

The Alternative Proteins Eligibility Criteria

Climate Bonds Standard and Certification Scheme

Final Criteria Document

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Definitions

Blended alternative protein products: A blended product combines traditional animal-sourced proteins with alternative proteins e.g., a part beef and part mycoprotein burger.

Climate Bonds Certification: allows the issuer to use the Climate Bonds Certification mark in relation to that bond. Climate Bonds Certification is provided once the independent CBSB is satisfied the bond conforms with the CBS.

Climate Bonds Initiative (Climate Bonds): An investor-focused not-for-profit organisation, promoting large-scale investments that will deliver a global low carbon and climate resilient economy. Climate Bonds seeks to develop mechanisms to better align the interests of investors, industry, and government to catalyse investments at a speed and scale sufficient to avoid dangerous climate change.

Climate Bonds Standard (CBS): A screening tool for investors and governments that allows them to identify green bonds the proceeds of which are being used to deliver climate change solutions. This may be through climate mitigation impact and/or climate adaptation or resilience. The CBS is made up of two parts: the parent standard (CBS v4.2) and a suite of sector-specific eligibility Criteria. The parent standard covers the Certification process and pre- and post-issuance requirements for all Certified bonds, regardless of the nature of the capital projects. The Sector Criteria detail specific requirements for assets identified as falling under that specific sector. The latest version of the CBS is published on the Climate Bonds website.

Climate Bonds Standard Board (CBSB): A board of independent members that collectively represents USD34tn of assets under management. The CBSB is responsible for approving (i) Revisions to the CBS, including the adoption of additional sector Criteria, (ii) approved verifiers, and (iii) applications for Certification of a bond under the CBS. The CBSB is constituted, appointed, and supported in line with the governance arrangements and processes as published on the Climate Bonds website.

Climate Bonds Certification: allows the issuer to use the Climate Bonds Certification Mark in relation to that bond. Climate Bonds Certification is provided once the independent CBSB is satisfied the bond conforms with the CBS.

Hybrid alternative proteins: A hybrid alternative protein contains no animal-sourced ingredients but combines multiple (two or more) alternative proteins e.g., a plant-based burger which uses precision fermented heme to mimic the taste of meat.

Industry working group (IWG): A group of key organisations that are potential issuers, verifiers and investors convened by Climate Bonds. The IWG provides feedback on the draft Sector Criteria developed by the technical working group (TWG) before they are released for public consultation.

Investment period: The interval between the bond's issuance and its maturity date otherwise known as the tenor.

Novel animal-sourced foods: Edible products produced using innovative technologies that do not require the direct rearing or harvesting of animals but do originate from animal cell-lines. This includes cultivated meat, which is grown from animal cells in a controlled environment, as well as any other emerging protein sources that replicate animal-derived foods at a cellular level without conventional animal agriculture.

Technical working group (TWG): A group of key experts from academia, international agencies, industry, and NGOs convened by Climate Bonds. The TWG develops the Sector Criteria, which are detailed technical criteria for the eligibility of projects and assets as well as guidance on the tracking of eligibility status during the term of the bond.

Traditional animal-sourced food: Edible products derived from animals through conventional agricultural methods, including but not limited to meat, dairy, eggs, and seafood. These foods originate from livestock, poultry, and aquatic species raised or harvested using traditional farming, ranching, or fishing practices.

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1 Introduction

1.1 The Climate Bonds Standard

Investor demand for climate bonds is strong and is expected to increase in line with the delivery of quality products into the market. However, investor concerns about the credibility of green labelling are also growing. Standards, assurance and Certification will be essential to improve confidence and transparency, which in turn will enable continued strong growth in the market.

The Climate Bonds Standard (CBS) and Certification Scheme is an easy-to-use screening tool that provides a clear signal to investors and intermediaries on the climate integrity of Certified Climate Bonds.

A core element of the Standard is a suite of sector-specific eligibility Criteria. Each sector-specific Criteria sets climate change benchmarks for that sector that are used to screen assets, capital projects, and entities so that only those that have climate integrity, either through their contribution to climate mitigation, and/or to adaptation and resilience (A&R) to climate change, will be Certified. Where a bond (or other debt instrument), asset, or entity encompasses projects, expenditures, or activities spanning multiple sectors, each category of assets will be subject to the relevant Sector Criteria.

These sector-specific Criteria are determined through a multi-stakeholder engagement process, involving TWGs and Industry Working Groups (IWG), convened and managed by Climate Bonds, and are subject to public consultation. Finally, they are reviewed and approved by the Climate Bonds Standards Board (CBSB).

The second key part of the CBS is the overarching CBS, available at <https://www.climatebonds.net/standard/the-standard>, is that it documents the common management of proceeds and reporting requirements that all Certified Climate Bonds must meet, in addition to meeting the sector-specific Criteria.

1.2 The need for Alternative Proteins Criteria

Around 60% of the emissions from the food system and 12–20% of all greenhouse gas (GHG) emissions worldwide are caused by animal agriculture and the production of animal feed.¹ The animal agriculture sector also uses an estimated 41% of total agricultural water to cultivate and process animal feed crops and over three-quarters of total global farmland is occupied by production of animal source foods.^{2,3,4} Additionally, an estimated 73% of all antimicrobials sold globally are used in animals raised for food.⁵ Despite being significantly larger contributors to climate change and other environmental impacts, animal source foods provide just 17% of the world's calories, and 38% of its protein.⁶ Thus, reducing emissions from meat and dairy production is one of the biggest mitigation actions within the food system.⁷ Yet, current projections predict an increase in global meat consumption of 50% or more by 2050, albeit with significant regional differences, further worsening the impact of animal agriculture unless addressed.⁸

