surveys
	Dairy cattle: share of loose housing	%	Statistics Norway or specific data from interviews or surveys
	Dairy cattle: calf housing stocking density for group pens (live weight of less than 150 kg)	m^2/animal	Specific data from interviews or surveys
	Pigs: Stocking density	m^2/animal	Specific data from interviews or surveys
	Chicken: Stocking density	Kg live weight /m^2	Specific data from interviews or surveys
	Egg-laying hens: stocking density	m^2/animal	Specific data from interviews or surveys

Category	Indicator	Unit	Method and data source
	Farmed fish: placeholder	%	The choice of indicator will be further assessed
Poverty alleviation	Poverty headcount ratio at $3.20/day	%	SDG dashboards or specific data from interviews or surveys
Food security	Self-sufficiency ratio	%	NIBIO
Fair competition	Documented statement or procedures (policy, strategy etc.) to prevent engaging in or being complicit in anti-competitive behavior	-	HHI-Index (concentration in a market) or or specific data from interviews or surveys
Promoting social responsibility	Percentage of suppliers the company has audited regarding social responsibility in the last year	%	Specific data from interviews or surveys
Supplier relationship	Reasonable volume fluctuations	-	Specific data from interviews or surveys
Distribution of income between suppliers and retail	Presence of contractual instruments within the supply value chain that ensure the distribution of the value among the actors	-	Statistics Norway, producer price index and consumer price index or specific data from interviews or surveys

5 Further work

In this report, a wide range of categories for environmental and social sustainability was proposed for further work in the project, based on interaction with stakeholders and literature review. However, it has not been tested that all these categories are suitable for use in a scoring system. In the further work in NewTools WP3, the categories and associated indicators described in this report will be screened and further tested based on the following criteria:

- Measurable: The indicator data must be quantifiable for a specific food product (Bonisoli et al., 2018; Dantsis et al., 2010; de Boer & Cornelissen, 2002; Feenstra, 2005; Gómez-Limón & Sanchez-Fernandez, 2010). If, however, an indicator is considered important for the assessment of sustainability, but is not measurable, it will not be rejected, but be a placeholder. The placeholder will mark data gaps and work will be continued on the development of a measurable indicator.
- Available: The data must be available to the public (Bélanger et al., 2012; de Boer & Cornelissen, 2002; Gómez-Limón & Sanchez-Fernandez, 2010).
- Cost-effective: It must be possible to access the data with little monetary input (Feenstra, 2005).
- Stable, reliable, credible: The data must be from a reliable and credible source, collected in a rigorous and consistent way and replicable from one time period to the next (de Boer & Cornelissen, 2002; Feenstra, 2005).
- Sensitive to change: The indicator must respond to change over a reasonable length of time—not take hundreds of years to show progress (Bélanger et al., 2012; de Boer & Cornelissen, 2002; Feenstra, 2005).
- Social validation/acceptable (Feenstra, 2005).

In addition to test of the categories and indicators against these criteria, a statistical analysis will also be carried out where correlations between the indicators will be assessed. This will provide a basis for reducing the need for data and avoiding double counting of impacts.

Feedback on the draft report has also raised a number of questions that are not answered in this report, but which will be addressed in further work. These questions are:

- How can the scoring systems generate incentives for improvements in the food value chain?
- Will the scoring system make products comparable across product groups or only within product groups?
- What is the reference for the scoring system, i.e. point of departure for developing the scale?

The cost-effectiveness of obtaining data for calculating the indicators will be assessed in the further work. Efforts will be made to use existing systems, both public reporting systems and private initiatives such as KSL (Kvalitetssystem i landbruket) and the climate calculator.

PART B

6 Environmental categories for the food value chain

When choosing categories to be included and indicators to represent these categories, some important principles were set.

- The actual impact should be quantified rather than the theoretical impact, e.g., by using pesticide emissions rather than pesticide use as an indicator.
- Midpoint[7] indicators (e.g., amount of greenhouse gases released) would be chosen rather than endpoint[8] indicators (e.g., number of people killed, or species lost).
- Indicators that show the quantitative impact of a product on a certain environmental category would be preferred over qualitative and semi-quantitative indicators.

The selection of categories and indicators to be included in a framework assessing both environmental and social sustainability of food production/food value chain needs to be linked to the associated impacts from food production. This section gives an overview of the important impacts that food production/food value chain has on environmental aspects.

There are several environmental concerns in the world today. They can roughly be divided into issues caused by emissions and discharges of compounds to the environment and issues caused by withdrawal and depletion of resources vital for human beings and natural ecosystems. It is often hard to point out a direct link between an environmental issue and a certain impact because in many cases, several causes combine to give a certain effect. Hence, it is difficult to accurately determine the impacts of a certain issue.

The framework shall include all food products consumed in Norway. Less than half of the food consumed in Norway has been domestically produced. The dependence on imports varies greatly between food categories. Norway is nearly self-sufficient with meat and dairy products but imports most of the fruits and vegetables consumed. Since the framework we are developing is going to include all impacts in the value chain of foods, the overview given in this chapter includes also other countries than Norway. However, since 77% of food imports to Norway come from other European countries, the considerations are focused on Europe, but also international agreements are considered.

In this chapter, the aim is to present the environmental issues that the world faces today and to prioritize them according to the severity of the issue and to what extent it can be linked to activities in the food value chain, and according to the priority given to them by the stakeholders conducted in the survey. The environmental issues have been divided into categories used in LCA methodology.

The criteria for assessing which environmental issues to include in our analysis that have been considered are as follows in Table 4:

[7] Midpoint Indicator: *Midpoint indicators* are intermediate measures of environmental impact that reflect the changes in the natural environment caused by emissions or resource, e.g. kg CO2-eq released.

[8] Endpoint indicator: Endpoint indicators are measures of the actual impact of a certain environmental category, e.g. numbers of deaths and species extinct as a cause of climate impact from a process.

Table 4 Selection criteria for categories and indicators representing the categories.

Severity and extent	Severity and extent of the issue, e.g., what percentage of the land area, population or ecosystems are affected and what is the damage sustained?
Food system contribution	To what extent is the issue caused by activities in the food value chain?
Trend	What is the development of the issue (increasing or decreasing?
International agreements	Has Norway signed international agreements aimed at limiting the issue and to what extent has compliance been reached?
National and EU targets	Does Norway have national reduction targets and to what extent has compliance been reached?
Other	Are there other aspects relevant for selection of the category or indicator

6.1 Review of environmental categories

In this section, we systematically assess each environmental category using the criteria in Table 4.

6.1.1 Climate change

This category refers to the increase in the average global temperatures as result of greenhouse gas (GHG) emissions. The greatest contributor is generally the combustion of fossil fuels such as coal, oil, and natural gas. The global warming potential of all GHG emissions is measured in kilogram of carbon dioxide equivalent (kg CO_2 eq.), namely all GHG are compared to the amount of the global warming potential of 1 kg of CO_2.

Severity and extent: Climate change is a global issue and is perhaps the most important environmental sustainability topic in the world today. The temperature in Norway is increasing, the average from 1991 to 2020 is on average 1° C higher than the average from 1961 to 1990. Several important environmental and health issues can be attributed to climate change such as sea level rise, heat waves, floods and droughts.

Food system contribution: One important study, where LCA was used, is Poore and Nemecek (2018) and Vermeulen et al. (2012). They found that around 25% of global GHG emissions originates from the food system.

Trend: The latest IPCC report shows that, although efforts to reduce GHG emissions have given results, the trend in emissions is a large increase from year to year (IPCC, 2023). The target to limit global temperature increase to 1,5° C is now considered unrealistic (UNEP, 2022).

International agreements: The Paris agreement.

National and EU targets: Norway has in the Paris agreement set a target to reduce GHG emissions by

at least 50 %, and up to 55 %, compared to 1990-levels. EU countries has pledged a 55 % reduction in the same period.

Other: The agricultural sector in Norway has signed a voluntary agreement with the government to reduce GHG emissions by 5 million tonnes CO_2-equivalents in the period up to 2030. This agreement only covers emissions taking place in Norway, as opposed to life cycle emissions which are emissions taking place in other countries to produce and transport inputs to agricultural production.

Land Use can result in carbon sequestration or carbon emission, also called soil organic carbon (SOC) balance. Several models exist for estimating soil carbon balance, such as the Introductory Carbon Balance Model (ICBM); (Andrén & Kätterer, 1997; Andrén et al., 2004), which have been calibrated for arable land. In reporting guidelines, it is recommended to report carbon sequestration or emissions separately to the carbon footprint results due to limiting data availability and uncertainty (FEFAC, 2018; International Dairy Federation, 2022). Calibration of the ICBM model for permanent grassland and outfield pasture based on soil samples from Norwegian pastures are currently done in the project SUSCOW, and soil carbon balance from permanent and outfield pastures might be possible to include in the future.

In recent years, the GWP* metric have been suggested by, e.g., Allen et al. (2018) as its better accounts for the temperature impact of short-lived climate pollutants, such as CH_4. However, GWP* have been criticized for being a climate model, not a metric (Meinshausen & Nicholls, 2022) and for being sensitive to historical emissions of short-lived climate pollutants (Rogelj & Schleussner, 2019; Schleussner et al., 2019). Using the GWP* methodology is not straight forward and require a time series to be applied. Thus, for the purpose of estimating the climate change of a product, the current GWP* methodology cannot be applied.

6.1.2 Eutrophication

Eutrophication impacts ecosystems due to the release of an excess of substances containing reactive nitrogen (N) or phosphorus (P), in particular to aqueous environments. These nutrients cause growth of algae or specific plants. This growth deprives the ecosystems of oxygen and negatively affects life in the original ecosystem.

Severity and extent: Globally biogeochemical N flows have exceeded the threshold of the planetary boundary and is considered beyond the zone of uncertainty (high risk), while biogeochemical P flows are also outside the planetary boundary but associated with less risk (Campbell et al., 2017). Eutrophication is one of several environmental problems associated with the release of reactive P and N-compounds.

The critical load for eutrophication were in 2020 exceeded in 75% of the total ecosystem area of the 27 Member States. Critical parts are Denmark, north- eastern -middle eastern Germany, northern Italy and Northern Spain (EEA, 2022b). Eutrophication is a serious issue in many parts in Norway (Miljødirektoratet, n. d.). The most affected coastal area is the Skagerrak area, other examples include the Oslo fjord. Many lakes are also affected, e.g., Vansjø in south-eastern Norway. In all, around 25 % of Norway`s land area received too much Nitrogen, a large contributing factor for eutrophication (ibid).

Food system contribution: The global food system is a major contributor of eutrophicating emissions, around 59 % of total emissions according to (Tukker et al., 2006). Food production is not the only source of emissions in Norway, but an important one. Aquaculture contributed in 2020 (Miljødirektoratet, n. d.) roughly 79 % of all P emissions in coastal waters, whereas agriculture only contributed 5,3 %. For Nitrogen emissions in coastal waters (ibid), 36,4 % of the total came from aquaculture and 15,3 % from agriculture in 2020.

Trend: The trend for this issue in the EU is positive, with a reduction in 12% since 2005. For 2030, it is estimated that there will be a reduction of 20% compared to 2005.

International agreements: Gothenburg Protocol (UNECE, n. d.), the OSPAR convention, EUs framework directive for water, the North Sea Treaty and the Nitrate Directive.

National and EU targets: Targets have been set in the North Sea Treaty (waterborne Phosphorus and Nitrogen nutrient salts). Norway has pledged to reduce emissions of Phosphorus and Nitrogen by 50 % in the coastal region between Lindesnes and the Swedish border relative to the 1985-level. The target for P has been met, but the target for N has not been met.

Targets for airborne emissions have been set according to the Gothenburg Protocol (NOx, SO_2, NMVOC, NH_3). The target for NH3 reduction is an 8 % reduction compared to the 2005-levels and for NOx a reduction of 23 % in the same time frame. For NH_3, only 3 % reduction has been achieved (Landbruksdirektoratet & Miljødirektoratet, 2023).

Other: In the past, several indicators for eutrophication have been proposed, e.g., amount of fertilizer input per hectare and potential impact of nutrients emitted to the environment. For this framework, the latter approach is recommended. Different environments respond differently to the nutrients typically released into the environment, hence separate indicators should be used for marine, freshwater and terrestrial eutrophication.

6.1.3 Acidification

Acidification occurs when compounds are emitted to nature that cause a drop in pH when in contact with water. Acidification occurs because of long-distance air pollution, acid rain and emissions of ammonia from, for example, agriculture. Acidification can kill marine organisms like algae, plankton and fish. Acidic compounds dissolve important nutrients, such as calcium and potassium, and reduce their availability to plants. It can also cause microorganisms to disappear, and this results in reduced breakdown of organic material. In addition, acidification can dissolve toxic metals, so that, for example, aluminium and mercury are made available to plants and microorganisms. Ocean acidification is mainly caused by CO_2 and should thus be treated separately from acidification in land areas.

Severity and extent: Globally, acidification is of high concern and the emissions of N and P has exceeded the planetary boundaries (Campbell et al., 2017; Richardson et al., 2023) and is considered beyond the zone of uncertainty (high risk). Acidification is one of several environmental issues associated with release of active P and N-compounds.

Acidification is measured by the nitrogen and sulphur compounds deposited, and the exceedance of the acidity critical loads. Areas where the critical load will be exceeded is now only in some hotspots in Europe, in particular at the border area between the Netherlands and Germany (United Nations Treaty Collection, 2019). There are significant emissions of acidifying substances in Norway, in all 5

400 tonnes acid equivalents per year. Despite a positive trend, acid rain is still an issue (Miljødirektoratet, n. d.).

Food system contribution: According to recent estimates, food products, in particular meat and dairy products, are among the largest contributors to environmental impacts associated with consumption, in terms of acidification, eutrophication, climate change, and land and water use (Beylot et al., 2019). In Norway, agriculture is one the highest contributors to acidifying emissions, with about 35 %.

Trend: Acidification has decreased in Europe and one of the major reasons for this has been the success in reducing sulphur dioxide emissions. This has been achieved largely through reducing burning of sulphur-rich fossil fuels. However, large emissions of reactive Nitrogen species such as NOx now represent major sources of acidifying compounds.

The trend in acidification impact in Norway is also positive, i.e. emissions have been reduced. In 1980, more than 30 % of Norwegian land area received acidifying emissions more than the damage threshold for water-living organisms. In the period 2012-2016, that number was only 7 %. (Miljødirektoratet, n. d.)

International agreements: Norway has signed the Gothenburg Protocol and has set targets for limiting emissions of acidifying gases. The targets set for NOx and SO_2 emissions in the period 2005 to 2020 has already been met, whereas the target for NMVOC and NH_3 are above the Gothenburg 2020 target. However, the total effect has been a reduction of acidifying gases, from 7952 tonnes acid equivalents in 1990 to 5383 tonnes acid equivalents in 2020. New reduction targets have been set. For NOx, this target is to limit yearly emissions to 160 944 tonnes from 2020 onwards.

National and EU targets: National: SO2, NOx, VOCs, ammonia and particulate matter (PM2.5) by 2020. Indicators used by the Norwegian Government: Yearly emissions of NOx, SO_2, NMVOC, NH_3.

Other: The potential impact of substances that contribute to acidification is converted to the equivalent of mol hydron (general name for a cationic form of atomic hydrogen, mol H+ eq.).

Acidification is an important environmental impact but because of possible strong correlation with other impact categories such as climate change, energy use and depletion of fossil resources, a separate acidification category might not be needed.

6.1.4 Biodiversity

Biodiversity is the issue where species are lost and/or populations are greatly reduced. Species loss applies to both plants and animals and is often due to the occupation of areas, but other causes can be climate changes, pollution and alien species. Some systems, however, can also make a positive contribution to biodiversity.

Severity and extent: Research show that biodiversity loss is of major concern worldwide e.g. (Campbell et al., 2017; Ceballos et al., 2017; Pimm et al., 2014); genetic diversity is an impact is outside of the planetary boundary.