Various recent studies have shown that even the most ambitious technological improvements to livestock rearing are insufficient to meet the necessary agricultural GHG reduction targets to limit warming to 1.5 °C.⁹ A reduction in the per capita consumption of animal-sourced foods would contribute to this goal.^{10,11} If 50% of the main animal products (pork, chicken, beef and milk) were substituted, net reduction of forest and natural land would be almost fully halted and agriculture and land use GHG emissions decline by 31% in 2050 compared to 2020.¹² Alternative proteins are a crucial part of this dietary shift.^{13,14} Alternative proteins are varied and can be whole plant- and fungi-based (e.g., beans, nuts, and mushrooms), traditional plant-based (e.g., tofu or tempeh), novel plant-based (e.g.,

extruded or 3D-printed plant protein), fermentation-derived (such as precision and biomass fermented), and cultured meat.¹⁵

According to a 2023 UNEP report, alternative proteins typically have a significantly lower GHG intensity (Kg CO2e/kg product) than the animal source foods they are replacing. They also typically exhibit superior performance in terms of other environmental aspects, including water and land usage, energy consumption, potential for eutrophication and feed conversion. For example, the outcomes of various LCAs suggest that novel plant-based beef analogues could reduce energy use 30–50%, GHG emissions 67–89% and land-use 86–97%, when compared to the beef products they are replacing.¹⁶

While alternative proteins typically represent a significant environmental improvement on traditional animal-sourced foods, not all alternative proteins, produced in all ways, perform better than all animal-sourced foods. For example, technology-intensive processes such as precision fermentation and cultivated meat production can drive high energy demand. If this energy is sourced from fossil fuels, the resultant products can emit more than the lower impact traditional animal-sourced foods such as poultry or milk.^{17,18} Similarly, some key ingredients/feedstocks are linked to deforestation, with soy and palm oil of particular concern.¹⁹ Therefore, it is not simply a matter of encouraging the adoption of all alternative proteins but rather establishing Criteria to avoid greenwashing. This would also channel finance towards projects and products that genuinely mitigate the climate impacts of traditional animal-sourced food.

1.3 Criteria development timeline

The development of the Alternative Proteins Criteria is part of a wider Agrifood Systems Transition Programme within Climate Bonds, aimed at establishing financial screening standards for elements with the highest potential to drive climate mitigation actions across the global agrifood system. Alternative protein was identified as a strategic element in this.

The Criteria development timeline began with the internal research and scoping phase, which took place from February 2024 to June 2024. Following this, TWG convened from June to November 2024 to identify 1.5°C-aligned, science-based investable opportunities and refine the framework. Simultaneously, the IWG held meetings from September to November 2024 to gather sector-specific insights and practical considerations. Public consultation on the draft Criteria is scheduled to occur between December 2024 and February 2025, allowing for stakeholder feedback. The final Criteria are set to be approved by the CBSB and then launched in March 2025, following this comprehensive year-long process. Thereafter, the TWG will continue to review the Criteria as needed (see Figure 1).

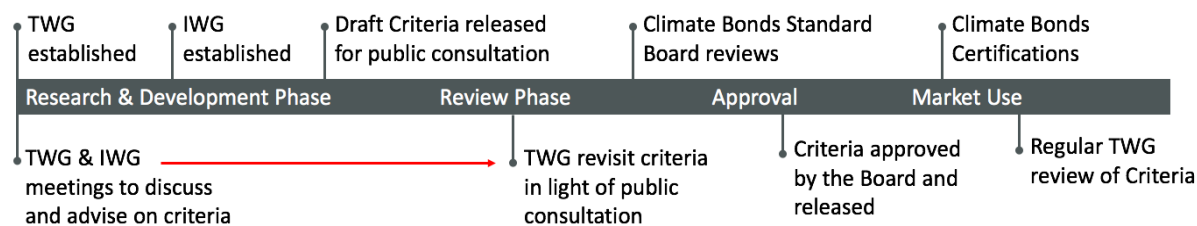


Figure 1. Criteria development timeline

2 Scope of the Alternative Proteins Criteria

2.1 Key elements of the Criteria

As a general principle, bonds, assets and entities will be considered eligible for Certification under the CBS if they meet the following requirements:

- Promote Greenhouse Gas (GHG) mitigation through reduced emissions; and
- Meet minimum safeguard requirements for adapting to climate change and facilitating increased climate resilience in the systems in which they are located; and
- Meet minimum safeguard requirements for harm reduction across the categories of water, biodiversity, social aspects, animal welfare, and nutrition; and
- Meet minimum disclosure requirements to raise the levels of transparency and disclosure.

Chapter 4 of this document contains complete details of these Alternative Proteins Criteria requirements.

2.2 Documents supporting these Criteria

Information to support issuers and verifiers is available at [<https://www.climatebonds.net/standard/the-standard>] as follows:

- Alternative Proteins sector Background Paper that details why the Criteria were chosen.
- Alternative Proteins Brochure giving a high-level summary of the Criteria requirements.
- Alternative Proteins Criteria Frequently Asked Questions (FAQs).
- [The Climate Bonds Standard](#): contains the requirements of the overarching CBS.
- [The Climate Bonds Standard & Certification Scheme Brochure](#): provides an overview of the Climate Bonds Standard and Certification Scheme, of which these Criteria are a part.

For more information on Climate Bonds and the Climate Bonds Standard and Certification Scheme, see www.climatebonds.net.

2.3 Revisions to these Criteria

These Criteria will be reviewed on a regular basis, at which point the TWG will review the deals that are printed in the early stages in addition to any developments in improved methodologies and data that can increase the climate integrity of future deals. As a result, the Criteria are likely to be refined over time, as more information becomes available. Certification will not be withdrawn retroactively from bonds certified under earlier versions of the Criteria.

3 Entities and activities in scope

3.1 Alternative proteins in scope

These Criteria apply to eligible alternative protein production entities, assets and projects, as well as projects associated with the distribution of alternative proteins. They cover associated financial instruments such as UoP bonds and sustainability-linked debt (SLD), as well as physical assets and whole entities.

The Criteria cover the production and distribution stages of alternative proteins (Figure 2). The rest of the food value chain is covered by other Climate Bonds Criteria including: Agriculture Production (Crops and Livestock), Deforestation- and Conversion-Free Sourcing, and an additional future sector Food Value Chain Criteria.^{20,21,22}

These Criteria are for alternative protein production and distribution entities (and their debt), including specialised alternative protein producers, diversified alternative protein producers, alternative protein distributors (e.g., retailers, food services, and traders).

Alternative proteins in scope include plant-based, fermentation derived and cultivated analogues for animal-based products or ingredients intended for human consumption, which can include specific proteins/fats/compounds (e.g., casein or heme), products, or whole muscle meats. Any proteins/fats/compounds (e.g., casein or heme), products, or whole muscle meats not intended for human consumption are out of scope such as those used in medicine, animal food/feed, and bioenergy. Insect protein is also currently out of the scope of these Criteria (see Table 1).

Table 1. Types of alternative proteins products in and out of scope

Production system	Included (lists are non-exhaustive)	Excluded
Wholefood plant- and fungi-based	Products made from protein-rich crops and mycelium with minimal processing for direct human consumption and with the purpose of providing an alternative to traditional animal-sourced foods e.g., products made from minimally processed nuts, legumes, seaweed or mushrooms.	Products intended exclusively for non-food or non-human food uses e.g., animal feed or bioenergy crops.
Non-novel plant- and fungi-based	Non-novel plant-based protein products made with traditional processing methods for the purpose of providing an alternative to animal-based foods e.g., tofu, seitan, and soy milk.	Non-food or non-human food fungi products e.g., medicines or biofuels.
Novel plant- and fungi-based	Plant-based foods made using plant-sourced proteins and innovative processing techniques including but not limited to fractionation, extrusion, or 3D printing for direct human consumption and the purpose of providing an alternative to animal-based foods. e.g., plant-based meat analogues, dairy, eggs, alternatives.	Non-food or non-human food uses of novel plant-based materials e.g., packaging, textiles, animal feed or bioenergy.

<p>Fermentation derived</p>	<p>Foods, food ingredients, or pet food in countries where regulatory approval for human food is not available, produced through traditional, microbial, biomass or precision fermentation for direct human consumption e.g., tempeh, fermented dairy alternatives, mycoprotein, hydrogen-oxidising bacteria, ingredients such as heme, or proteins engineered through fermentation for use in other alternative proteins such as plant-based foods or cultivated meat for the purpose of providing an alternative to animal-based foods.</p>	<p>Fermentation-derived products for non-food or non-human food uses e.g., biofuels, industrial enzymes, products used solely as animal feed or pet food.</p>
<p>Cultivated meat</p>	<p>Meat products grown from animal cells in a controlled environment (e.g., cultivated beef, chicken, or seafood) for direct human consumption, cultivated meat as an ingredient used in hybrid plant/cell-based products for human consumption for the purpose of providing an alternative to animal-based foods, or as pet food in countries where regulatory approval for human food is not yet available.</p>	<p>Cultivated meat products for non-food or non-human food uses e.g., pet food or cell cultures for medicinal purposes.</p>
<p>Hybrid products</p>	<p>Products for direct human consumption that combine multiple alternative proteins (e.g., plant-based, fermentation-derived, cultivated) with no traditional animal-sourced ingredients, developed to improve sensory, nutritional, or functional properties.</p>	<p>Hybrid products intended for non-food or non-human food uses such as animal feed, bioenergy, or industrial applications.</p>
<p>Blended products</p>	<p>Blended products that contain at least one of the specified alternative proteins alongside animal-origin products, such that their purpose is providing an alternative to animal-based foods. Blended products must replace at least 60% of the ingredients that would typically be animal-derived with alternative proteins or whole plant-based foods. This is compared to the original product being</p>	<p>Blended products which replace less than 60% of the ingredients typically from animal origin. Blended in which more than 10% of the substituted traditional animal-sourced foods are replaced with ingredients other than alternative proteins or whole plant-based foods (e.g., starches and other fillers). Blended products where more than 40% of the protein content comes from animal sources.</p>

	<p>reformulated or the average product in the market. When an existing product is used as a benchmark for reformulation, that original product must have been on the market for a minimum of one year.</p> <p>At least 90% of the traditional animal-sourced foods eliminated must be replaced with an alternative protein or whole plant-based foods as defined in the scope of these Criteria.</p> <p>After reformulation, no more than 40% of the product's protein content can be derived from traditional animal sources.</p>	<p>Reformulations of products which have been on the market for less than one year.</p> <p>Blended products intended for non-food or non-human food uses such as blended pet food.</p>
Insect protein	Excluded.	All insect protein.
Other	<p>Alternative proteins produced using emerging or novel production methods that meet all preconditions and sustainability criteria of the alternative proteins, above i.e., they must be designed for human consumption, for the purpose of providing an alternative to animal-based foods, and contain no more than 40% traditional animal-sourced ingredients. An example includes, but is not limited to, molecular farming where plants are engineered to produce specific proteins for direct human consumption.</p>	<p>Products intended exclusively for non-food or non-human food uses e.g., animal feed, bioenergy, and industrial applications.</p>

Interim revenue from other sectors

Products that are primarily intended for human consumption but are generating interim revenue from other sectors (e.g., pet food) while awaiting regulatory approval for human food markets may still qualify under these Criteria. This does not impact the long-term intended use of the product, which must align with the Criteria's objectives of providing an alternative to animal-based foods for human consumption. Entities must provide evidence demonstrating their intention to enter the human food market and ensure that the majority of revenue is expected to be derived from human food applications once approval is obtained.

3.2 Entities in scope

3.2.1 Specialised alternative protein producers

Those whose core focus is alternative proteins (as defined below) and whose company fits in one of the following organisation types:

- protein producer,
- food manufacturer.²³

For specialised alternative protein producers, the term ‘alternative proteins’ refers to the following:

- Analogues that directly substitute animal-derived products or ingredients (via whole, traditional and, novel plant-based, fungi-based, fermentation-enabled, cultivated, or hybrid food technologies).
- Traditional plant-based protein products.
- Plant-based and fungi-based whole-food proteins and fats.²⁴

3.2.2 Diversified alternative protein producers

Those that produce a variety of products and are diversifying their product portfolios to include alternative proteins (as defined below).