The report "The European environment state and outlook 2020" (EEA, 2020) states that: "*Assessments of species and habitats protected under the Habitats Directive show predominantly unfavourable conservation status at 60 % for species and 77 % for habitats. Biodiversity loss is not confined to rare*

or threatened species. Long-term monitoring shows a continuing downward trend in populations of common birds and butterflies, with the most pronounced declines in farmland birds (32 %) and grassland butterflies (39 %)." The IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services) states that destruction and loss of biodiversity and nature is as catastrophic as climate change (EEA, 2020). The main drivers of biodiversity loss are land use change, including habitat loss, fragmentation and degradation of land areas, as well climate change, extraction of natural resources, pollution and invasive alien species. Figure 3 summarizes to which extent species in several categories are endangered, e.g. 58 % of endemic trees, 40 % of freshwater fish, 17 % of mammals and 13 % of bird species are endangered. Figure 3 gives an overview of the major global pressures on biodiversity, where land-use change, and pollution are the most important.

Biodiversity is also an important issue in Norway, 2752 species are defined as threatened species, and 107 species have become extinct since 1800 (Norwegian biodiversity information centre, 2021). Land use is one major contributor, and this is strongly connected to agriculture as this sector occupies large areas. Agricultural production takes place in areas mentioned above (forest, mountain areas, wetland, etc) previously dominated by these nature categories. Fisheries occur in large areas but the degree to which the sea is affected by these activities is largely unknown. However, much is known about the effect on fish stocks. 74 ocean species are threatened by extinction in Norwegian territorial waters. Of these, several commercial fish-species are included.

The endangered species live in the forest (48 %), mountains areas (6 %), wetland (10,5 %), fresh water (7,1 %), salt water (2 %) and seminatural areas (29 %). Figure 3 summarizes the species losses in Europe in the different species classes. Freshwater molluscs, endemic trees and freshwater fish are the species classes that contain the most endangered species.

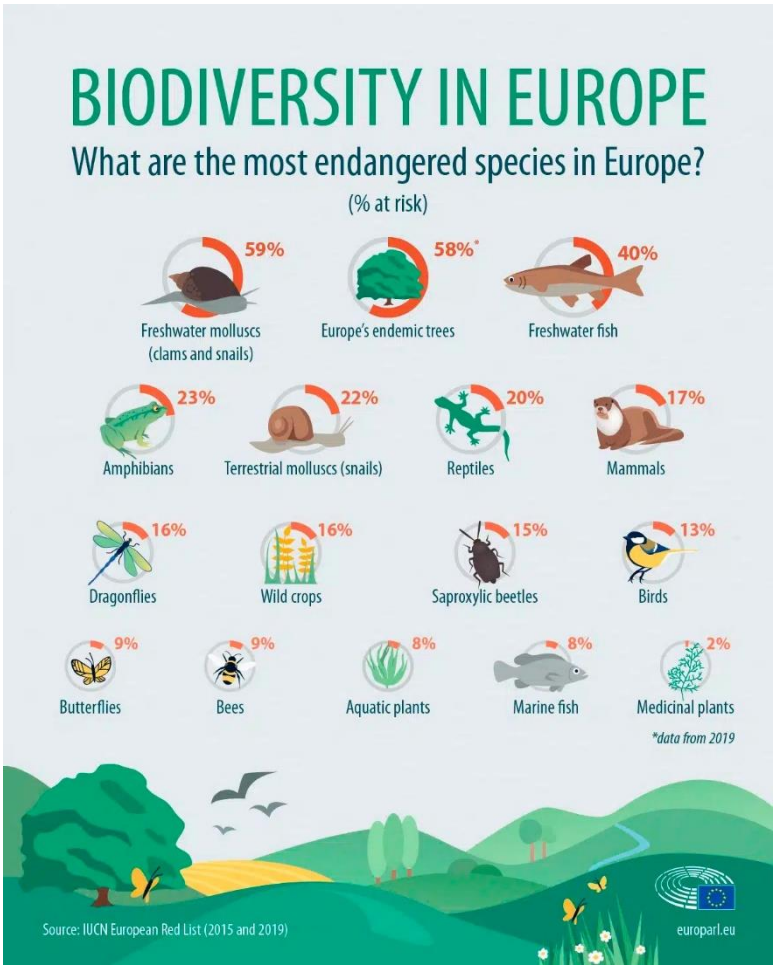

Figure 3 Overview of endangered species in Europe. Source: European Parliament (2020).

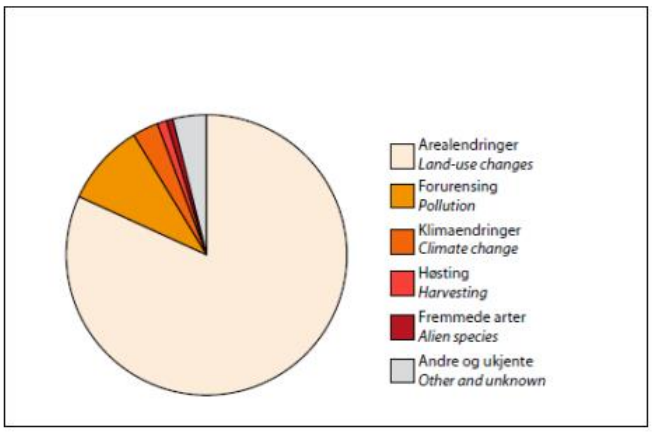

Figure 1: Land-use change, pollution, climate change, harvesting (over-exploitation) and alien species are the five major global pressures on biological diversity. In Norway, land-use change is by far the most significant factor. Other factors include noise, traffic and external pressures (originating outside Norway). Source: Norwegian Biodiversity Information Centre 2010.

Figure 4 The five major global pressures on biodiversity. Source: Norwegian Ministry of Climate and Environment (2014).

Food system contribution: The primary driver for biodiversity loss is food production (Benton et al., 2021) and worldwide food systems contribute more than 90 % of all biodiversity loss (Ritchie et al., 2022). Agriculture and aquaculture are a threat to 94% of the species that today are evaluated to be threatened by extinction by IUCN (International Union for Conservation of Nature) Red List.

Changes in area use has been found to be the greatest driver for biodiversity loss. Agricultural production affects biodiversity by occupying and cultivating forest areas, draining wetlands, discharging nutrients and pollutants to rivers and lakes (and subsequently oceans). It also contributes positively to biodiversity through the use of seminatural areas. Thus, ruminants can contribute to biodiversity depending on how much pasture is included in the feed. Seminatural areas includes pastures, heather-burning areas and areas used for grass-production. One important reason that many species are threatened by extinction is that seminatural areas has decreased significantly over the last 100 years. However, this contribution must be weighed against the negative impacts of feed concentrate ingredient production.

Figure 4 summarizes the factors found to be the causes of biodiversity loss globally. Land use is one major contributor, and this is strongly connected to agriculture as this sector occupies large areas. Agricultural production takes place in areas mentioned above (forest, mountain areas, wetland, etc) previously dominated by these nature categories. Most arable land in Norway has already been cultivated and therefore expansion of agricultural area is very small, but it does occur. From 2005 to 2021, approx. 27 000 hectares of land has been converted into use for agricultural production. Most of this area was only usable for grass production. In addition to production agriculture and aquaculture, food is collected directly from nature through picking berries and mushrooms, hunting and fishing. Fisheries is the most important of these activities and include food and feed fisheries. Fisheries has consequences for the fish stocks harvested and other organisms in the food chain, but also disrupts ecosystems where they live, e.g. by direct mechanical action from bottom trawling.

Aquaculture production of salmon and trout in Norway is very high and has negative impacts on biodiversity through escaped fish, delousing agents and release of nutrients that particularly affects wild salmon in some Norwegian rivers. In addition, biodiversity is affected by feed fisheries and agricultural production of feed ingredients. For example, the use of soybean derived ingredients occupies large agricultural areas and contributes to deforestation in South America which also threatens biodiversity.

International agreements: Norway has signed the Convention and the Strategic Plan for Biodiversity 2011-2020, including the Nagoya protocol (2014) and the Cartagena protocol (2003). This includes a number of targets, the Aichi Biodiversity Targets. Norway has also signed the RAMSAR convention on conservation of wetlands and recently Norway signed the Kunming Montreal agreement on biodiversity (Convention on Biological Diversity, 2022).

In addition to these agreements, the Convention for Protection of the Marine Environment of the North-East Atlantic (OSPAR convention), the North Sea treaties, the Water directive, Nitrate directive and the Gothenburg protocol are also important for biodiversity.

National and EU targets: The Aichi targets have been translated into national targets and action plans. There is a strong correlation between land use and biodiversity. The EU 2030 Biodiversity Strategy sets the following targets: Build a coherent Trans-Europe Nature Network. Legally protect a minimum of

30% of the EU's land areas and 30% of the EU sea area and integrate ecological corridors (which means an extra of 4% of land and 19% for seas areas as compared to today).

Norway has agreed to fulfil a number of targets as part of the biodiversity convention, the so-called Aichi targets. Progress is underway to reach the Aichi targets, and some have been almost fully implemented, for example target 16 on ratification and implementation of the Nagoya Protocol. Other targets cover the protection of land areas (17,6 % already protected, and marine areas 3,1 % already protected (Miljødirektoratet, n. d.).

Other: Several methods have been proposed to measure biodiversity impacts, such as Chaudhary & Brooks (2018) and Knudsen et al. (2017) but no method has gained widespread international acceptance. Method development is ongoing, and review has also been carried out (Damiani et al., 2023; Sanyé-Mengual et al., 2023).

6.1.5 Chemical pollution and ecotoxicity

Chemical pollution signifies, in this document, the emission of compounds in chemical products, not emissions of chemical compounds resulting from processes such as combustion. Exposure to chemical pollution negatively impacts human health and the environment. Chemical pollution can happen through several pathways, both direct and indirect. In this context, mainly toxic impacts are considered. Ecotoxicity occurs when a substance is released which causes damage to animals, plants, fungi and microorganisms. A substance contributing to ecotoxicity, affects the function and structure of the ecosystem by exerting toxic effects on the organisms which live in it. Toxic effects can occur as soon as the substances are released (acute ecotoxicity) or may appear after repeated or long-term exposure to the substances (chronic ecotoxicity). Chronic ecotoxicity is often caused by substances which have a low degradability in the environment, and which can therefore remain for a long time after their emission (persistent substances). Some substances also have the tendency of accumulating in living organisms, so that tissues and organs can be exposed to concentrations of the substance which are far higher than the concentration in the surrounding environment. The chronic ecotoxicity of a compound is thus determined by its toxic effects, its biodegradability, and its ability of accumulating in living organisms (European Commission et al., 2018).

Severity and extent: The consumption of industrial chemicals in the EU in 2017 was 304 million tonnes. Of these, 22 % were hazardous to the environment and 71 % were hazardous to health (EEA, 2020). Even though the condition of Norwegian rivers and lakes is generally good, a significant share is still affected by organic pollutants (Miljødirektoratet, n. d.).

Food system contribution: The contribution of chemicals used in agriculture and fisheries is not exactly known. In the seafood sector, delousing agents (aquaculture) and anti-algal growth agents are hotspots. For agriculture, pesticides are an important class of chemicals used.

Emissions of pesticides in agriculture are in general low. The sales of pesticides in the EU (360 000 tonnes) have remained relatively stable between 2011 and 2020, while in Norway it has fallen (Eurostat, 2023a).

The JOVA program (Program for jord- og vannovervåking i landbruket) in Norway monitors levels of pesticide emissions in some test fields across the country. The program has analysed 2640 samples in

the period 1995-2018 (Bøchmann et al., 2021). The conclusion is that there is a risk for negative consequences for the environment in short periods during the growing season. However, the magnitude of the issue is difficult to gauge.

Trend: There has been a statistically significant reduction of pesticide emissions In Norway during the years the JOVA program has operated.

International agreements: The directive on sustainable use of pesticides (Rammedirektivet for bærekraftig bruk av pesticider, 2009) sets targets and gives advice on sustainable use of pesticides. The Aarhus protocol on POPs (Persistent Organic pollutants) focuses on a list of 16 substances that have been singled out according to agreed risk criteria. The substances comprise eleven pesticides, two industrial chemicals and three by-products/contaminants. The pesticides are not used in Norway but may be used in other countries to produce imported food or feed.

National and EU targets: Even though pesticide use in the EU has not increased in recent years, further reduction is high on the agenda. As part of the Green Deal, the European Commission adopted a goal to cut pesticide in half before 2030.

Other: Different approaches have been proposed to quantify toxic impacts of pesticides, e.g. amount of residual amounts found in foodstuffs and potential impact of pesticide emissions. The latter approach is recommended in this framework because it is assumed to give a more precise impact of toxic impacts of food production on the environment and human beings.

6.1.6 Photochemical oxidant formation (POCP)

Photochemical oxidants are a group of highly reactive, airborne substances that are often formed locally in the troposphere and can lead to health issues, crop damage and degradation of works of art. Examples include Ozone, hydrogen peroxide and hydroxyl radical.

Severity and extent: A large proportion of Europe's agricultural areas are exposed to high ozone levels, and this reduces crops. It is also a health issue. For example, in England in 2019, 11,7 deaths per 100 000 people could be attributed to air pollution of which ground level ozone contributed 0,41 deaths. Other European countries show values on the same level, but in Southern Europe, the death rate caused by ozone is higher, e.g. for Italy 1,83 deaths per 100 000 inhabitants.

Food system contribution: The contribution from food systems is difficult to determine. There are many activities in the value chain that contributes to the issue, e.g. transport, electricity production and primary production.

International agreements: In 2012, as a party to the Gothenburg Protocol, Norway took on further commitments to reduce emissions of SO2, NOx, VOCs, ammonia and particulate matter (PM2.5) by 2020.

National and EU targets: SO2, NOx, VOCs, ammonia and particulate matter (PM2.5) by 2020. Indicators used by the Norwegian Government: Yearly emissions of NOx, SO2, NMVOC, NH3.

Other: Several measures have been taken in Norway to reduce emissions of POCP, e.g. reduction of NOx from engines and reduction of gases from loading and unloading of petroleum products and from pumping of fuel into vehicles.

6.1.7 Local air pollution

Local air pollution signifies, in this context, short range pollution in the local environment where people live. Although other organisms also suffer from local air pollution, this has largely been regarded as a health issue. There exists an overlap with other environmental impacts, e.g. POCP and acidification. Generally, the most important example of such pollution is small particles (measured as PM10 or PM2.5), NOx and tropospheric ozone (FHI, 2023).

Severity and extent: Air pollution is a serious issue in many countries. As an example, in England in 2019, 11,7 deaths per 100 000 people could be attributed to air pollution of which outdoor particulate matter was the main cause (11,29 deaths) and ground level ozone contributing much less (0,41 deaths). Other European countries show values on the same level, but in Southern Europe, the death rate caused by ozone is higher, e.g. for Italy 1,83 deaths per 100 000 inhabitants (EEA, 2022a).

Trend: Emissions of fine particles and NOx have decreased in the last 5-15 years, whereas tropospheric ozone emissions have remained constant (FHI, 2023).

Food system contribution: Combustion of fuels is the main source for the emissions of small particles, in particular for heating buildings. I 2020 this accounted for 44 % of PM10-emmissions and 58 % of the PM2.5-emmissions in EU. Other important sources for particle pollution are industry, road transport, agriculture and forestry. In Norway, heating with wood is the most important contributor (43 % of PM10 in 2020). The contribution from transport was 15 %, In other countries, mining and combustion of coal for energy production are important sources. The main sources of NOx pollution were road transport (37 %), agriculture and forestry (19 %) and industry (15 %). In addition to the direct emissions, a proportion of the emissions from other sectors, e.g. industry and transport, can be attributed to the food value chains.

International agreements: In 2012, as a party to the Gothenburg Protocol, Norway took on further commitments to reduce emissions of SO2, NOx, VOCs, ammonia by 2020 and commitments have been continued beyond this year.

National and EU targets: One of the Governments environmental targets (Miljødirektoratet, n. d.) is to ensure safe air for breathing. This is based on yearly averages of PM10 (particles smaller than 10 micrometres), PM2.5 (particles smaller than 2.5 micrometres), and N2O. Norway set limits on particle pollution in 2022. Indicators used by the Norwegian Government: PM10, PM2.5, N2O emissions.

6.1.8 Waste

Waste is not an environmental impact in itself but can represent lost resources and environmental issues from f ex pollution of air, water and soil.