The company fits in one of the following organisation types:

- protein producer,
- food manufacturer,
- food retailer producing their own product lines.²⁵

For diversified alternative protein producers, the term ‘alternative proteins’ refers to the following:

- Analogues that directly substitute animal-derived products or ingredients (via whole, traditional and novel plant-based, fungi-based, fermentation-enabled, cultivated, or hybrid food technologies).
- Traditional plant-based protein products.
- Plant-based and fungi-based whole-food proteins and fats.
- Blended products.²⁶

3.2.3 Distributors of alternative proteins

Those that sell a variety of products and are diversifying their product portfolios to include alternative proteins.

The company fits in one of the following organisation types:

- Retailer e.g., supermarket.
- Restaurant e.g., fast-food chain.
- Food service e.g., school catering.
- Traders e.g., selling alternative protein ingredients not produced by the company.

For alternative protein distributors, the term ‘alternative proteins’ refers to the following:

- Analogues that directly substitute animal-derived products or ingredients (via whole, traditional, and novel plant-based, fungi-based, fermentation-enabled, cultivated, or hybrid food technologies).

- Traditional plant-based protein products.
- Plant-based and fungi-based whole food proteins and fats.
- Blended products.²⁷

3.2.4 Service and enabling technology providers supporting alternative proteins

Entities providing equipment, inputs, research, development, monitoring, or other services that contribute to the mitigation benefits of alternative proteins.

The company fits in one of the following organisation types:

- Providers of enabling technologies for alternative protein production (e.g., bioreactors, scaffolding, culture media, precision fermentation infrastructure).
- R&D firms improving the efficiency, sustainability, and scalability of alternative proteins. Supply chain monitoring and traceability service providers ensuring deforestation-free and low-emission sourcing.
- Technical consultants offering life-cycle assessments, environmental impact evaluations, or sustainability certification support.

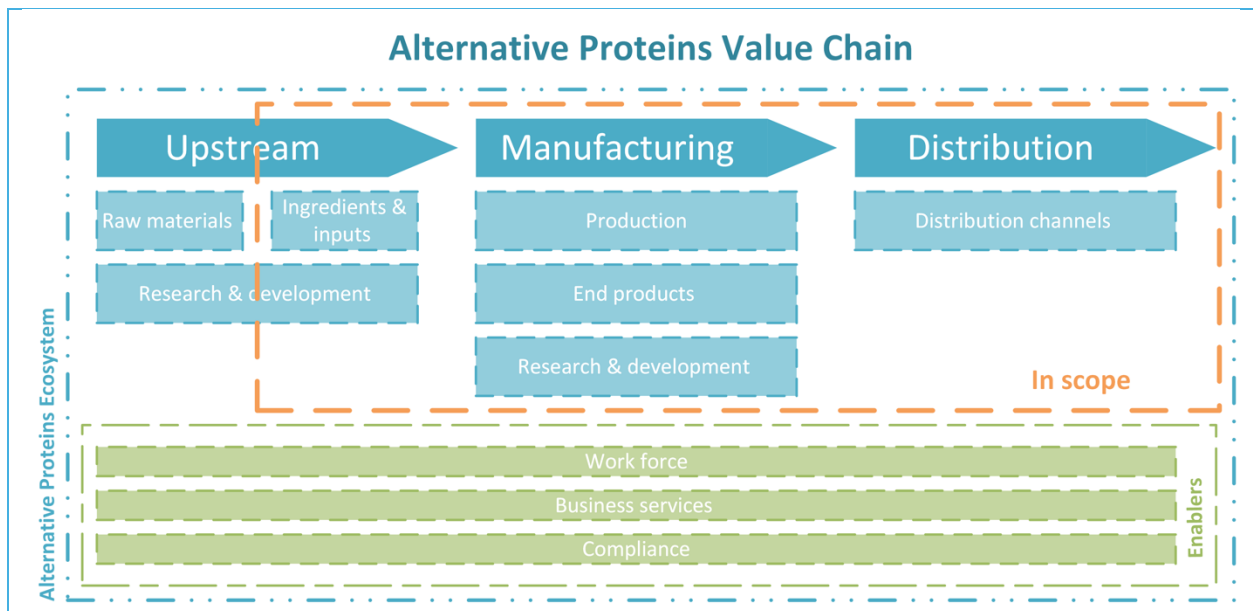


Figure 2. Entities in scope

Source: Climate Bonds (adapted from GFI, 2020)

3.3 Alignment with other Sector Criteria

Climate Bonds has developed Sector Criteria with links to the alternative protein value chain, the most relevant of which are summarised in Table 2.

Table 2. Assets or projects partially or wholly covered by other Sector Criteria.

Section of the alternative proteins chain	Covered by other Sector Criteria	Climate Bonds Criteria
Land use change: deforestation and conversion of natural ecosystems	For entities in the food value chain beyond the farm, and only to cover the land use change element of their decarbonisation strategies.	Agri-Food Deforestation and Conversion Free Criteria
Waste	Waste management (includes composting and anaerobic digestion).	Waste Management Criteria
Water infrastructure	Water infrastructure assets and/or projects.	Water Infrastructure Criteria
Low-carbon fuels	Hydrogen, ammonia, and biomass for electricity production.	Hydrogen, Waste management, and Bioenergy Criteria
Renewable electricity generation facilities	Solar, wind, marine, hydropower, geothermal, and bioenergy.	Solar, Wind, Geothermal, Hydropower, Bioenergy and Marine Criteria
Electrical utilities	Electrical utility entities (electricity generation segment).	Electrical Utility Criteria
Agricultural production	Production of ingredients and feedstocks grown or raised on farms.	Agriculture Production Criteria (Crops & Livestock)

4 Eligibility Criteria for Use of Proceeds Certification and Asset Certification for climate mitigation measures

These Criteria outline requirements for UoP and Asset Certification for projects and assets dedicated to mitigation measures in alternative protein production and distribution.

Capital investment should be directed toward achieving significant emissions reductions.

The process to check eligibility, involving a four-step rational (

), is explained in detail in the sections below.

1. **Precondition for all Certification applications (i.e., project, asset, or portfolio of assets or measures)**
 - a. **Deforestation- and conversion-free.** The commodity sourcing associated with the Certification application (i.e., project, asset, or portfolio of assets or measures) must be deforestation- and conversion-free since 31 December 2020. This is in-line with the Climate Bonds Deforestation- and Conversion- Free Sourcing Criteria (see Table 3).²⁸
 - b. **Carbon intensity threshold.** Any alternative protein production associated with the Certification application (i.e., project, asset, or portfolio of assets or measures) must have, or be expected to have, a carbon intensity at or lower than 4.2 kg of CO₂ equivalent (CO₂e) per kg of product after the implementation of eligible measures (see Table 4).
2. **Select the route(s) for Certification from the main categories of climate objectives:**
 - a. Enable substitution of traditional animal-sourced foods in the market (see Table 5, Section 1; Table 6, Section 1; Table 7, Section 1; Table 8, Section 1; and Table 9, Section 1).
 - b. Energy (see Table 5, Section 2; Table 6, Section 2; Table 7, Section 2; and Table 8, Section 2).
 - c. Raw materials (see Table 5, Section 3; Table 6, Section 3; Table 7, Section 3; and Table 8 Section 3).
 - d. Waste (see Table 5, Section 4; and Table 7, Section 4).
 - e. Research and development (see Table 5, Section 5; Table 7, Section 5; Table 9, Section 1.5; and Section 2.2.8 on p.11 of the CBS V4.2).
3. **Check climate adaptation and resilience safeguard:** climate impacts risk assessment and risk mitigation checklist (see Section 6.3).
4. **Check other environmental and social safeguards (Section 6):**
 - a. Water (Section 6.4);
 - b. Biodiversity (Section 6.5);
 - c. Social (Section 6.6);
 - d. Animal Welfare (Section 6.7) (if applicable); and
 - e. Nutrition (Section 6.8).

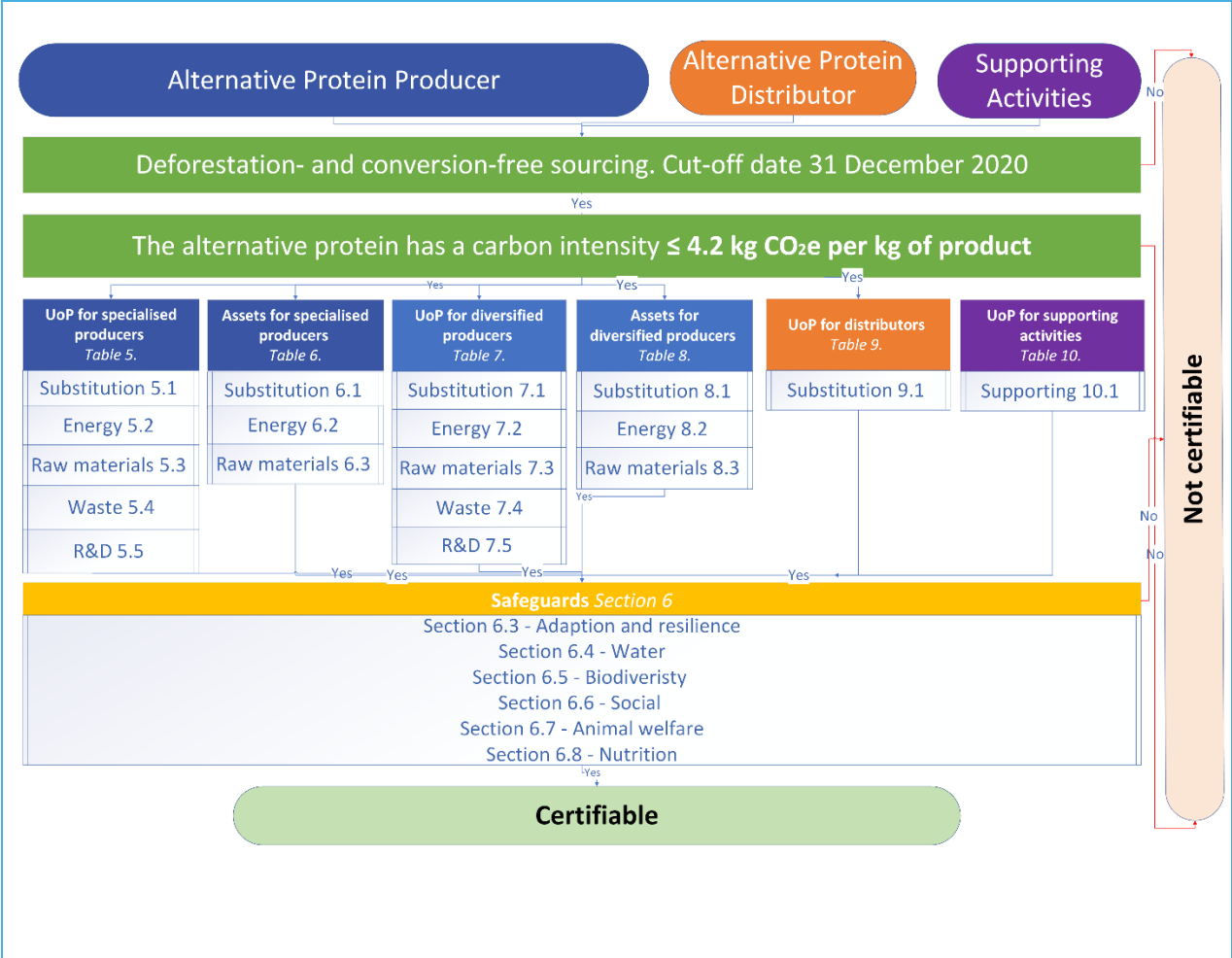


Figure 3. Assets and use of proceeds four-steps process rationale

4.1 Eligible types of expenditures

Eligible expenditure includes:

- Related and supporting expenditures for projects or physical assets, where the projects or physical assets meet the relevant sector eligibility Criteria (such as these Criteria in Sections 4.3-4.6).
- Capital expenditures undertaken to increase the value and/or lifetime of the assets or projects.
- Related and supporting expenditures including relevant installation and routine maintenance expenditure and upgrades undertaken to maintain the value and/or lifetime of the asset.
- Infrastructure expenditures directly supporting production scale-up, including but not limited to bioprocessing capacity building and other essential production infrastructure.