Severity and extent: Yearly, 11,58 million tonnes of waste are generated in Norway (2021). The pro capita waste amount is 726 kg, significantly higher than the EU average of 505 kg (Miljødirektoratet, n. d.). The most important topic is hazardous waste. The amount of hazardous waste is increasing every year. The total amount of packaging waste in Norway was, according to Eurostat, in 2019 15,6 kg/capita, or 882 000 tonnes per year. Plastic is one of the materials most used in packaging and,

according to Mepex (Syversen et al., 2020), 21,700 tonnes per year is wasted yearly (7 % of the yearly total 3,1 million tonnes of plastic waste).

Food system contribution: Of the 11,58 mill tonnes waste generated in 2017, only 143 000 tonnes of waste is attributed directly to agriculture, forestry and fisheries, but several other sectors generating waste is represented in the food value chain (SSB, n.d.).

For the food industry, retail and households, packaging and food waste make up the largest amount. The food industry has the largest consumption of packaging, and accounts for 67% of the total quantity of packaging out of ten industries with the largest use of packaging (Prestrud et al., 2019) and the used packaging must be handled by the households and sorted for either recycling or residual waste for incineration. The food waste from the food industry, the school and care sector and households was 400,000 tonnes in 2021 (Stensgård et al., 2023; Stensgård, Prestrud, Hanssen, et al., 2020) This waste caused a high environmental impact, the climate effect alone was almost 1.3 million CO_2-equivalents, mainly from producing the food that replaces the wasted food. The waste handling itself gave only a minor impact.

Another waste stream from the food value chain is plastics used in agriculture which amounted 19,660 tonnes delivered to recycling in 2019 (https://www.bondelaget.no/bondelaget-mener/miljo-og-klima/plast-i-landbruket/).

International agreements: Norway has entered into a number of international agreements. These are mostly concerned with marine plastics (e.g. the London convention) and hazardous waste (E.g. the Basel Convention). A significant proportion of international marine waste comes from fisheries; hence the seafood sector plays an important part in the fulfilment of these agreements.

National and EU targets: In Norway, the focus is on food waste and hazardous waste. Norway has set targets to reduce food waste and e.g. a voluntary agreement between industry, primary producers, retail and other actors with the government has been signed. The EU commission has proposed that by 2030, Member States shall reduce food waste by 10%, in processing and manufacturing, and by 30% (per capita), jointly at retail and consumption (restaurants, food services and households) (https://food.ec.europa.eu/safety/food-waste/eu-actions-against-food-waste/food-waste-reduction-targets_en). For packaging the EU Waste Framework Directive has recently been updated with targets for recycling rates of glass, paper and plastic and other targets for reducing packaging material in all value chains including food (European Commision, 2008)

Other: Using life cycle assessment, these impacts will be included if they are significant.

6.1.9 Energy use

Energy is a limited resource in many parts of the world. However, energy is not lost, only transformed. Hence, energy shortage refers to a shortage of energy resources with the needed quality for use. For example, energy in the form of hot water might be available in a certain location but cannot, with the current technology level) be used to propel a tractor.

Severity and extent: Demand for energy is high in Europe and increasing rapidly. Between 1950 and 2008 primary energy use in the EU rose fivefold (EEA, 2020). Total domestic energy use in Norway was 212 TWh.

Food system contribution: In the EU, agriculture accounts for only 3.2 % of total direct consumption of energy, however this number does not account for energy use in the supply chain, i.e. energy used to produce fertilizers and other inputs. Looking at the whole food value chain, energy is also used in processing, storage, distribution and consumption. Globally, about 30 % of primary energy demand comes from the agriculture and food sectors (FAO, 2011).

Out of the total energy use in Norway, 7 TWh was used in agriculture and fisheries (Energifakta Norge, n. d.). Official statistics from Statistics Norway puts the total energy used in agriculture, forestry and fisheries at 5.2 TWh in 2019 (SSB, n. d.). Of this, 57 % came from oil and oil products, 40 % from electricity, 3 % from natural gas while the sources heat and biofuels supplied a very small amount. The statistics does not include embedded energy i.e., energy used to produce inputs such as fertilizer, lime, pesticides and infrastructure. It also does not include inputs in other parts of the food value chain.

The significant price increase of fertilizers in Europe since the start of the Ukrainian war have been driven largely by global pressures including increased demand, the war in Ukraine and higher energy costs. Agriculture is very dependent on energy inputs as natural gas is the most common energy source to produce ammonia, a very important raw material for N fertilizers.

International agreements: No agreements have been signed.

National and EU targets: No national targets. The EU has set up binding energy reduction targets from august 2023, where each member state will be required to annually save 1.49% of energy use from 2024 to 2030, but there is no specific target for the agricultural sector (https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficiency-targets-directive-and-rules/energy-efficiency-targets_en).

Other: As a category, energy use partly overlaps with climate gas emissions, acidifying emissions, and use of fossil resources. However, while the latter three categories are very connected to fossil energy use, energy use also includes energy from renewable sources such as hydropower, wind power and biogas. Even though these energy sources give lower environmental impacts than fossil energy, they do have environmental impacts. Furthermore, they are in limited supply and can, to a certain degree, be used for the same purposes as fossil energy. Hence if renewable energy use is reduced, the surplus could, in many cases, be used to replace non-renewable energy.

6.1.10 Use of fossil resources

The earth contains a finite number of non-renewable resources, such as fossil fuels like coal, oil and gas. The basic idea behind this impact category is that extracting resources today will force future generations to rely on other energy sources. These energy resources may have high environmental impacts (e.g. biofuels) or their availability may be low. This can for example lead to reduced food production.

Severity and extent: Fossil resources are consumed at a high rate, the supply is finite. It is difficult to assess the amount remaining because there are probably large resources remaining undiscovered. However, with the remaining reserves and the current exploitation levels, oil will only last for 54 years,

natural gas 49 years and coal 139 years (MET Group, 2021). The supply is limited, and the consumption is high. It is a high priority in many countries to gradually phase out the use of fossil energy resources, but this will take long time, not the least because alternative sources have their disadvantages. This means that it is important to reduce the use of this resources and thus encourage the gradual replacement with renewable resources.

Food system contribution: In the EU, about 57 % of the total energy consumption (Eurostat, 2023b) in the agriculture and forestry sector comes from fossil resources. Hence it might be argued that the category total energy consumption could represent both energy use and use of fossil resources.

Fossil fuels are used as energy source and raw material for plastic products. This energy is used both to power tractors that work the field and vehicles that transport food, and to produce and transport inputs to agriculture, e.g. fertilizers, pesticides, plastic, infrastructure (machines and buildings) and animal feed ingredients, hence it is difficult to determine the amount of fossil fuels used in Norway to produce food. As seen in SSB (n. d.), the recorded direct fossil energy use in primary agricultural production is 2.7 TWh.

Food value chains use large amounts of fossil energy resources. In the food value chain, the most common fossil fuel-derived product are plastics. In 2016, the total amount of plastics from agriculture, forestry and fisheries was 23 000 tonnes, 9 % of the total plastic waste in the country. In 2017, 18 000 tonnes of plastics were delivered from the agricultural sector for recycling. Of this amount, 10 600 tonnes were recycled in Norway and 7 800 tonnes were recycled abroad. The same year, 13 000 tonnes agricultural plastics was purchased, which means that the amount delivered to waste handling exceeded the amount sold (Ranneklev et al. 2019).

International agreements: There exist no international agreements or treaties to reduce fossil resource use, except indirectly, through the agreements on climate gas emissions.

National and EU targets: Reduction of the dependence of fossil fuels has a high priority in Europe in the current situation. The EU aims to be climate neutral by 2050, which includes reducing fossil fuel use. Reducing fossil fuels means increasing renewable energy and the EU has a target of 42.5% of energy use coming from renewable energy in 2030 (European Commission, 2023c).

The EU also has the “fit for 55” package that shall reduce energy and fossil fuels to reach the climate neutrality goal (European Commission, 2023a)

Other: Using the suggested category (resource use, fossils) the amount of feedstock in materials contributing to are converted into MJ and added together.

6.1.11 Land use

Land is an important resource that should be conserved, especially in the face of increasing demand due to population expansion. Land is used for several purposes, of which for example agriculture, roads, housing, and mining are important. There exists considerable pressure on land areas globally, and the pressure is increasing because of population increase. In Norway, most land that is possible to be used for agriculture has been used already. To feed the increasing population, it is necessary to produce food more efficiently and/or to change the diet in a direction that require less land resources. In the EU, 40.4% of the total land area is actively managed by farmers. At the same time 15.1% of land

is unused or abandoned with signs of previous use (Eurostat, 2023c). Land abandonment is a continuous process, with a further 3% of total agricultural land in EU projected to be abandoned by 2030 (Perpina Castillo et al., 2018).

Globally, there are still natural areas that have not been used for agricultural purposes, but such expansion will often entail other environmental consequences, e.g. through conversion of tropical forests to farmland and the emissions associated with this.

Severity and extent: Land use is a resource indicator. It is important to consider that the expansion of land use for food and feed production has happened at the expense of natural ecosystems and has been a major driver for biodiversity loss, see section 6.1.4 .

Food system contribution: About 50% of all habitable land globally is used for agriculture (Ritchie & Roser, n. d.). Of this land, 77 % was used for livestock production, while 23 % was used for plant production directly for consumption. This includes impacts not only for primary production, but also for other parts of the food chain such as processing, transports and storage. The occupation of areas in seas and oceans is a more complicated question since ecosystems exists in the whole volume of water from seafloor to surface. Hence the occupation and disruption of the seafloor is not equivalent to land use. Human activities do affect the seafloor, for example directly through bottom trawling. In Norway, only 3 % of the land area is used for agricultural purposes.

International agreements: Land Use is usually considered a domestic issue and thus normally not covered by international agreements. However, EU has made an action plan for strengthening biodiversity that mostly revolves around land conservation.

National and EU targets: The protection of agricultural soils has a high priority in Norway. Recently, the Government (Regjeringen.no) set a target that a maximum of 200 hectares of agricultural area should be converted to other purposes per year, a target that is to be met before 2030. In the EU, land use is linked to soil quality and to greenhouse gas emissions as soils and forests can capture (sequester) or emit CO_2. EU member states must compensate emissions from land use and forestry by an equal removal of CO_2 within the sector for 2021-2030 (https://www.consilium.europa.eu/en/infographics/fit-for-55-lulucf-land-use-land-use-change-and-forestry/).

Other: Vast areas of agricultural land have been degraded in recent decades, in many cases making them unfit for agriculture. Thus, an indicator on land use should consider not only occupation of agricultural land but also degradation of agricultural land.

Some of the impacts of land use is covered by other categories. One important example is land use change, which is the release of CO_2 that takes place when a biomass-rich ecosystem such as a forest, is replaced by a biomass-poor ecosystem such as cereal or grass production.

The LANCA method proposed by PEF as indicator for land use is a composite indicator specifically developed for soil quality assessment within LCA. It gathers five indicators to assess the impact of land use on soil quality: 1) erosion resistance, 2) physicochemical filtration, 3) groundwater regeneration, 4) mechanical filtration and 5) biotic production. The indicator is expressed in points (Pts).

6.1.12 Water use

Water use involves the human use of water from lakes, rivers or groundwater, which is not immediately released back into the same watershed in nature, with the result that the surroundings are deprived of water. It can also include rainwater and water that is released back into the ecosystems but with a reduced water quality.

Severity and extent: Water use is one of the impacts considered in the Planetary boundaries work done by EEA and FOEN and others. Their conclusion was that freshwater use was within the European share of global safe operating space. However, there are significant proportions of agricultural lands In Europe with soil moisture deficits (EEA, 2021).

Water is an extremely scarce resource in some regions of the world, while water supplies are plentiful in other regions. This means that the environmental impact caused by water use can be very different depending on the region in question.

The availability of water is normally very high in Norway. However, in the summer of 2018, there was large issues concerned with water availability in Norway and yields of several food and feed crops were very low.

Food system contribution: As shown in one study (Ritchie and Roser, 2021) a large part of the total water is used in food production. Agriculture is a major contributor to water scarcity, especially in Southern Europe (EEA, 2020).

Trend: The situation of soil moisture deficit has significantly worsened the last 20 years (EEA, 2021).

National and EU targets: The EU has the Water Framework Directive (WFD) which focuses on ensuring good qualitative and quantitative health, i.e. on reducing and removing pollution and on ensuring that there is enough water to support wildlife at the same time as human needs (https://environment.ec.europa.eu/topics/water/water-framework-directive_en).

Other: Water consumption can be divided into rainwater (green water), water from rivers and lakes (blue water) and water with degraded quality (grey water). The last category contains water not consumed but where the quality of the water has been degraded. Food production can consume large quantities of water. The method “Water Footprint” which sums up these three categories, has been used to calculate the impact of many food products. Examples are beef with a water footprint of more than 17 000 litres pr kg and oat meal with 2800 litres per kg (Grace, 2023). This method is used by one of the environmental schemes operating in Norway in combination with the “Overall basin risk score (OBRS) in the WWF tool “water risk filter”. The impact calculated is based on a combination of a national score and a product related score, while certain foods lie outside of the system and is awarded the same score, e.g. wild-caught seafood, venison, and wild berries get 1 point.

The AWARE method proposed here adjusts absolute water consumption with regionalized factors and it quantifies Available Water Remaining per unit area. The characterization factors vary between 0.1 and 100 and are measured in m3 world equivalent. This method is more adapted to the product level than the method, hence it is chosen for this purpose.

6.1.13 Phosphorus

Phosphorus is a very important scarce resource at risk of being depleted.

Severity and extent: P is a resource in limited supply when we consider the cheap and easily extracted P from mines. Of the imported P, 75 % comes from just one region: Morocco and Spanish Sahara, the latter country largely under occupation by Morocco. The deposits of cheap and easy extractable phosphorus are rapidly being depleted while reuse of the mineral only takes place at a small scale.

In general, the earth's crust contains large amounts of P not contained in these resources, but these are more expensive and complicated to extract. An obvious solution would be to reuse the P through use of human waste products to fertilize fields, but this use is very restricted because of risk of diseases and contamination with other constituents of wastewater sludge.

Food system contribution: The food system is the main user of P fertilizer. The sale of fertilizers in Norway was in 2018 to 2020 approximately 472 000 tonnes, of which the nutrients N, P and K comprised 150 000 tonnes (Mattilsynet, 2021). The amount of P was 8950 tonnes on average. The amount of some other nutrients was also considerable, approx. 15 600 tonnes of Sulphur, 4400 tonnes of Magnesium, while Boron use was 86 tonnes. The Phosphorus used in the manufacture of fertilizers come from phosphate rock which is mined and processed to phosphoric acid.

National and EU targets: In the context of the Green Deal, EU has set a target to reduce fertilizer consumption.

6.1.14 Specific categories for seafood

In addition to the categories mentioned above, the stakeholders added some categories they wanted to include (section 6.2.1). Based on discussions in the workshop (section 6.2.2), it was decided to proceed with the category "fishing methods" which is an expansion of the initial category "bottom trawling". Based on this, the researchers in WP3 made the decision to evaluate whether impacts in the primary production stage in the seafood sector are covered by the already selected categories.

Many of the impacts caused by activities in the seafood value chains are covered by the categories listed already. This includes climate gas emissions and other emissions connected to fuel use and toxic impacts related to release of delousing compounds. Indicators for biodiversity loss may or may not cover impacts in this sector. Impacts that disrupt ecosystems and may not be covered by biodiversity loss indicators include depletion of fish (and other species) stocks, ghostfishing and impact on seafloor of equipment, in particular bottom trawling. Escaped farmed fish is one example from aquaculture production. Escaped fish is a threat to wild salmon and sea trout. Norway has a special responsibility for the Atlantic salmon (Salmo salar), since about one fifth of the entire population is found in Norway. In 2013, quality norms were established for wild salmon stocks under the Nature Diversity Act (Norwegian Ministry of Climate and Environment, 2014).