In line with this, eligible expenditures (i.e., project, asset, or portfolio of assets or measures) relating to alternative protein production and distribution systems might include capital and operating expenditure relating to, for example, (1) inputs (e.g., feedstocks, ingredients, energy), (2) capital goods (e.g., bioreactors, processing equipment, renewable energy generation, storage), (3) processing (e.g., drying, moulding/shaping, extruding), (4) waste

management on the production unit (composting, waste product processing, recycling), (6) trade and (7) sale (e.g., through retail or food service).

Facilities and infrastructure are not required to be exclusively dedicated to alternative protein production, particularly for diversified producers or input and technology suppliers. However, eligible expenditures must be clearly directed toward activities related to alternative protein production or distribution. Furthermore, eligible manufacturing facilities or equipment may extend beyond food production to include infrastructure essential for scaling up production, such as enabling technologies such as cell-line development, which offer capacity-building solutions for the alternative protein sector. No specific threshold is required for eligibility, provided the expenditures are aligned with the Criteria relevant to alternative proteins.

For the avoidance of doubt, what will not be considered eligible are activities, assets, or projects where the climate benefits are unclear or have an unclear time horizon, for example:

- Research and development programmes before TRL 6 (unless aiming to bring the solution, product, or technology to TRL 6) or where climate benefits are unclear based on current science.
- Policy advocacy or regulatory approval.
- General behavioural change training with unclear climate objectives.
- Any project with an unclear time horizon for climate benefits.
- Expenditure relating to general corporate purposes.

Note: *While policy advocacy and regulatory approval processes are critical for the development and scaling of alternative proteins, these activities themselves are not eligible under these Criteria. However, research that supports such initiatives, such as studies on sustainability impacts, health benefits, and product testing for safety, can be Certified via the R&D route.*

For example, research conducted to build a dossier for novel-food regulatory approval would be eligible under the R&D category. This includes studies on nutritional composition, environmental impact assessments, and safety evaluations necessary for demonstrating compliance with regulatory requirements. However, the actual process of obtaining regulatory approval, including submission fees and administrative costs, falls outside the scope of these Criteria.

Similarly, policy advocacy itself is not eligible for Certification. Direct funding for lobbying efforts or regulatory engagement could be considered market-distorting, particularly in cases where financial support influences policy outcomes rather than fostering objective scientific and technological advancements. Nevertheless, research that informs policy discussions, such as assessments of the contribution to food security of alternative proteins, climate resilience, or public health, would be eligible, provided it is undertaken as part of a broader research initiative.

These distinctions ensure that funding supports the advancement of scientific knowledge and innovation while maintaining market integrity and regulatory neutrality.

4.2 Preconditions

4.2.1 Deforestation- and conversion-free sourcing

The food commodity sourcing associated with any Certification application (i.e., project, asset, or portfolio of assets or measures) must be free from deforestation and conversion of natural ecosystems since the cut-off date of 31 December 2020.

All Certification applications (i.e., project, asset, or portfolio of assets or measures) must fulfil this requirement and provide evidence of compliance as a precondition for Certification. This is in-line with the Climate Bonds Deforestation- and Conversion-Free Sourcing Criteria.²⁹

Table 3. Deforestation- and Conversion-Free Sourcing Criteria in Brief

	Eligibility criteria	Requirements	Details
1	Cut-off date	31 December 2020	Free from deforestation and conversion of natural ecosystems in the supply chain of certifiable entities since the cut-off date. <i>Full table in appendix 2.</i>

4.2.2 Carbon intensity

All Certification applications (i.e., project, asset, or portfolio of assets or measures) must fulfil this requirement and provide evidence of compliance as a precondition. Any alternative proteins production associated with the Certification application must have, or be expected to have, a carbon intensity at or lower than 4.2 kg of CO₂ equivalent (CO₂e) per kg of product after the implementation of associated eligible measure(s). This threshold is derived from the Poore and Nemecek 2018 dataset and should follow GHG accounting guidance from the GHG Protocol.^{30,31}

Table 4. Carbon intensity threshold

	Eligibility Criteria	Requirement	Details
1	Carbon intensity	Alternative proteins associated with the UoP asset must be equivalent to or lower than 4.2 kg of CO ₂ equivalent (CO ₂ e) per kg of product.	Must include scope 1, 2, and 3 as defined below and should follow GHG accounting guidance from the GHG Protocol.

All emissions from activities from cradle-to-gate are included in the scope. This includes all the emissions generated during the life cycle of a product until it exits the factory (the ‘gate’). This encompasses resource extraction, material processing, and transportation of raw materials.

With regard to the activity boundary, emissions of the associated alternative protein production to be included in the carbon intensity threshold are:

Scope 1

- CO₂, CH₄, and N₂O emissions related to on-site energy production (including electricity) and fuel combustion.
- Emissions from production-related processes e.g., CO₂ from energy use during ingredient preparation and extrusion cooking if powered by fossil fuels on site.
- Emissions from microbial respiration during fermentation e.g., CO₂ produced as a by-product of microbial fermentation.
- Emissions from waste handling such as CO₂ from any waste handling that involves energy use or chemical reactions or CH₄ and N₂O if biowaste is composted or treated anaerobically.
- Emissions from refrigeration systems including fluorinated gases (HFCs) if refrigerants leak from cooling systems.

Scope 2

- Emissions from purchased energy generation used at the production unit; CO₂, CH₄, and N₂O depending on the type of energy used.
- Emissions from cooling and refrigeration systems including CO₂, CH₄, and N₂O from electricity generation, as mentioned above.
- Lighting, ventilation, and other utilities including CO₂, CH₄, and N₂O from electricity generation for running facility utilities as mentioned above.

Scope 3

- Emissions from purchased raw materials, ingredients, machinery, packaging, fuel, and feedstocks:
 - Emissions from producing ingredients and feedstocks.
 - Emissions from direct or statistically estimated land use change (CO₂ from stock changes; N₂O and CH₄ emissions from natural vegetation burning; CH₄, N₂O, and CO₂ emissions from peat soil burning).
 - Direct and indirect N₂O emissions from N inputs to agricultural soils (except from N fixation and precipitation).
 - Non-biogenic CO₂ emissions from lime and urea.
 - CH₄ and N₂O emissions from rice cultivation.
 - CH₄ and N₂O emissions from biomass burning.
 - CO₂, CH₄, and N₂O emissions related to on-farm energy production (including electricity) and fuel combustion (grouped as CO₂-input, fuel burning, lime, urea).
 - Emissions from manufacture of fertiliser, lime, pesticides, and other agricultural inputs, capital equipment, and infrastructure e.g., greenhouses.
 - Emissions from growing of seeds, saplings, and other similar inputs.
 - Emissions from processing ingredients and feedstocks e.g., CO₂ from energy used in refining, processing and drying the ingredients before transporting to the production facility; and
 - Emissions from the transport of raw materials, machinery, fuel, and feedstocks e.g., CO₂ from fuel combustion in trucks, ships, or planes used to transport ingredients and products, or CH₄ and N₂O emitted during the combustion of fossil fuels in diesel-powered transportation vehicles.

Note on Scope 3: Owing to the fact that the carbon intensity of the final alternative protein product is the metric, facilities responsible for the production/manufacturing stage must partially incorporate scope 3 emissions. However, this is only scope 3 emissions up to the point of the finished alternative protein product not downstream emissions associated with transporting or retailing the product. For example, a specialised alternative protein producer must incorporate upstream scope emissions from agricultural production but not the downstream emissions associated with retailing or food waste.

This approach follows that used by Poore and Nemecek (2018), which in turn primarily follows the system boundary in the World Food LCA Database.^{32,33}

4.3 Measures eligible for specialised alternative protein producers

4.3.1 Eligibility requirements for Use of Proceeds Certification for specialised alternative protein producers

Based on current science, eligible measures for UoP Certification by specialised alternative protein producers aiming at reducing GHG emissions are presented in Table 5, including details on the specific requirements for demonstration of compliance described the Climate Bonds Standard and in Chapter 6 of this document.³⁴

In addition to meeting the climate mitigation requirements in Table 5, applicants must meet:

- The preconditions requirements (see Section 4.2); and
- The adaptation and resilience (A&R) safeguard requirements (see Section 6 for details); and
- The safeguards on biodiversity, water, social aspects, animal welfare and nutrition (see Section 6 for details).

Certification of the financing of multiple measures and/projects expanding the alternative proteins scope may also require compliance with other Sector Criteria to be eligible for Climate Bonds Certification. For example, if a Certification application includes the purchase of on-site renewable energy technology it would be necessary for the issuer to prove compliance with both the Climate Bonds Alternative Proteins Criteria and the respective Climate Bonds Renewable Energy Criteria (e.g., solar, wind, hydropower, etc.).

Table 5. UoP Certification. Eligible measures for specialised alternative protein production

UoP Certification: Eligible measures for specialised alternative protein production				
Route for Certification		Eligible measure	Requirement	Demonstration of compliance
Table 5: Section 1 - Encouraging substitution of traditional animal-sourced foods				
Upscaling production	5.1.1	Installation, upgrade, and operation of processing equipment for all stages of alternative protein production, including but not limited to protein extraction, concentration, isolation, bioprocessing, structuring, texturising, fermentation, cultivation, drying, cooling, cell isolation, cell storage, cell proliferation, and upstream and downstream processing (e.g., fermenters, centrifuges, homogenisers, separators, filtration systems, mechanical processing of muscle fibres, extrusion systems, 3D printers, and other advanced manufacturing systems). This list is non-exhaustive, and other justifiable equipment used in these processes may also be eligible. (This measure is repeated in the energy section as it also relates to reducing energy demand).	Equipment falls in top 25% of energy efficiency rates for equipment available.	Evidence of energy efficiency ratings.
	5.1.2	Acquisition and/or retrofitting of existing assets for alternative protein product or ingredient production, including but not	Equipment falls in top 25% of energy efficiency rates for equipment available.	Evidence of energy efficiency ratings.

		<p>limited to adapting existing food and non-food processing infrastructure (e.g., dairy processing, bioethanol plants or brewery facilities) for alternative protein use.</p> <p>This list is non-exhaustive, and other justifiable equipment used in these processes may also be eligible.</p> <p>(This measure is repeated in the energy section as it also relates to reducing energy demand.)</p>		
	5.1.3	<p>Installation, upgrade, and operation of control and monitoring systems for optimising production parameters (e.g., AI-driven process control, automated bioprocessing systems, machine learning for formulation optimisation, digital twins for process simulation). This list is non-exhaustive and for illustration only, and additional control and monitoring innovations that contribute to efficiency improvements and emissions reductions may also qualify.</p>	<p>Equipment falls in top 25% of energy efficiency rates for equipment available.</p>	<p>Evidence of energy efficiency ratings.</p>
Encouraging consumers to substitute	5.1.4	<p>Developing and delivering marketing/communications strategy for alternative protein products that appeal to mainstream consumers.</p>	<p>Inclusive of at least one of the following:</p> <ul style="list-style-type: none"> • Placement • Price • Promotion • Presentation • Product attributes 	<p>Investment plan for marketing alternative protein products.</p>
	5.1.5	<p>Conducting market research to understand sensory and nutritional preferences, consumer behaviour, and barriers to adoption. This list is non-exhaustive and other market insight initiatives that facilitate product improvements and increase alternative protein uptake are also eligible.</p>	<p>The aim of the research is to inform either or both product formulation and targeted marketing/communications.</p>	<p>Investment plan for marketing alternative protein products.</p>
	5.1.6	<p>Collaboration with institutions to incorporate alternative proteins into public food procurement strategies, school meals, or corporate canteens.</p>	<p>Aim of the measure must be designed to increase institutional adoption of alternative proteins.</p>	<p>Formal agreements, procurement policies, or programme implementation reports.</p>
	5.1.7	<p>Research initiatives that support policy advocacy for alternative protein adoption, including, but not limited to, studies on consumer behaviour, regulatory frameworks, and sustainability impacts.</p>	<p>Focus of the project is to increase shift to alternative protein products.</p> <p>AND</p> <p>Must comply with the R&D Criteria within the CBS V4.2. See Section 2.2.8 on pp.11 of the CBS.</p>	