It was not possible for the researchers, given restraints in time and resources to make a comprehensive evaluation of the severity and extent of the sustainability challenges caused by primary production of the seafood sector and whether these challenges were covered by the already existing categories. In addition, the researchers could not define a specific impact category that would encompass specific

for the seafood sector, hence it was concluded that the best way to proceed was to investigate whether the sustainability impacts would be covered by the existing indicators.

6.1.15 Stratospheric ozone depletion

Stratospheric ozone depletion (SOD) potential accounts for impacts related to the reduction of the protective ozone layer within the stratosphere caused by emissions of ozone depleting substances (CFCs, HFCs, and halons). The stratospheric ozone (O3) layer protects human beings and other organisms from hazardous ultraviolet radiation (UV-B). Its depletion increases skin cancer cases in humans and damage to plants.

Severity and extent: Ozone layer depletion increases the amount of UVB that reaches the Earth's surface. These wavelengths cause skin cancer, sunburn, permanent blindness, cataracts and genetic and immune system damage (Britannica, 2023). Recent quantitative risk estimates have been developed for cataract, melanoma, and all skin cancers combined. These estimates indicate that under the Montreal Adjustments, cataract and skin-cancer incidence will peak mid-century at additional incidences of just under 3 per 100,000 and about 7 per 100,000, respectively (Longstreth et al., 1998)

Trend: As a result of concerted international efforts, y 2005 the consumption of ozone-depleting chemicals controlled by the agreement had fallen by 90–95 percent in the countries that were parties to the protocol. In 2000, the ozone hole reached its maximum extent (28.4 million km²) since 1979 and has stopped increasing in size in subsequent years (EEA, 2023). In late September 2022, the Antarctic ozone hole reached its maximum area of 24.5 million km². Up until early November 2022, the Antarctic ozone hole has been similarly large and long-lasting to the ones recorded in 2021 and 2020 (ibid).

Food system contribution: The gases that are the major causes of SOD are CFCs and HCFCs in in freezing and cooling equipment, HCFCs and halons in fire extinguishers, CFCs and HCFCs in foam, CFCs and HCFCs as aerosol propellants and methyl bromide for the fumigation of soils. There is a lack of evidence concerning the contribution of food value chains to SOD, hence it might be inferred that the food sector is not a major contributor.

International agreements: The Montreal Protocol on substances that deplete the ozone layer was implemented in 1987.

National and EU targets: The EUs has put the Ozone Regulation in place to implement the Unions commitments from the Montreal Protocol. This regulation has also been adopted by Norway through its membership in the EEA (European Economic Area).

Other: The potential impacts of all relevant substances for ozone depletion are converted to their equivalent of kilograms of trichlorofluoromethane (also called Freon11 and R-11), hence the unit of measurement is in kilogram of CFC-11 equivalent (kg CFC-11 eq).

6.1.16 Radioactive emissions (ionizing radiation).

Ionizing radiation, which largely stems from radioactive compounds, is potentially very harmful to human beings and other organisms.

Severity and extent: Acute health effects such as skin burns or acute radiation syndrome can occur when doses of radiation exceed very high levels, whereas low doses of ionizing radiation can increase the risk of longer-term effects such as cancer. On the other hand, ionizing radiation has many beneficial applications in medicine, industry, agriculture and research (WHO, 2023). However, this also represents an occupational health risk for healthcare professionals.

The most important source of radioactive contamination is through background radiation, e.g. from cosmic rays. Medical use of radiation accounts for 98 % of the population dose contribution from all human-made sources and represents 20% of the total population exposure (ibid).

In Norway, it is estimated that 300 deaths from lung cancer each year are linked to radiation from Radon. The Radon comes from natural sources, and this is the case for most exposure to ionizing radiation in Norway (Miljødirektoratet, n. d.). Compared to radon and UV radiation, radioactive pollution has little effect on public health in Norway, but for some groups of people the contribution to their total exposure to ionizing radiation can be significant. This includes people who heat large amount of reindeer meat or other products (freshwater fish, mushrooms, berries) from areas that experienced large amounts of fallout from the Chernobyl accident (ibid).

Food system contribution: Occupational exposure to human-made sources is mostly restricted to certain sectors such as medical use of radiation, military uses and nuclear energy generation. The food sector does not appear to be a sector where such exposure is a problem. Exposure to background radiation is largely determined by geography, and thus not specifically linked to food (Miljødirektoratet, n. d.).

International agreements: There exists a number of international treaties (U.S.NRC, 2022) that have relevance to ionizing radiation, in particular treaties on Nuclear Safety and non-proliferation of nuclear weapons, but also on how to safely handle radioactive sources in general.

National and EU targets: The EU has implemented a number of measures to reduce exposure to radioactivity including monitoring of the environment. (European Commission, 2023b). In Norway the responsibility for monitoring over public exposure to dangerous radiation lies with the DSA (Norwegian Radiation and Nuclear Safety Authority).

6.2 Views on environmental impact from stakeholder involvement

In this section the inputs of stakeholders on the environmental categories in the form of a survey and workshop are summarized.

6.2.1 Survey on environmental categories

A survey was conducted in February 2023 where project partners were asked to evaluate a set of environmental categories (see chapter 2). The categories to be included have been chosen based on the PEF (Product Environmental Footprint) carried out by the European Commission.

The survey was distributed to 54 stakeholders and 35 responses were received: food and feed industries and organisations (16), farmers and workers organisations (4), authorities and county governors (7), consumer organisation (1), non-governmental organisations (NGO; 4) and university and research institutes (3). Each respondent was asked to answer as a representative of the organization or company, i.e., each answer represents a company and not an individual employee. In the survey, the respondents had to choose which of the environmental categories should be included based on relevance to measure the social sustainability of the food value chain, both for Norwegian and imported food products.

The results of the survey are summarized in Table 5. All the environmental categories that were included in the survey and that had an average score from respondents of 4 or more (4 - quite relevant, 5 - very relevant), were included i.e., it applies to climate change, water use, eutrophication (freshwater, marine, terrestrial), acidification, resource use, fossils, land use and ecotoxicity. In addition to these responses the respondents mentioned several other issues that they wanted to include but that was not included in the category list. These topics were biodiversity, animal welfare, chemicals, local food production, renewable resources and circularity as well as farming methods and topic specific to fishing.

Table 5. The questions included in the survey and the average score from respondents (very relevant (5), quite relevant (4), don't know (3), somewhat relevant (2) and not relevant (1) and standard deviation of the responses.

Questions	**Average score of the responses**	**Standard deviation of the scores**
How relevant is it to include the following categories in a food product score for social and environmental sustainability? *We do not want you to decide on whether the category can be easily measured, but rather emphasize whether it is considered important for measuring the environmental sustainability of the food. Think about all types of food when you answer the question, both food produced in Norway and abroad.*		
Climate Change	4.7	0.8
Water use	4.9	0.4
Particulate matter	2.6	1.6
Eutrophication (freshwater, marine, terrestrial)	4.9	0.4
Acidification	4.9	0.5
Resource use, fossils	4.8	0.8
Land Use	4.9	0.5
Ecotoxicity	4.8	0.7
Photochemical ozone formation	3.6	1.3

6.2.2 Workshop on environmental categories

The outcome of the workshop discussions in the groups and plenary were summarized to reflect the discussions but were not an expression of agreement within or between the groups. The discussions were focused on a few selected topics (see chapter 2). The results from the discussions on environmental topics are summarized below and WP3 researchers has made conclusion based on the discussions at the workshop. The conclusions are given below each topic in *italic*.

- Chemicals in food production:
  Chemicals use is important and must be quantified. This is especially important for chemicals that are harmful to the environment or health. However, it is not the use of chemicals that is important but the effect of their usage, e.g., ecotoxicity and human toxicity. Thus, there is no need for indicators quantifying the input of chemicals but rather the emissions. The chemicals should be specified. Examples relevant for Norwegian production include pesticides, lice removers, disinfectants, detergents, biocides, gas for good shelf life. Pesticides are important for maintaining food production. Should we then regard those production systems who do not use them? They have also been risk assessed and approved, but it is not certain that these assessments are good enough. The entire value chain must be considered as it is not only in the primary production that chemicals are used.
  Conclusion: The toxic impact of chemicals used in the value chain should be considered for inclusion. An indicator should be risk-oriented, thus taking into consideration the amount of chemicals/pesticides reaching recipients, not the amount applied.

- Bottom trawling
  Instead of "bottom trawling", the category should be "fishing methods". This fishing method can give negative impacts on biodiversity and should be included as a category. There are alternatives to this fishing method. However, the severity of the issues caused should be gauged. It is not clear if the effects are measurable.
  Conclusion: The negative impacts of fishing practices such as bottom trawling should be accounted for. This could be included by, e.g., introducing a category for fishing methods.

- Ghost fishing.
  This signifies the phenomenon where lost or discarded fishing equipment catch fish or other marine species. It is probably difficult to measure the impact of ghost fishing and even more difficult to relate it to the product level. This is an issue for the seafood industry might be better to handle through other means, e.g., through laws and regulations.
  Conclusion: Though ghost fishing is potentially a significant environmental issue, it is not recommended to include it as an indicator, rather other policy measures might be needed.

- Renewable resources and circularity.
  It is positive to include such aspects, however they are probably already covered by the LCA-categories. If they are not, we should introduce categories to represent these aspects. For example, the use of sewage sludge and residual materials ("green NPK") is important. This topic must be seen in relation with soil health, e.g., the carbon balance. Residual resources should go back to the soil. The indicators should encourage the use of renewable resources in the farms. Resource use is about using marginal resources in the best way for the best purpose.

Thus, the framework should encourage the optimal use of for example food waste. The term "renewable" must be more clearly defined before such a category is introduced.
Conclusion: Renewable resources and circularity are important aspects which should be considered when choosing categories and indicators.

- Organic production.
  This issue could be covered by the other categories already proposed, such as animal welfare. In general, a more neutral term such as "farming methods" should be used, referring to the discussion on bottom trawling (above). Organic farming is a static framework not considering improvements. If we include an indicator for organic farming, there is a risk for double counting. Soil health is an important topic, e.g., the right soil for the right product, maintenance of soils and loss of renewable resources in the soil. This must be handled with the indicators chosen.
  Conclusion: The framework should be designed so that differences in environmental impact between organic and conventional agriculture are captured.

- Local food production
  This is an issue which both relates to social and environmental sustainability. If this shall be a category the term must be defined. If it signifies the distance from production to consumer, then some producers in Sweden will be more local than some Norwegian producers, thus using national borders as a basis would not be right. For the meat and milk producers, it is important that the feed comes from Norway or at least using production methods similar to Norway. It is uncertain how a category like this could function in food labelling framework.
  Conclusion: Local food production is probably not a good indicator to include in the framework. It is preferable to design the system to capture the effects of local production, e.g., climate effect of smaller transportation distance.

- Other topics
  - Small-scale farmers and fishermen who lack capital are unable to invest in new technology, which can lead to lower sustainability. On the other hand, small-scale agriculture and food production can be considered more sustainable than large-scale and industrial production because the resources and area can be used more efficiently and that can safeguard species diversity to a greater extent.
  - Animal welfare is a social category and animal health is proposed as an environmental category.
  - Some topics are not on the product level but on an overarching level and should thus not be included in this framework. They can, e.g., be included in guidance documents for procurers.

  Animal welfare is both a social and environmental issue. The use of antibiotics is an example of an environmental issue connected to animal welfare. There is a lot of data on the use of antibiotics in animal husbandry.

6.3 Summary of review on environmental categories

Based on the considerations mentioned in previous sections, a summary is made, see Table 6. As there are no absolute criteria for several of the categories used, e.g. severity and extent of the issue, the evaluations given in the table are only indicative of the scale and should not be seen as absolute and quantified judgements. The criteria given in the table form only a part of the background information that is relevant when choosing which categories to include.

Table 6. Summary of evaluation of environmental categories.

Category	Severity and extent of issue	Connection to food value chain	Trend in Europe	National and EU prioritisation	Partners and other interested partners prioritisation
Climate change	Very high	Relatively strong (25 %)	Increasing	High	High (4,6 out of 5)
Eutrophication	High	Very strong (59 %)	Decreasing	Medium	High (4,9 out of 5)
Acidification (terrestrial)	Low/medium	Relatively strong (35 %)	Decreasing	Medium	High (4,8 out of 5)
Biodiversity loss	Very high	Very strong (> 90 %)	Increasing	High	Not asked
Local air pollution	High/medium	Not known, assumed weak	Decreasing	High	Medium (2,5 out of 5)
Toxic impacts, ecotoxicity	High	Not known, assumed weak	Decreasing	High	High (4,6 out of 5)
Photochemical oxidants	High	Not known,	Not known	Medium/ High.	Relatively high (3,5 out of 5)
Waste	Medium	Not known, assumed weak	Decreasing	High	Not asked
Energy use	High	Relatively high (30 %)	Increasing	High	Not asked
Fossil resource use	Very high	Medium (approx. 18 %)	Decreasing	High	High (4,7 out of 5)
Land use	High	High (globally 45 %)	Increasing, globally	Medium/ High	High (4,8 out of 5)
Water use	Medium/ High	Very strong (70 % globally, 40 % in many OECD countries)	Decreasing in OECD-countries.	High /medium	High (4,9 out of 5)
Phosphorus use	Medium/ High	Very strong	In EU slow increase since 2010	Low	Not asked
Atmospheric ozone layer destruction	Low/medium	Weak	Decreasing.	Low	Not asked

Category	Severity and extent of issue	Connection to food value chain	Trend in Europe	National and EU prioritisation	Partners and other interested partners prioritisation
Ionizing radiation	Low	Weak	Decreasing	Low	Not asked
Animal health	In Europe, the use of antibiotics is high				
Fishing method	Not quantified				

7 Social categories for the food value chain

7.1 Description of social categories

The descriptions of the categories in the following sections are based on excerpts from the methodological sheets for S-LCA (UNEP, 2021) and experiences from the work with social categories during the project. For the survey on social categories (section 7.3.1) the wording of the category name was adapted to Norwegian conditions to make it as specific and understandable as possible. Therefore, some of the category names deviate somewhat from the methodology sheet in the S-LCA guidelines (UNEP, 2021). In addition, some categories were added based on the responses from the survey and descriptions based on discussions at the workshop and other literature on the topic. All categories are organized into stakeholder groups according to S-LCA guidelines (UNEP, 2020). That the categories in this project are also chosen according to the participatory approach recommended in the UNEP guidelines.

7.1.1 Freedom of association and collective bargaining (stakeholder group: worker)

This category is defined as all workers and employers right to establish and to join organizations of their choice, without prior authorization, to promote and defend their respective interests, and to negotiate collectively with other parties. They should be able to do this freely, without interference by other parties or the state, and should not be discriminated against because of union membership. The category can be measured by several indicators e.g., collective bargaining coverage rate, trade union density rate, SDG 8 Fundamental labour rights and ITUC (International Trade Union Confederation) Global Rights Index or the Countries' Risk Classification (amfori BSCI).

7.1.2 Child labour (stakeholder group: worker)

The term "child labour" is often defined as work that deprives children of their childhood, their potential, and their dignity, and that is harmful to physical and mental development. Child working constitutes child labour if the child is below the age of 15 years. Moreover, children below the general minimum age (between the ages of 13 to 15 years old) may do light work, if it is not likely to be harmful to their health, safety, or development and is not impeding school.

7.1.3 Fair salary (stakeholder group: worker)

Fair wage means a wage fairly and reasonably commensurate with the value of a particular service or class of service rendered, and in establishing a minimum fair wage for such service or class of service. Codes of conduct which deal with wages and benefits have focused on three standards when assessing level of wages: the minimum wage required by law; the local „prevailing industry wage"; the „living wage".

7.1.4 Working hours in accordance with current regulations (stakeholder group: worker)

The hours of work comply with applicable laws and industry standards. Workers are not on a regular basis required to work more than 48 hours per week and have at least one day off for every 7-day period. Overtime is voluntary, does not exceed 12 hours per week, is not demanded on a regular basis, and is compensated at a premium rate.

7.1.5 Forced labour (stakeholder group: worker)

Forced or compulsory labour is any work or service that is exacted from any person under the menace of any penalty, and for which that person has not offered himself or herself voluntarily. Providing wages or other compensation to a worker does not necessarily indicate that the labour is not forced or compulsory. By right, labour should be offered voluntarily, and workers should be free to leave the employment at any time in accordance with established rules.

7.1.6 Equal opportunities and discrimination (stakeholder group: worker)

Everyone has the right to be treated fairly and access to equal opportunities. Equal opportunity or the principle of non-discrimination emphasizes that opportunities in education, employment, advancement, benefits and resource distribution, and other areas should be freely available to all people irrespective of their age, race, sex, religion, political association, ethnic origin, or any other individual or group characteristic unrelated to ability, performance, and qualification.

7.1.7 Health and safety for workers (stakeholder group: worker)

All workers have the right to a safe and healthy workplace. The International Labour Organization (ILO) and the World Health Organization (WHO) have a common definition of occupational health: „Occupational health should aim at: the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations; the prevention amongst workers of departures from health caused by their working conditions; the protection of workers in their employment from risks resulting from factors adverse to health; the placing and maintenance of the worker in an occupational environment adapted to his physiological and psychological capabilities; and, to summarize, the adaptation of work to man and of each man to his job.“

The term health, in relation to work, indicates not merely the absence of disease or infirmity; it also includes the Physical and mental elements affecting health, which are directly related to safety and hygiene at work.

7.1.8 Social benefits and social security (stakeholder group: worker)

Social benefits refer to non-monetary employment compensation which are typically offered to full-time workers but may not be provided to other classes of workers (e.g., part-time, home workers, contractual). Social security, as an important component of social protection, encompasses a narrower set of benefits and compensatory government schemes, such as social insurance and social assistance.

7.1.9 Employment relationship (stakeholder group: worker)

The aim of the assessment is both to verify whether there is a formal contract protecting the workers and legally defining their relationship with the employers and defining the level of protection afforded by the contract. ILO defines employment relationship as the legal link between employers and employees.

7.1.10 Sexual harassment (stakeholder group: worker)

Sexual harassment is sex-based behavior that is unwelcome and offensive to its recipient. This category assesses whether an organization might create or tolerate working conditions in which sexual harassment occurs, and to what extent company actions are successful in preventing sexual harassment.

7.1.11 Conditions for farmers, fishermen and small businesses (stakeholder group: worker)

The definition includes small companies or enterprises, not only “small-scale agriculture” or “family farm”. Small enterprise are privately owned corporations, partnerships, or sole proprietorships which have fewer employees and/ or less annual revenue than a regular-sized business or corporation. The assessment aims at capturing the peculiarities of smallholders including farmers and fishermen, especially regarding the endowment of factors of production, the role played by the family, the relationships with the market, and the economic size of the smallholders, focusing in particular on aspects related to work.

7.1.12 Mental health (stakeholder group: worker)

This category is added based on responses from the survey and is not recognized by the S-LCA guidelines (UNEP, 2020) . Mental health is already included in the “health and safety” according to the description of this category but is highlighted by establishing this as a separate category. However, it is important to avoid double counting.

7.1.13 Cultural heritage (stakeholder group: local community)

Cultural heritage includes language, social and religious practices, knowledge and traditional craftsmanship, as well as cultural spaces and objects (e.g. burial grounds; natural, built and archaeological sites; historic cities, etc.). International human rights conventions secure the rights of individuals to preserve their cultural heritage. This category assesses whether an organization respects local cultural heritage and recognizes that all community members have a right to pursue their cultural development.

7.1.14 Safe and secure living conditions (stakeholder group: local community)

With regard to general safety, operations can impact community safety through equipment accidents or structural failures. Project-related land use changes can also lead to natural disasters, such as landslides. Disease may spread as a result of business-related land use changes, for example when poor water drainage contributes to the spread of malaria. This category assesses how organizations impact community safety and health. This includes the general safety conditions of operations and their public health impacts.

7.1.15 Respect for the rights of indigenous peoples (stakeholder group: local community)

Respect of indigenous rights includes the right to lands, resources, cultural integrity, self-determination, and self-government. Historically, states have denied many indigenous populations these rights. This category assesses organizational respect for the rights of indigenous peoples, as a group or as individuals.

7.1.16 Local employment (stakeholder group: local community)

Local hiring preferences provide important income and training opportunities to community members. Organizations that develop relationships with locally-based suppliers will further encourage local employment and development. This category assesses the role of an organization in directly or indirectly affecting local employment.

7.1.17 Public commitments to sustainability issues (stakeholder group: society)

A public commitment is a promise or agreement made by an organization, or a group of organizations, to its customers, employees, shareholders, local community, or the general public whose fulfilment can be evidenced in a transparent and open way. Typically, this will take the form of performance improvement targets with defined dates for achievement and public reporting of progress. This category assesses to what extent an organization is engaged in reducing its sustainability impacts. Public promises entail a higher binding character than internal goals. Official and public commitments or declarations are examples of measures which will be accounted for in the assessment.

7.1.18 Corruption (stakeholder group: society)

Corruption is the misuse of power for personal advantages. Different types of corruption exist, including bribery, embezzlement, theft and fraud, extortion, abuse of discretion, favoritism, nepotism and clientelism, conduct creating or exploiting interests, and improper political contributions. This category assesses whether an organization has implemented appropriate measures to prevent corruption and if there is evidence that it has engaged or has been engaged in corruption.

The indicator at country level can be assessed by the Corruption Perceptions Index or Countries' Risk Classification (amfori BSCI).

7.1.19 Animal welfare (stakeholder group: society)

This category was renamed from the original name 'Ethical treatment of animals' in the S-LCA guidelines (UNEP, 2020). The category focuses on the well-being and/or welfare of animals that are affected by product systems and/or organizations' behavior. Based on the current product systems and/or organizations' behaviors, the primary focus, but not limited to, is to start with the prevention of abusive treatment of animals and consider improved practices in decision-making and policies in accordance with animals' natures. This relates to the fundamental animals' needs in accordance with their nature and natural behavior. The ethical treatment of animals is closely linked to animal welfare. According to The World Organisation for Animal Health, animal welfare "means the physical and mental state of an animal in relation to the conditions in which it lives and dies".

This category can have several indicators. Stocking density and mortality is suggested as indicators for all animal species. For dairy cattle there are no requirements for stocking density and therefore the share of dairy cows on pasture and loose housing is suggested.

Animal welfare is included in a business food sustainability declaration scheme, using the animal protection index and sales of veterinary antimicrobial agents for food producing animals. The animal protection index has limited scope and Norway is not included. The sales and use of veterinary antimicrobial agents for food producing animal as an indicator has some disadvantages. Antimicrobial agents are a necessity for the treatment of sick animals as an important part of animal welfare. Antibiotics was also earlier used preventively to decrease the negative effects on production level of a bad environment, but this is now prohibited in the EU. It is therefore no longer relevant as an indicator for animal welfare.

7.1.20 Poverty alleviation (stakeholder group: society)

Poverty is a multidimensional phenomenon caused by the lack of opportunity, education, health, and security – and the malnutrition of people. A poor person has minimal opportunities to make an income and sustain the household 's primary needs, living in precarious conditions, with precarious health conditions and at risk of unemployment. Thus, not being able to be properly nourished, clothed, have an adequate abode, and be part of a community indicate poverty.

7.1.21 Food security (stakeholder group: society)

This category is added based on responses from the survey and is not recognized by the S-LCA guidelines (UNEP, 2020). According to FAO (2006), food security is a term that includes food availability, access, utilization and stability, and is currently missing in the S-LCA methodology but has relevant socio-economic aspect for the sustainability of food systems. Food security is vital for developing countries experiencing food shortages and emergencies. However, it is not only about food emergency but also stable food supply in developed countries, especially in times of crisis. Self-sufficiency was assumed belonging to the same topic as food security, in terms of how a food product is contributing to the production country's resilience regarding availability of food. Or contrary, whether a food item contributes to food insecurity in the origin country. The self-sufficiency ratio is the ratio of domestic production to domestic consumption (FAO, 2012), but the method needs to be further discussed in the project.

7.1.22 Fair competition (stakeholder group: value chain actors)

Anti-competitive behavior: Actions of the reporting organization and/or employees that may result in collusion with potential competitors to fix prices, coordinate bids, create market or output restrictions, impose geographic quotas, or allocate customers, suppliers, geographic areas, and product lines with the purpose of limiting the effects of market competition. This category assesses if the organization's competitive activities are conducted in a fair way and in compliance with legislations preventing anti-competitive behavior, anti-trust, or monopoly practices.

7.1.23 Promoting social responsibility (stakeholder group: value chain actors)

Social responsibility (SR) is an organization's obligation to consider the interests of their stakeholders as customers, employees, shareholders, or communities. By integrating SR into core business processes and stakeholder management, organizations can achieve the ultimate goal of creating both social and corporate value (shared value). This category seeks to assess whether the enterprise promotes social responsibility among its suppliers and through its own actions. This measure considers whether the enterprise manages its suppliers in a socially responsible way, including monitoring, auditing, and training efforts. This category also examines whether enterprises take corrective action towards suppliers when warranted.

7.1.24 Supplier relationship (stakeholder group: value chain actors)

Supplier relationships are defined as affiliations with organizations that supply another organization with goods and services. The supplier relationships also concern all mutual activities, co-operations, agreements that regulate the exchanges, trade, and relation among organizations, bearing in mind that every organization in the value chain is responsible for complying with applicable laws and regulations. Procurement practices have strong impacts on the supply chains, driving behaviors. An organization should consider the potential impacts or unintended consequences of its procurement and purchasing decisions on other organizations, and act with due diligence to avoid or minimize any negative impact.

7.1.25 Distribution of income between suppliers and grocery trade (stakeholder group: value chain actors)

This category was renamed from the original name 'wealth distribution' in the S-LCA guidelines (UNEP, 2020). The category focuses on how the value is distributed among all the actors of the value chain. An equal distribution is obtained when a fair selling price for a product or service is established, i.e., when the price is such that it covers all the production costs, and everyone returns an acceptable profit margin. The existence of contractual agreements at sector/ cluster level, which safeguard the negotiation power of the weakest actors, support the establishment of fair-trading conditions and thus of an equitable value distribution. The aim of the assessment is to evaluate the extent to which the value is distributed in an equitable way to all the actors of the value chain.

7.2 Social hotspot

A social hotspot analysis in the Social Hotspot Database (Benoit Norris et al., 2019) was carried out to identify the categories with the highest social risk. An impact assessment for the product groups that are available in the database was compiled, i.e. dairy products, meat products, vegetables, fruit, nuts, sugar, rice, fishing, cereal and grains, see Table 7. The risk (mrheq – medium risk hours equivalents) for each product was used to calculate the percentage of contributions from the categories for each product. The average percentage for the products was used to set a score for each category, see Table 7. The categories in the S-LCA guidelines and social hotspot database are not the same, but many of them include the same themes. Categories in the social hotspot database are therefore linked as best as possible to the categories in S-LCA, but it was not possible to include them all. The social categories and their relevance according to the survey and hotspot analysis are shown in Table 8.

Table 7 Results from social hotspot analysis, the percentage of contributions from the categories for each product, the average percentage and the score of the hotspot analysis, the score 1 for x<1%, score 2 for 1%≤x<2%, score 3 for 2%≤x<3%, score 4 for x>3%

	Dairy products	Meat products	Vegetables, fruit, nuts	Sugar	Rice	Fishing	Cereal and grains	Average % of contributions	Hotspot score
1A Wage assessment	3.7 %	3.3 %	3.9 %	4.7 %	3.2 %	3.0 %	4.1 %	3.7 %	4
1C Workers in poverty	4.1 %	4.5 %	3.9 %	4.4 %	4.7 %	4.4 %	3.7 %	4.2 %	4
1D Child Labor	3.2 %	3.8 %	2.7 %	4.1 %	4.2 %	3.6 %	2.3 %	3.4 %	4
1E Forced Labor	5.1 %	5.0 %	5.1 %	5.5 %	5.1 %	4.9 %	5.1 %	5.1 %	4
1F Excessive Working Time	4.9 %	4.0 %	5.4 %	3.6 %	3.6 %	4.7 %	6.0 %	4.6 %	4
1G Freedom of Assoc	3.2 %	3.1 %	3.5 %	3.3 %	2.9 %	3.2 %	3.6 %	3.3 %	4
1H Migrant Labor	2.9 %	3.8 %	2.8 %	2.8 %	4.0 %	3.2 %	2.4 %	3.1 %	4
1I Social Benefits	2.1 %	1.4 %	2.2 %	1.7 %	1.1 %	1.9 %	2.6 %	1.8 %	2
1J Labor Laws/Convs	0.9 %	0.8 %	1.0 %	0.6 %	0.6 %	0.8 %	1.2 %	0.8 %	1
1K Discrimination	4.6 %	4.3 %	4.5 %	4.8 %	4.4 %	4.5 %	4.4 %	4.5 %	4
1L Unemployment	3.8 %	4.1 %	3.8 %	3.5 %	4.1 %	4.1 %	3.6 %	3.8 %	4
2A Occ Tox & Haz	5.6 %	5.4 %	5.9 %	5.4 %	5.1 %	5.7 %	6.0 %	5.6 %	4
2B Injuries & Fatalities	6.9 %	6.2 %	7.0 %	5.7 %	5.8 %	6.6 %	7.5 %	6.5 %	4
3A Indigenous Rights	1.6 %	2.3 %	1.1 %	2.4 %	2.4 %	1.7 %	1.1 %	1.8 %	2
3B Gender Equity	1.9 %	2.0 %	1.9 %	2.8 %	2.3 %	1.9 %	1.7 %	2.1 %	3
3C High Conflict Zones	2.6 %	3.0 %	2.5 %	3.4 %	3.0 %	2.5 %	2.4 %	2.8 %	3
3D Non-Communicable Diseases	0.6 %	0.6 %	0.6 %	0.6 %	0.7 %	0.6 %	0.6 %	0.6 %	1
3E Communicable Diseases	2.7 %	2.5 %	2.6 %	2.5 %	2.5 %	2.8 %	2.7 %	2.6 %	3
3F Poverty and inequality	4.6 %	3.6 %	4.9 %	4.3 %	3.4 %	4.5 %	5.4 %	4.4 %	4
3G State of Env Sustainability	4.4 %	4.8 %	4.4 %	4.5 %	4.9 %	4.6 %	4.2 %	4.5 %	4
4A Legal System	3.0 %	3.2 %	3.3 %	3.5 %	3.2 %	2.8 %	3.3 %	3.2 %	4
4B Corruption	1.7 %	1.7 %	1.8 %	2.1 %	1.9 %	1.7 %	1.6 %	1.8 %	2
4C Democracy &Freedom of Speech	4.0 %	4.1 %	4.3 %	3.9 %	3.9 %	3.5 %	4.6 %	4.0 %	4
5A Access to Drinking Water	3.5 %	4.1 %	2.8 %	3.0 %	4.3 %	3.9 %	2.4 %	3.4 %	4
5B Access to Sanitation	3.9 %	4.3 %	3.8 %	3.5 %	4.3 %	4.2 %	3.6 %	3.9 %	4
5C Children out of School	3.1 %	3.1 %	3.1 %	3.1 %	3.1 %	3.2 %	3.1 %	3.1 %	4
5D Access to Hospital Beds	3.3 %	3.2 %	3.1 %	3.7 %	3.3 %	3.4 %	3.2 %	3.3 %	4
5E Smallholder v Commercial Farms	1.1 %	1.7 %	0.7 %	2.1 %	1.7 %	1.1 %	0.7 %	1.3 %	2
5F Access to Electricity	1.9 %	1.5 %	2.2 %	1.0 %	1.4 %	2.1 %	2.2 %	1.8 %	2
5G Property rights	4.9 %	4.7 %	4.9 %	3.6 %	4.5 %	5.2 %	5.0 %	4.7 %	4

7.3 Views on social impact from stakeholder involvement

7.3.1 Survey on social categories

The guidelines for social life cycle assessment (S-LCA) (UNEP, 2020) were used as a starting point to explore which categories were the most relevant to include. Other important frameworks as SAFA guidelines (Sustainability assessment of food and agriculture systems) developed by FAO (2014), and the Farmers' Association's sustainability strategy - Bondelagets bærekraftsstrategi (Bondelaget, 2021) were also reviewed to ensure that all important aspects were included.

The S-LCA framework from UNEP applies participatory approaches in which actors participate and contribute to the study or scientific process and that allows the perspective of different actors involved in the food supply chain to be considered. Moreover, it increases the legitimacy of the assessment. The social categories comprise socially significant themes or attributes and are linked to the following stakeholder groups: Workers; Local community; Society; Value chain actors; Consumers; Children. Several indicators may be used to assess each of the categories. In the S-LCA guidelines the terminology sub-category is used. For consistent terminology, we use 'categories' meaning the same as 'sub-category' in the S-LCA guidelines.

The survey was sent to 54 companies and organisations and 25 responses were received (see chapter 2). Each respondent was asked to answer as a representative of the organization or company, i.e., each answer represents a company and not an individual employee. In the survey, the respondents had to choose which of the social categories should be included based on relevance to measure the social sustainability of the food value chain, both for Norwegian and imported food products.

The categories the respondents should assess were based on UNEP guidelines (UNEP, 2020, 2021), but the wording was translated and adapted to Norwegian conditions to make it as concrete and understandable as possible. For the same reason, the categories 'safe and healthy living conditions' and 'secure living conditions' were combined, so that there were a total of 39 categories to assess in the survey.

The response options were given a numerical value; not relevant - score 1, slightly relevant score - 2, quite relevant - score 3 and very relevant score - 4. The categories with a final average score above 3 (quite relevant or very relevant) were further included in the study, see Table 8.

The survey made it possible for the respondents to add categories that they thought were missing in the UNEP guidelines. The following categories were suggested in the survey regarding social sustainability: mental health for farmers, food security, self-sufficiency, food sovereignty, market access and solidarity.

7.3.2 Workshop on social categories

The outcome of the workshop discussions (see chapter 2) in the groups and plenary were summarized aiming to reflect the discussions and different points of view within or between the groups but not as a consensus from the discussions.

Mental health for farmers was not discussed because this was a category that was considered relevant without further discussion and is described in literature (Fremstad, 2023). The following is a summary of the

social categories added from the survey. The results from the discussions on social topics are summarized below and WP3 researchers has made conclusion based on the discussions at the workshop. The conclusions are given below each topic in *italic*.

- Food security and self-sufficiency were discussed together because it is within the same topic but has different wording. The main impression from the discussions is that is difficult to take in as a category, because it is difficult to find a good indicator at product level. Food security does not necessarily mean that the product is produced in Norway, for what will happen if production fails in Norway? It was also discussed what can be defined as Norwegian products. Is it Norwegian if it is based on imported inputs? If it is a criterion that, e.g., the feed must be Norwegian produced, that means more cattle and sheep and less chicken and pigs, because the latter are to some extent based on imported feed.
  Conclusion: Food security is included in the further work

- Food sovereignty is a more general political level. For food-exporting countries, especially developing countries, there may be a risk of exports being prioritized over food for the own population. Coffee and tea are examples of products that do not promote local food production. The goal must be to produce sufficient food that is available for everyone and that farmers have power over own products. When a Norwegian company imports from business in countries with poverty and a high risk of violations of human rights, the use of long-term agreements can ensure financial stability for the food producers.
  Conclusion: Food sovereignty belongs at a political level and are partly included food security, and therefore not included as an own category

- Market access is difficult to include at product level. This deals e.g. about small-scale producers who do not have market access to grocery shops. This topic is already included in the S-LCA guidelines in the category '*supplier relations and conditions for deliveries'* in the stakeholder group value chain actors.
  Conclusion: Market access is already included in the category supplier relationship

- Solidarity can in an international agricultural and food supply context, be described as producing as much as possible on our own land and our own resources and not to take up land in other countries that is needed for their own food production.
  Conclusion: Solidarity was considered as belonging to food security, and not included directly in this assessment.

- Other aspects were also discussed, without it being clear whether it belonged to the environmental or social theme. One of the discussions was whether small scale production is sustainable or not. Small-scale farmers and fishermen who lack capital are unable to invest in new technology, which can lead to lower sustainability. On the other hand, small-scale agriculture and food production can be more sustainable than large-scale and industrial production because the production is based on available resources. Therefore, for example, area can be used more efficiently, and this will safeguard biodiversity to a greater extent. It was also discussed whether animal welfare is a social category. Animal health was proposed as an environmental category.

7.4 Summary of assessment of social categories

This section contains a description of the selected categories, based on the social hotspot, survey and workshop discussions. The categories that had similar content in the social hotspot analysis were linked to the categories in S-LCA. For the final selection, the average of the survey results and the score from the hotspot analysis was used. Categories with a total score of 3 and above are included for further testing in the next phase of the project, see Table 8.

Table 8 Social categories and the relevance according to the survey and hotspot analysis. The number and letter behind the categories are referring to the categories in the social hotspot database (SHDB). Categories which have an average score below 3 are not included further and are marked with grey text. Score scale (very relevant (4), quite relevant (3), somewhat relevant (2) and not relevant (1.) N/A not available because the category was not included in the SHDB.

Stakeholder groups	Category	Score survey	Score hotspot	Average score
Workers	Freedom of association and collective bargaining 1G	3.6	4	3.8
	Child labour 1D	3.8	4	3.9
	Fair salary 1A	3.8	4	3.9
	Working hours in accordance with current regulations 1F	3.6	4	3.8
	Forced labour 1E	3.8	4	3.9
	Equal opportunities and discrimination 1K	3.5	4	3.8
	Health and safety 2A, 2B	3.9	4	4.0
	Social benefits and social security 1I	3.5	2	2.8
	Employment relationship and contract 1J	3.6	1	2.3
	Sexual harassment	3.6	N/A	3.6
	Conditions for farmers, fishermen and small business 5G	3.5	4	3.8
	Mental health	Added	N/A	
Local community	Access to material resources 5A	2.8	4	3.4
	Access to community services such as health services and education 5B	2.8	4	3.4
	Migration of jobseekers 1H	2.4	4	3.2
	Cultural heritage	3	N/A	3.0
	Safe and secure living conditions 3E	3.5	3	3.3
	Respect for the rights of indigenous peoples 3A	3.6	2	2.8
	Community engagement	2.9	N/A	2.9
	Local employment 1L	3.3	4	3.7
Society	Public commitments to sustainability issues 3G	3.2	4	3.6
	Contribution to economic development	2.8	N/A	2.8
	Prevention and mitigation of armed conflicts 3C	2.7	3	2.9
	Technology development	2.1	N/A	2.1
	Corruption 4B	3.6	2	2.8
	Animal welfare	3.7	N/A	3.7

Stakeholder groups	Category	Score survey	Score hotspot	Average score
	Poverty alleviation 3F	3.3	4	3.7
	Food security	Added	N/A	
Value chain actors	Fair competition	3.2	N/A	3.2
	Promoting social responsibility 1C	3.1	4	3.6
	Supplier relations and conditions for deliveries	3.2	N/A	3.2
	Respect for intellectual property rights	2.8	N/A	2.8
	Distribution of income between suppliers and grocery trade	3.2	N/A	3.2
Consumers	Health and safety	3.3	N/A	3.3
	Consumer satisfaction	2.3	N/A	2.3
	Consumer privacy	2.9	N/A	2.9
	Transparency about working conditions and sustainability	3.8	N/A	3.8
	End-of-life responsibility	3.4	N/A	3.4
Children	Children's right to education 5C	2.8	4	3.4
	Children's right to healthcare 5D	2.9	4	3.5
	Marketing aimed at children	3.2	N/A	3.2

In the consultation process it became clear that the stakeholder groups “consumers” and “children” are outside the system boundaries and therefore the categories in these stakeholder groups, are not included in the proposed categories.

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Appendix 1 Survey on social categories

NewTools og sosial bærekraft

NewTools skal utvikle to skåringssystemer om matens ernæringsmessige kvalitet og sosiale- og miljømessige bærekraft. Denne undersøkelsen handler om sosial bærekraft. Dere har fått denne henvendelsen fordi dere representerer en aktør eller en interesseorganisasjon knyttet til matens verdikjede. Vi ønsker innspill på hva som bør inkluderes i sosial bærekraft for matproduksjon.

Det er ulike problemstillinger for sosial bærekraft, avhengig av hvilket ledd i matens verdikjede som vurderes. Verdikjeden er delt inn i arbeidstakere og bønder, verdikjedeaktører (eks. grossister og dagligvarehandel), forbrukere, lokalsamfunn og samfunn. For hvert ledd er det laget forslag til kategorier for vurdering av sosial bærekraft, basert på Guidelines for social LCA (FN), Sustainability Assessment of Food and Agriculture systems (FAO) og Bondelagets bærekraftstrategi. Vi ønsker innspill på hva som er de mest relevante for matens verdikjede, både for norske og utenlandske matvarer. Det er også mulig å legge til kategorier hvis dere synes det mangler noe. Resultatene fra denne undersøkelsen vil bli tatt med i det videre arbeidet med å utforme skår for sosial bærekraft. Undersøkelsen sendes til alle partnere i NewTools-prosjektet og vil også bli sendt til aktører i matsystemet som ikke er med i prosjektet, for et bredt tilfang av innspill.

Det vil ikke bli publisert hva den enkelte partner har svart, men svarene vil bli aggregert for hver sektor. Dere svarer på vegne av deres organisasjon, ikke som enkeltperson. Vi ønsker ikke mer enn ett svar fra hver organisasjon, men flere i organisasjonen kan involveres ved f.eks. å svare på spørreundersøkelsen på et felles møte.

Det tar ca. 15 - 20 min å svare på denne spørreundersøkelsen og fristen er den **3. november 2022**. Du kan lese mer om NewTools her https://www.fhi.no/studier/newtools/.

Trenger du hjelp til å utfylle spørreskjema kan du kontakte Hanne Møller, epost: ham@norsus.no.

Samtykkeerklæring

Jeg har mottatt og forstått informasjon om spørreundersøkelsen og har fått mulighet til å stille spørsmål. Ved å utfylle og innsende spørreskjemaet, samtykker jeg til å delta i spørreundersøkelsen og jeg samtykker til at min e-postadresse brukes frem til spørreundersøkelsen er avsluttet og NORSUS har analysert svarene, senes 31. januar 2023.

Hva er din epost adresse?

_____

Arbeidstakere

Hvor relevant er det å inkludere følgende kategorier for arbeidstakere i en skår for matvarer for sosial- og miljømessig bærekraft?

Vi ønsker ikke at du skal ta stilling til hvorvidt kategorien lett kan måles, men heller vektlegge hvorvidt den anses som **viktig** for å måle matens sosiale bærekraft. Tenk på alle typer matvarer når du svarer på spørsmålet, både mat produsert i Norge og i utlandet. Arbeidstakere kan være langs hele matens verdikjede og inkluderer ansatte i primærproduksjon og matindustrien. Bønder og små bedrifter er inkludert som en egen kategori under arbeidstakere. Kategoriene er nærmere beskrevet under skjemaet på denne siden.

	Ikke relevant	Litt relevant	Ganske relevant	Meget relevant
Rett til organisering i fagforening	❍	❍	❍	❍
Barnearbeid	❍	❍	❍	❍
Rettferdig lønn i forhold til verdien av arbeidet som utføres	❍	❍	❍	❍
Arbeidstid i samsvar med gjeldende regler	❍	❍	❍	❍
Tvangsarbeid	❍	❍	❍	❍
Like muligheter / diskriminering	❍	❍	❍	❍
Helse og sikkerhet	❍	❍	❍	❍
Sosiale ytelser og trygd	❍	❍	❍	❍
Arbeidsforhold og kontrakt som fastsetter lønn, arbeidstid, ferie og fratredelsesvilkår	❍	❍	❍	❍
Seksuell trakassering	❍	❍	❍	❍
Vilkår for bønder og små bedrifter	❍	❍	❍	❍

Er det en eller flere kategorier du ønsker å legge til? _____

Beskrivelse av kategoriene:

Rett til organisering i fagforening

Alle arbeidstakere og arbeidsgivere kan etablere og slutte seg til organisasjoner etter eget valg, uten forutgående autorisasjon, for å fremme og forsvare deres respektive interesser, og for å forhandle kollektivt med andre parter. De gjør dette fritt, uten innblanding fra andre parter eller staten, og diskrimineres ikke på grunn av fagforeningsmedlemskap.

Barnearbeid

Begrepet «barnearbeid» defineres ofte som arbeid som frarøver barn deres barndom, deres potensiale og deres verdighet, og som er skadelig for fysisk og mental utvikling. Det refererer til arbeid som er: mentalt, fysisk, sosialt eller moralsk farlig og skadelig for barn; fratar barn muligheten til å gå på skolen; arbeid som forplikter barn til å forlate skolen for tidlig; eller arbeid som krever at barn prøver å kombinere skolegang med altfor langt og tungt arbeid. I sine mest ekstreme former innebærer barnearbeid at barn blir slaver, separert fra familiene sine, utsatt for alvorlige farer og sykdommer og/eller overlatt til seg selv på gatene i store byer – ofte i en veldig tidlig alder.

Rettferdig lønn i forhold til verdien av arbeidet som utføres

Rettferdig lønn betyr en lønn som er rimelig i forhold til verdien av en bestemt tjeneste eller tjeneste som ytes, ved å etablere en rimelig minstelønn for slik tjeneste. Etiske retningslinjer som omhandler lønn og ytelser har fokusert på tre standarder ved vurdering av lønn: minstelønnen som kreves ved lov, den lokale "rådende industrilønnen" og "levelønn". Den første har blitt ansett som utilstrekkelig i mange tilfeller fordi den lovlige minstelønnen har blitt holdt kunstig lav i mange land for å tiltrekke seg investeringer. Undersøkelser har vist at uten å jobbe for mye overtid, er minstelønnen i mange land ikke tilstrekkelig til å dekke en arbeiders grunnleggende behov.

Arbeidstid i samsvar med gjeldende regler

Arbeidstiden er i samsvar med gjeldende lover og bransjestandarder. I Norge gjelder arbeidsmiljøloven som fastsetter grenser for den alminnelige arbeidstiden: 9 timer i løpet av 24 timer (normalarbeidsdag) og 40 timer i løpet av 7 dager (normalarbeidsuke). For arbeidstakere med belastende arbeidstidsordninger, for eksempel skift-, turnus-, natt- og søndagsarbeid, er den ukentlige arbeidstiden kortere. I utlandet gjelder andre regler.

Tvangsarbeid

Tvangsarbeid er ethvert arbeid eller tjeneste som kreves av enhver person under trusselen om straff, og som vedkommende ikke har tilbudt seg frivillig. Å yte lønn eller annen kompensasjon til en arbeider betyr ikke nødvendigvis at arbeidet ikke er tvangsmessig eller obligatorisk. Arbeidskraft tilbys frivillig og arbeidstakere står fritt til å forlate arbeidsforholdet når som helst i samsvar med etablerte regler.

Like muligheter / diskriminering

Like muligheter betyr at alle mennesker vurderes og behandles likt uavhengig av kjønn, rase eller alder, som f.eks. funksjonshemming, sivilstatus, graviditet, familiestatus eller familieansvar, religiøs eller politisk

overbevisning eller seksuell legning. Likestilling eller prinsippet om ikke-diskriminering gir like muligheter innen utdanning, arbeid, avansement, ytelser og ressursfordeling og andre områder for alle mennesker uavhengig av alder, rase, kjønn, religion osv.

Helse og sikkerhet
Ivaretakelse av helse og sikkerhet for arbeidstakere og bønder betyr at arbeidsstedet er trygt og fritt for alvorlige farer og inkluderer også fysiske og psykiske elementer som kan påvirke helsen. Arbeidsstedet omfatter alle de stedene arbeidstakere trenger å være på grunn av sitt arbeid og som er under direkte eller indirekte kontroll av arbeidsgiver.

Sosiale ytelser og trygd
Sosiale ytelser kan være sykepenger, betalt fødselspermisjon, måltider, avtaler med treningssentre, barnehager mm. De sosiale fordelene som gis til arbeiderne kan avhenge av den sosiale konteksten og det er ulike lover og retningslinjer angående trygd og sosiale ytelser i de enkelte land. For eksempel har noen land et offentlig medisinsk system tilgjengelig for alle innbyggere, mens andre land har et privat medisinsk system som krever at borger/arbeidere må ha en helseforsikring.

Arbeidsforhold og kontrakt som fastsetter lønn, arbeidstid, ferie og fratredelsesvilkår
Den internasjonale arbeidsorganisasjonen (ILO) definerer ansettelsesforhold som "den juridiske forbindelsen mellom arbeidsgivere og arbeidstakere". Det eksisterer når en person utfører arbeid eller tjenester under visse betingelser i retur for godtgjørelse. Arbeidsforholdet gir gjensidige rettigheter og plikter mellom arbeidstaker og arbeidsgiver.

Seksuell trakassering
Seksuell trakassering er uønsket seksuell oppmerksomhet som har som formål eller virkning å være krenkende, skremmende, fiendtlig, nedverdigende, ydmykende eller plagsom. Seksuell trakassering kan forekomme i mange ulike varianter og kan være både fysisk, verbal og ikke-verbal (kroppsspråk). På arbeidsplassen kan seksuell trakassering skje både fra medarbeidere, ledere og andre man er i kontakt med gjennom arbeidet. Arbeidsgiver skal organisere og lede arbeidet slik at ingen arbeidstakere blir utsatt for seksuell trakassering. Skulle det likevel skje har arbeidsgiver ansvar for å følge opp hendelsen i etterkant.

Vilkår for bønder og små bedrifter
Begrepet omfatter både småskala jordbruk og små bedrifter. Små bedrifter er privateide selskaper, eller enkeltpersonforetak som har få eller ingen ansatte. I utviklingsland er det ofte strukturelle begrensninger for småbrukeres tilgang til ressurser, teknologi, og markeder. Verdensbanken (2003) definerer småbrukere som bønder med mindre enn 2 hektar jordbruksland og det er ofte familiebruk som hovedsakelig bruker familiearbeid til produksjon, og de er ofte utsatte i leverandørkjedene.

Lokalsamfunn

Hvor relevant er det å inkludere følgende kategorier for lokalsamfunn i en skår for matvarer for sosial- og miljømessig bærekraft?

Vi ønsker ikke at du skal ta stilling til hvorvidt kategorien lett kan måles, men heller vektlegge hvorvidt den anses som **viktig** for å måle matens sosiale bærekraft. Tenk på alle typer matvarer når du svarer på spørsmålet, både mat produsert i Norge og i utlandet. Kategoriene beskriver relasjonen mellom en bedrift/organisasjon og lokalsamfunnet og er nærmere beskrevet under skjemaet på denne siden

	Ikke relevant	Litt relevant	Ganske relevant	Meget relevant
Tilgang til materielle ressurser	❍	❍	❍	❍
Tilgang til samfunnstjenester som f.eks. helsetjenester og utdanning	❍	❍	❍	❍
Migrasjon av arbeidssøkere	❍	❍	❍	❍
Ivaretakelse av kulturarv	❍	❍	❍	❍
Trygge levekår	❍	❍	❍	❍
Respekt for urfolks rettigheter	❍	❍	❍	❍
Samfunnsengasjement	❍	❍	❍	❍
Lokal sysselsetting	❍	❍	❍	❍

Er det en eller flere kategorier du ønsker å legge til? _____

Beskrivelse av kategoriene:

Tilgang til materielle ressurser
Lokalsamfunnet og bedrifter kan dele bruken av materielle ressurser (naturlige og menneskeskapte) og ha en gjensidig interesse i å beskytte og forbedre kvantiteten og kvaliteten på lokale ressurser og infrastruktur, men det kan oppstå konflikter om rettferdig deling av disse.

Tilgang til samfunnstjenester
Organisasjoner og bedrifter kan fremme samfunnstjenester i lokalsamfunnet, for eksempel ved helsetjenester, utdanning og informasjon.

Migrasjon av arbeidssøkere
Økonomisk utvikling kan føre til migrasjon av personer som søker arbeid. Organisasjoner og bedrifter kan gi muligheter for utdanning til arbeidsinnvandrere og legge til rette for kommunikasjon mellom arbeidsinnvandrere og fastboende for å minimere risikoer for konflikt.

Ivaretakelse av kulturarv
Kulturarv inkluderer språk, sosial og religiøs praksis, kunnskap og tradisjonelt håndverk, så vel som kulturelle rom og gjenstander (f.eks. gravplasser; naturlige, bygde og arkeologiske steder; historiske byer). Internasjonale menneskerettighetskonvensjoner sikrer individers rett til å bevare sin kulturarv. Dette inkluderer å praktisere og revitalisere kulturelle tradisjoner og religiøse oppfatninger som respekterer menneskers rettigheter.

Trygge levekår
En bedrifts aktiviteter kan påvirke lokalsamfunnets sikkerhet. Prosjektrelaterte endringer av landskap kan også føre til naturkatastrofer, som for eksempel jordskred. Sykdom kan spre seg som følge av arealendringer, for eksempel kan oversvømmelse bidra til spredning av malaria. Deponering av farlig materiale og utslipp kan føre til uheldige helseeffekter.

Respekt for urfolks rettigheter
Respekt for urfolks rettigheter inkluderer rett til landområder, ressurser, kulturell integritet, selvbestemmelse og selvstyre. Historisk sett har stater nektet mange urbefolkninger disse rettighetene.

Samfunnsengasjement
Fellesskapets interesser kan bli påvirket av en bedrifts handlinger eller produkter. En bedrift kan inkludere og ivareta disse interessene ved utviklingen og implementeringen av deres virksomhet, spesielt når det påvirker lokalt miljø og helse.

Lokal sysselsetting
Bruk av lokal arbeidskraft gir viktige inntekter og opplæringsmuligheter til lokalsamfunnets medlemmer. Organisasjoner som bruker lokale leverandører, vil gi lokal sysselsetting og utvikling. Organisasjoner kan også støtte lokalsamfunnet ved opplæring av ansatte.

Verdikjedeaktører

Hvor relevant er det å inkludere følgende kategorier for verdikjedeaktører i en skår for matvarer for sosial- og miljømessig bærekraft?

Vi ønsker ikke at du skal ta stilling til hvorvidt kategorien lett kan måles, men heller vektlegge hvorvidt den anses som **viktig** for å måle matens sosiale bærekraft. Tenk på alle typer matvarer når du svarer på spørsmålet, både mat produsert i Norge og i utlandet. Kategoriene beskriver relasjonen mellom en bedrift/organisasjon og andre verdikjedeaktører og er nærmere beskrevet under skjemaet på denne siden.

	Ikke relevant	Litt relevant	Ganske relevant	Meget relevant
Rettferdig konkurranse i dagligvaremarkedet	❍	❍	❍	❍
Fremme samfunnsansvar - corporate social responsibility	❍	❍	❍	❍
Leverandørforhold og betingelser for leveranser	❍	❍	❍	❍
Respekt for immaterielle rettigheter - Intellectual Property Rights	❍	❍	❍	❍
Fordeling av inntjening mellom leverandører og dagligvarehandel	❍	❍	❍	❍

Er det en eller flere kategorier du ønsker å legge til? _____

Beskrivelse av kategoriene:

Rettferdig konkurranse i dagligvaremarkedet
Samarbeid mellom mulige konkurrenter for å fastsette priser, koordinere bud, opprette markeds- eller produksjonsbegrensninger, geografiske kvoter m.m. kan begrense markedskonkurransen. Noen eksempler er: prisfastsettelse, der partene samarbeider om å selge samme produkt eller tjeneste til samme pris; budrigging, der partene samarbeider for å manipulere et konkurrerende bud; og lokketilbud som når et produkt selges til svært lav pris med den hensikt å drive konkurrenter ut av markedet.

Fremme samfunnsansvar

Bedriftens samfunnsansvar er den norske samlebetegnelsen for det engelske begrepet corporate social responsibility og kan defineres som bedriftens sosiale og miljømessige hensyn i sin daglige drift på frivillig basis, utover å overholde eksisterende lover og regler i det landet man opererer.

Leverandørforhold og betingelser for leveranser

Leverandørforholdene gjelder alle gjensidige aktiviteter, samarbeid, avtaler som regulerer utveksling, handel og forhold mellom organisasjoner, og ansvar for å følge gjeldende lover og regler. Organisasjonens leverandører kan være en bedrift eller enkeltperson – inkludert underleverandører, produsenter, distributører og konsulenter som leverer varer og tjenester.

Respekt for immaterielle rettigheter

Immaterielle rettigheter (Intellectual Property Rights, IPR) refererer til beskyttelse av oppfinnelser, forfatter- og kunstnerarbeid, symboler, navn, logoer, design og andre innovasjoner. IPR inkluderer industrielle (registrerbare) rettigheter (patent, varemerke og design) og åndsverk, opphavsrett, domener, forretningshemmeligheter med mer.

Fordeling av inntjening mellom leverandører og dagligvarehandel

Denne kategorien fokuserer på hvordan verdien fordeles mellom aktørene i verdikjeden, fra primærprodusenten til dagligvarehandel. En rettferdig fordeling oppnås når salgsprisen for et produkt eller en tjeneste dekker alle produksjonskostnadene og gir alle en akseptabel fortjenestemargin.

Forbrukere

Hvor relevant er det å inkludere følgende kategorier for forbrukere i en skår for matvarer for sosial- og miljømessig bærekraft?

Vi ønsker ikke at du skal ta stilling til hvorvidt kategorien lett kan måles, men heller vektlegge hvorvidt den anses som **viktig** for å måle matens sosiale bærekraft. Tenk på alle typer matvarer når du svarer på spørsmålet, både mat produsert i Norge og i utlandet. Kategoriene beskriver forbrukeres tilgang til informasjon om matvarer og/eller forbrukeres relasjonen til en matprodusent. Kategoriene er nærmere beskrevet under skjemaet på denne siden.

	Ikke relevant	Litt relevant	Ganske relevant	Meget relevant
Helse og sikkerhet	❍	❍	❍	❍
Forbrukers tilfredshet	❍	❍	❍	❍
Forbrukers personvern	❍	❍	❍	❍
Åpenhet om arbeidsforhold og bærekraft	❍	❍	❍	❍
Forbrukerinformasjon om matsvinn og emballasje	❍	❍	❍	❍

Er det en eller flere kategorier du ønsker å legge til? _____

Beskrivelse av kategoriene:

Helse og sikkerhet
Forbrukeres helse og sikkerhet er i denne sammenheng beskyttelse mot produkter og tjenester som kan være helsefarlige. I Norge skal matloven sikre helsemessig trygge næringsmidler og fremme helse, kvalitet og forbrukerhensyn langs hele produksjonskjeden, samt ivareta miljøvennlig produksjon.

Forbrukers tilfredshet
Forbrukeres tilfredshet kan ivaretas gjennom forbrukerundersøkelser, returpolicyer, kvalitetssikringer, garantier osv., og bidrar til å kartlegge forbrukertilfredshet knyttet til produktet.

Forbrukers personvern
Organisasjoner og bedrifter kan tilby produkter eller tjenester som gjennom deres bruk bidrar til å krenke forbrukernes personvern (f.eks. data- og kommunikasjonsteknologier). Forbrukernes personvern kan være å

beskytte forbrukerdata, begrense personlig informasjon som samles inn og begrense bruken av data til dens opprinnelige eller avtalt formål.

Åpenhet om arbeidsforhold og bærekraft
En bedrifts informasjon om hvordan grunnleggende menneskerettigheter og anstendige arbeidsforhold håndteres. Rapportering om bedriftens arbeid med bærekraft kan hjelpe forbrukeren å ta informerte valg.

Forbrukerinformasjon om matsvinn og emballasje
En næringsmiddelprodusents informasjon om produktets holdbarhet og evt. tilleggsinformasjon for redusert matsvinn (f.eks. «Best før, ofte god etter») og informasjon om håndtering av emballasjen etter bruk.

Samfunn

Hvor relevant er det å inkludere følgende kategorier for samfunn i en skår for matvarer for sosial- og miljømessig bærekraft?
Vi ønsker ikke at du skal ta stilling til hvorvidt kategorien lett kan måles, men heller vektlegge hvorvidt den anses som **viktig** for å måle matens sosiale bærekraft. Tenk på alle typer matvarer når du svarer på spørsmålet, både mat produsert i Norge og i utlandet. Kategoriene beskriver relasjonen mellom en bedrift/organisasjon og samfunnet og er nærmere beskrevet under skjemaet på denne siden.

	Ikke relevant	Litt relevant	Ganske relevant	Meget relevant
Offentlige forpliktelser i bærekraftspørsmål	❍	❍	❍	❍
Bidrag til økonomisk utvikling	❍	❍	❍	❍
Forebygging og demping av væpnede konflikter	❍	❍	❍	❍
Teknologiutvikling	❍	❍	❍	❍
Korrupsjon	❍	❍	❍	❍
Dyrevelferd	❍	❍	❍	❍
Fattigdomsbekjempelse	❍	❍	❍	❍

Er det en eller flere kategorier du ønsker å legge til? _____

Beskrivelse av kategoriene:

Offentlige forpliktelser i bærekraftspørsmål
En offentlig forpliktelse er en bredere tolkning av sosialt ansvar som innebærer at organisasjoner ikke bare vurderer bærekraftspørsmål i organisasjonen, men også i forhold til samfunnet.

Bidrag til økonomisk utvikling
Organisasjoner kan fremme økonomisk utvikling ved f.eks. å skape inntekter, arbeidsplasser, gi utdanning og opplæring, foreta investeringer eller delta i forskning.

Forebygging og demping av væpnede konflikter
Omhandler hvordan en organisasjon opptrer i konfliktsoner, dvs. steder hvor det er spent situasjon mellom ulike parter forårsaket av ulike interesser, mål eller verdisystemer.

Teknologiutvikling
Utvikling og overføring av teknologi kan spille en viktig rolle for økonomisk utvikling. Teknologioverføring kan innebære at en teknologi utviklet for én sektor blir brukt i en annen sektor. Overføring av slike teknologier og kunnskap er sterkt avhengig av nettverksbygging mellom sektorer.

Korrupsjon
Korrupsjon er misbruk av makt for å oppnå fordeler. Ulike typer korrupsjon finnes, inkludert bestikkelser, underslag, tyveri og bedrageri, utpressing, misbruk av skjønn, favorisering, utnytte interesser, og upassende politiske bidrag.

Dyrevelferd
Formålet med loven om dyrevelferd er å fremme god dyrevelferd og respekt for dyr. Dyr har egenverdi uavhengig av den nytteverdien de måtte ha for mennesker. Dyr skal behandles godt og beskyttes mot fare for unødige påkjenninger og belastninger. Dyrevelferd omfatter også hvordan dyr opplever og håndterer miljøet det lever i, både fysisk og psykisk, og deres mulighet til å utføre naturlig adferd.

Fattigdomsbekjempelse
Fattigdom er forårsaket av mangel på muligheter, utdanning, helse og sikkerhet. Fattigdom kan være relativ og/eller absolutt. Relativ fattigdom er vanskeligstilt sosial og økonomisk situasjon sammenlignet med andre mennesker i samfunnet. Ved absolutt fattigdom er de grunnleggende menneskelige behov ikke oppfylt (mat, trygt drikkevann, sanitæranlegg, helse, husly og utdanning).

Barn

Hvor relevant er det å inkludere følgende kategorier for barn i en skår for matvarer for sosial- og miljømessig bærekraft?
Vi ønsker ikke at du skal ta stilling til hvorvidt kategorien lett kan måles, men heller vektlegge hvorvidt den anses som **viktig** for å måle matens sosiale bærekraft. Tenk på alle typer matvarer når du svarer på spørsmålet, både mat produsert i Norge og i utlandet. Barn er inkludert for å representere fremtidens generasjon i de nye guidelines for sosial LCA (UNEP 2020). Kategoriene beskriver relasjonen mellom en bedrift/organisasjon og "barn" er nærmere beskrevet under skjemaet på denne siden.

	Ikke relevant	Litt relevant	Ganske relevant	Meget relevant
Barns rett til utdanning	❍	❍	❍	❍
Barns rett til helsehjelp	❍	❍	❍	❍
Markedsføring rettet mot barn	❍	❍	❍	❍

Er det en eller flere kategorier du ønsker å legge til? _____

Beskrivelse av kategoriene:

Barns rett til utdanning
Utdanning er å legge til rette for læring, eller tilegnelse av kunnskap, ferdigheter, verdier og personlig utvikling.

Barns rett til helsehjelp
Fysisk, mental og sosial helse betyr ikke bare fravær av sykdom, men er også nært knyttet til andre grunnleggende menneskerettigheter, særlig tilgang til drikkevann og tilstrekkelig hygiene.

Markedsføring rettet mot barn
Markedsføring overfor barn krever varsomhet på grunn av barns påvirkelighet, manglende erfaring og naturlige godtroenhet. Ansvarlig markedsføring rettet mot barn tar hensyn til alder, utvikling og andre forhold som gjør barn spesielt sårbare.

Har du kommentarer til dette tema om sosial bærekraft?

_____
_____
_____
_____
_____
_____

Har du kommentarer til denne undersøkelsen?

_____
_____
_____
_____
_____
_____

Tusen takk for dine svar og tilbakemeldinger!

Appendix 2 Survey on scope and environmmental categories

NewTools og miljømessig bærekraft

NewTools skal utvikle to skåringssystemer om matens ernæringsmessige kvalitet og sosiale- og miljømessige bærekraft. Denne undersøkelsen handler om miljømessig bærekraft. Dere har fått denne henvendelsen fordi dere representerer en aktør eller en interesseorganisasjon knyttet til matens verdikjede. Vi ønsker innspill på hva som bør inkluderes i miljømessig bærekraft for matproduksjon.

Den første delen av spørreundersøkelsen handler om synspunkter på valg av indikatorer, altså hva som skal måles. I den andre delen ønsker vi innspill på hvilke miljøpåvirkninger som er de mest relevante for matens verdikjede, både for norske og utenlandske matvarer. Spørsmålene tar utgangspunkt i de miljøpåvirkninger som er inkludert i den europeiske standardmetoden product environmental footprint (PEF). I tillegg er det mulighet for å legge til kategorier hvis dere synes det mangler noe. Resultatene fra denne undersøkelsen vil bli tatt med i det videre arbeidet med å utforme skår for miljømessig bærekraft. Undersøkelsen sendes til alle partnere i NewTools-prosjektet og vil også bli sendt til aktører i matsystemet som ikke er med i prosjektet, for et bredt tilfang av innspill.

Det vil ikke bli publisert hva den enkelte partner har svart, men svarene vil bli aggregert for hver sektor. Dere svarer på vegne av deres organisasjon, ikke som enkeltperson. Vi ønsker ikke mer enn ett svar fra hver organisasjon, men flere i organisasjonen skal involveres ved f.eks. å svare på spørreundersøkelsen på et felles møte.

Det tar ca. 15 min å svare på denne spørreundersøkelsen og fristen er den 1. mars 2023. Du kan lese mer om NewTools på https://www.fhi.no/studier/newtools/.

Trenger du hjelp til å utfylle spørreskjema kan du kontakte Hanne Møller, epost: ham@norsus.no

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Samtykkeerklæring
Jeg har mottatt og forstått informasjon om spørreundersøkelsen og har fått mulighet til å stille spørsmål. Ved å utfylle og sende inn spørreskjemaet, samtykker jeg til å delta i spørreundersøkelsen og jeg samtykker til at min e-postadresse brukes frem til spørreundersøkelsen er avsluttet og NORSUS har analysert svarene, senes 31. mai 2023.

Hva er din e-postadresse?

_____

Hva er viktig ved valg av indikatorer som skal inkluderes i miljømessig bærekraft? Du skal svare som representant for din organisasjon.

	uenig	delvis uenig	vet ikke	delvis enig	helt enig
Indikatorer skal være basert på vitenskap	❍	❍	❍	❍	❍
Indikatorer skal være basert på andre etablerte skåringssystemer	❍	❍	❍	❍	❍
Indikatorer må avgrenses til maksimum 10 miljømessige kategorier for å forenkle systemet	❍	❍	❍	❍	❍
Indikatorene skal omfatte alle viktige lokale, regionale og globale miljømessige problemer som kan knyttes til matproduksjon	❍	❍	❍	❍	❍
Indikatorene skal inkludere matsvinn hos grossist og butikk	❍	❍	❍	❍	❍
Indikatorene skal inkludere miljøpåvirkninger fra emballasjen	❍	❍	❍	❍	❍

Du svarte 'vet ikke' på ett eller flere av spørsmålene. Vennligst forklar hvorfor du svarte dette.

_____
_____
_____
_____
_____

Product environmental footprint og mest relevante miljøpåvirkningskategorier

Som nevnt tidligere i denne spørreundersøkelsen, ønsker vi i prosjektet å ta utgangspunkt i de miljøpåvirkninger som er inkludert i rammeverket, som er utarbeidet av EU: product environmental footprint (PEF). For matproduksjon er følgende miljøpåvirkningskategorier prioritert:

- Global klimaendring
- Vannforbruk
- Svevestøv
- Overgjødsling, marint
- Overgjødsling ferskvann
- Overgjødsling vegetasjon
- Forsuring
- Fossil ressursbruk
- Arealbruk
- Økotoksisitet
- Fotokjemisk ozondannelse

I tillegg arbeides det med andre miljøpåvirkningskategorier som anses som relevante, men hvor det ennå ikke enighet om en egnet beregningsmetode:

- Biologisk mangfold
- Ghost fishing - tapte eller glemte fiskeredskaper
- Område bunntrålet
- Antall drepte pattedyr og fugler
- Antall rømte oppdrettsfisk

Referanser:

Product Environmental Footprint Category Rules Guidance, Version 6.3 – May 2018 https://ec.europa.eu/environment/eussd/smgp/pdf/PEFCR_guidance_v6.3.pdf

Product Environmental Footprint Category Rules Feed for food producing animals https://ec.europa.eu/environment/eussd/smgp/pdf/PEFCR_feed.pdf

Product Environmental Footprint Category Rules for Dairy Products https://ec.europa.eu/environment/eussd/smgp/pdf/PEFCR-DairyProducts_2018-04-25_V1.pdf

Product Environmental Footprint Category Rules (PEFCR) for unprocessed Marine Fish Products Version: Draft v5 for Supporting Studies, 06.09.2022 https://www.marinefishpefcr.eu/_files/ugd/2c010a_b6e0bc4fecf349d2826cf30892e37f7c.pdf

Hvor relevant er det å inkludere følgende kategorier for miljømessig bærekraft i en skår for matvarer?
Vi ønsker ikke at du skal ta stilling til hvorvidt kategorien lett kan måles, men heller vektlegge hvorvidt den anses som viktig for å måle matens miljømessige bærekraft. Tenk på alle typer matvarer når du svarer på spørsmålet, både mat produsert i Norge og i utlandet.

Global klimaendring

Global klimaendring er utslipp av klimagasser målt i CO2-ekvivalenter. Det er valgt en 100-årig tidshorisont for global klimaendring.

❍ ikke relevant
❍ litt relevant
❍ vet ikke
❍ ganske relevant
❍ meget relevant

Vannforbruk

Vann er en knapp ressurs i noen deler av verden, mens det er rikelig med vannforsyning i andre steder. Dette betyr at miljøbelastningen forårsaket av vannbruk kan være veldig forskjellig avhengig av regionen det gjelder. Metoden som brukes her justerer derfor vannforbruket med fastsatte faktorer for hver region, og kvantifiserer gjenværende tilgjengelig vann (Available WAter Remaining) per arealenhet.

❍ ikke relevant
❍ litt relevant
❍ vet ikke
❍ ganske relevant
❍ meget relevant

Svevestøv

Luftforurensning som forårsaker primære og sekundære aerosoler (partikler) i atmosfæren som kan ha en betydelig negativ innvirkning på menneskers helse.

❍ ikke relevant
❍ litt relevant
❍ vet ikke
❍ ganske relevant
❍ meget relevant

Overgjødsling (ferskt vann, marint, vegetasjon)

Menneskeskapt overgjødsling skyldes utslipp av næringsstoffer som fosfor (P) og nitrogen (N). Overgjødsling i vann gir uklart og misfarget vann, overgrodd bunn og strand og rask gjengroing (eutrofiering). For stor algeproduksjon i forhold til tilgang på oksygen i vannet, fører til anaerob forråtnelse. Overgjødsling i vegetasjon kan gi økt gressvekst og tilbakegang av typiske arter.

❍ ikke relevant
❍ litt relevant
❍ vet ikke
❍ ganske relevant
❍ meget relevant

Forsuring

Forsuring oppstår blant annet som følge av forurenset nedbør som kan stamme fra luftforurensning langt unna og utslipp av ammoniakk fra blant annet jordbruk. Forsuring av innsjøer dreper alger, dyr og fisk. Sur nedbør løser opp viktige næringsstoffer, som kalsium og kalium, og reduserer derfor tilgjengeligheten for

planter. Det kan også medføre at mikroorganismer forsvinner, og dette gir redusert nedbryting av organisk materiale.

❍ ikke relevant
❍ litt relevant
❍ vet ikke
❍ ganske relevant
❍ meget relevant

Fossil ressursbruk

Fossile energiressurser er ikke-fornybare ressurser, som f.eks. gass, olje og kull. I tillegg inkluderes også bruk av uran og torv.

❍ ikke relevant
❍ litt relevant
❍ vet ikke
❍ ganske relevant
❍ meget relevant

Arealbruk

Arealbruk er en viktig indikator i matproduksjon, både arealtype og hva det brukes til og hvor intensivt arealet brukes. Arealbruk er et uttrykk hvor mye areal en produksjon beslaglegger og har betydning for alternativ bruk av arealet og for biologisk mangfold.

❍ ikke relevant
❍ litt relevant
❍ vet ikke
❍ ganske relevant
❍ meget relevant

Økotoksisitet

Skade på dyr, planter, sopp og mikroorganismer forårsaket av direkte toksisk virkning av stoffer.

❍ ikke relevant
❍ litt relevant
❍ vet ikke
❍ ganske relevant
❍ meget relevant

Fotokjemisk ozondannelse

Fotokjemisk ozondannelse gir skade på menneskekroppen og på naturen som følge av eksponering til ozon. Ozon dannes som følge av fotokjemiske reaksjoner, når nitrogenoksider og flyktige organiske forbindelser som bensin og løsemidler reagerer med sollys. Ozon utgjør en helserisiko fordi den kan skape betennelser i luftveiene og skade lungene og gi opphav til, eller forverre f.eks. astma, emfysem og bronkitt. Ozon gir også negative effekter på planter.

❍ ikke relevant
❍ litt relevant
❍ vet ikke
❍ ganske relevant
❍ meget relevant

Er det en eller flere kategorier organisasjonen din ønsker å legge til? Vennligst begrunn med noen få ord hvorfor dere synes dette er viktig

_____
_____
_____
_____
_____
_____

Har organisasjonen din kommentarer til dette tema om miljømessig bærekraft?

_____
_____
_____
_____
_____
_____

Har du kommentarer til denne undersøkelsen?

_____
_____
_____
_____
_____
_____

Tusen takk for dine svar og tilbakemeldinger!

Appendix 3 Invitation to workshop

Til partnere i NewTools-prosjektet, og medlemmer av vitenskapelig råd og strategisk råd

Viser til utsendt Outlook invitasjon om workshop i WP3.

Det inviteres til workshop med arbeidspakke (WP) 3 i NewTools **torsdag 23. mars kl. 11.30-15.00**. Møtet holdes på **Bjørvika Konferansesenter**, **Dronning Eufemias gate 6A,** Oslo i **møterom Utstikkeren**.

WP3 har ansvaret for utvikling av rammeverk for merking av miljømessig og sosial bærekraft, og vi ønsker å drøfte både det vi har gjort så langt og det videre arbeidet vårt med dere. Vi legger opp til både gruppearbeid og plenumsdiskusjoner etter korte innledninger hvor dere får høre om arbeidet vi gjør. Det serveres enkel lunsj (wraps og smoothie) ved ankomst. Workshopen ledes av Ellen-Marie Forsberg, adm.dir. på NORSUS (Norsk institutt for bærekraftsforskning). Ellen-Marie har en doktorgrad i filosofi med fokus på anvendt etikk, og jobber mye med tematikk innen ansvarlig forskning og innovasjon (RRI).

Program:
11.30 Servering av kaffe, smoothie og wraps
12.00 – 12.20 Introduksjon
12.20 – 12.40 Presentasjon av resultater fra survey og litteraturgjennomgang
12.40 – 13.40 Gruppearbeid
13.40 – 13.50 Kaffe og biopause
13.50 – 14.20 Presentasjon i plenum + diskusjon
14.20 – 14.30 Plan for videre arbeid
14.30 – 15.00 Øvrige innspill og diskusjon fra salen. Oppsummering.

Vi ber om at alle som ønsker å delta på workshopen sender påmelding via lenken.
Påmelding: https://forms.office.com/e/X05uazLKrz

Frist for påmelding er torsdag 16. mars.

Partnere kan melde på flere representanter om ønskelig.

Ved spørsmål, send e-post til newtools@fhi.no.

Appendix 4 Invitation to provide feedback on the report

Innspillsrunde på sosial og miljømessig bærekraft

Bakgrunn:
Arbeidspakke 3 i NewTools er ansvarlig for utvikling og testing av et skåringssystem for påvirkning på miljømessig og sosial bærekraft av matvarer (inkluderer drikkevarer). Forskerne ønsker innspill på vedlagte rapport som gir anbefalinger om hvilke kategorier som bør inngå i det videre arbeid og hvilke deler av verdikjeden som skal inkluderes.

Hensikt:
Hensikten med innspillsrunden er å få kartlagt hvordan de valgte kategoriene kan fungere som grunnlag for et skåringssystem for matens bærekraft. Det skal gjelde for matprodukter som konsumeres i Norge og for matvarer som produseres i andre land, men som konsumeres i Norge. Dessuten er det ønskelig med innspill på systemgrenser, referanseenhet, og om matsvinn og emballasje skal inngå.
Vi ønsker i denne omgang å fokusere på valg av kategorier og systemgrensene, ikke hvordan kategoriene skal vektes i forhold til hverandre eller om hvordan et merkesystem skal fungere. Disse aspektene skal vurderes i videre arbeid i prosjektet.

Grunnlagsmateriale:
Grunnlaget for innspillsrunden er samlet i vedlagte rapport. Vi ber om at kommentarene i størst mulig grad henviser til konkrete deler av rapporten.

Hvem inviteres?
Vi tar imot innspill fra alle som er involvert i prosjektet.

Informasjonsmøte:
Det ble holdt et kort informasjonsmøte tirsdag 5.september kl. 10. Opptaket er tilgjengelig for NewTools partnere på Sharepoint.

Hvordan gi innspill:
Innspill kan gis på Survey-xact eller ved å svare på denne eposten (newtools@fhi.no). Anonyme innspill blir ikke tatt hensyn til. Vennligst skriv navn på organisasjonen som står bak innspillet samt kontaktperson.

Hvordan vil innspillene bli brukt?
Alle innspill vil bli samlet i et dokument på NewTools-prosjektets SharePoint som alle prosjektpartnere vil få tilgang til. Forskerne i WP3 vil svare skriftlig på alle innspill som mottas, men vil gruppere innspillene etter tema. Innspillene vil bli brukt i det videre arbeid, f.eks. ved at ytterligere kategorier tas med. Innspillene kan også i ettertid bli brukt i rapporter, vitenskapelige artikler eller andre åpne publikasjoner, men i slike tilfeller vil innspillene omtales samlet og anonymt, dvs. uten å nevne innspillsgivere ved navn.

Spørsmål:
Hvis spørsmål oppstår som må løses før innspill kan gis, ber vi om at disse rettes til forskerne.

Frist for innspill: 4. oktober 2023

NORSUS
Norwegian Institute for Sustainability Research

The vision of NORSUS Norwegian Institute for Sustainability Research (formerly Ostfold Research) is to provide knowledge for sustainable societal development. We apply and develop knowledge and methods to understand and implement sustainable solutions in society. Together with a wide range of public and private clients, we undertake projects locally, nationally and internationally to enhance environmental performance, often also generating economic benefits.

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