Table 5: Section 2 - Energy source and intensity

Greening energy sourcing	5.2.1	On-site renewable or non-emitting energy generation, including solar, wind, marine, hydropower, geothermal, and bioenergy.	Certifiable under the corresponding Climate Bonds Criteria.	
Reducing energy intensity	5.2.2	Installation of energy-efficient equipment for all stages of alternative protein production, including but not limited to protein extraction, concentration, isolation, bioprocessing, structuring, texturising, fermentation, cultivation, drying, cooling, cell isolation, cell storage, cell proliferation, and upstream and downstream processing. Other energy-efficient technologies that demonstrably reduce emissions and improve efficiency may also be eligible. (This asset is repeated in the substitution section as it also relates to scaling production.)	Equipment falls in the top 25% of energy efficiency rates for equipment available.	Evidence of energy efficiency ratings.
	5.2.3	Retrofit of existing equipment to reduce energy intensity e.g., introduction of passive or semi-passive cooling systems to lower energy demand. (This asset is repeated in the substitution section as it also relates to scaling production.)	Retrofitted equipment falls in the top 25% of energy efficiency rates for equipment available.	Evidence of energy efficiency ratings.

Table 5: Section 3 - Raw materials

Increasing capacity	5.3.1	Expanding the range of ingredient/feedstock/input options for product development and supply chain diversification. Including but not limited to including cell line or scaffolding development, the use of novel feedstocks and sustainable sourcing (e.g., algae, seaweed, non-commodity crops, agricultural by-products, precision-fermented ingredients). Other feedstock/ingredient/input innovations that support diversification and sustainability objectives may also qualify. e.g., developing supply chains utilising crop waste and food by-products as feedstocks, or utilising non-commodity crops such as sorghum, seaweed, and chickpea as key ingredient options. OR e.g., trials with different proteins to test functionality such as texture, binding, rising, flavour, and nutritional properties.	Must expand primary ingredient supply beyond soy protein concentrate, soy proteins isolate, wheat gluten, pea protein, coconut oil, canola oil, sunflower oil, and cocoa butter.	Evidence of formulation changes or product testing that integrates non-standard ingredients as primary components.
	5.3.2	Plant protein extraction facilities e.g., milling; seed dehulling; solvent and/or supercritical extraction; fractionation and	Equipment falls in top 25% of energy efficiency rates for equipment available.	Evidence of energy efficiency ratings.

		functionalisation; air classification, chemical and/or biological extraction.		
	5.3.3	Increasing plant protein production to meet demand.	Certifiable under the Climate Bonds Agrifood Criteria.	

Table 5: Section 4 - Waste

Circular economies	5.4.1	Optimisation of co-products, by-products and wastes from alternative protein production to promote circularity. e.g., plant starch left over after protein extraction utilised as feedstock for fermentation, or protein extracts/hydrolysates from plant-based agro-industrial waste (soybean meal and peanut meal) utilised to replace foetal bovine serum.	At least 50% of a waste stream goes back into a production system. If the production system is bioenergy, it must follow Climate Bonds Bioenergy Criteria.	
	5.4.2	Sourcing of ingredients/feedstocks from co-products, by-products and wastes from alternative protein production, other agrifood systems or non-food systems to strengthen circularity. This includes but is not limited to waste valorisation of protein extracts or hydrolysates from plant-based agro-industrial waste, utilisation of fermentation by-products, upcycling plant starch residues, repurposing biomass for alternative protein inputs, carbon capture and reuse within production. This list is non-exhaustive and other waste valorisation and circular economy initiatives contributing to sustainability may also be considered. .	At least 50% of an ingredient supply must be sourced from co-products, by-products, and wastes from another system.	
Efficient resource use	5.4.3	Introducing continuous or semi- continuous harvest practices in cultivated meat production.	At least 50% improvement in efficiency.	
	5.4.4	Treatment and valorisation of waste materials for safe disposal and circularity.	Must ensure safe and responsible waste treatment and disposal/utilisation with measurable environmental benefits.	
Waste reduction	5.4.5	Implementing waste reduction strategies.	Must ensure measurable reductions in food waste and support community or sustainability goals.	Documentation of real or expected waste reduction outcomes.

Table 5: Section 5 - Research and development

Technological and economic feasibility	5.5.1	Research, applied research, and experimental development of solutions, processes, technologies, business models, and other products dedicated to improving the technological and economic feasibility of alternative proteins for the purpose of substituting animal-sourced foods.	Must comply with the R&D Criteria within the CBS V4.2. See Section 2.2.8 on pp.11 of the CBS. TRL 1 to TRL 5: Early-stage R&D may be considered eligible if aiming to bring	
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			<p>the solution, product, or technology to TRL 6.</p> <p>TRL 6: Projects require that the technology is fine-tuned to a variety of operating conditions, the process is reliable, and the performance meets expectations.</p> <p>Interoperability with other connected technologies must be demonstrated, the manufacturing approach clearly defined, and all environmental, regulatory, and socio-economic issues addressed. The project should aim to improve the scalability, affordability, and sensory attributes of alternative proteins to ensure their potential to substitute animal-sourced foods effectively.</p> <p>TRL 6 or 7: Where the researched, developed, or innovated technology, product, or other solution is at TRL 6 or 7, the project demonstrates advancements in one or more of the following areas:</p> <ul style="list-style-type: none"> (a) Achieving parity or superiority in sensory, nutritional, or functional characteristics compared to animal-sourced foods. (b) Evidence of scalability and cost-effectiveness in production systems to make the alternative protein competitive with animal-based counterparts. (c) Integration with existing supply chains to improve accessibility and adoption of alternative proteins. 	
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			<p>TRL 8: Where the researched, developed, or innovated technology, product, or other solution is at TRL 8 or higher, the entity must demonstrate the following:</p> <ul style="list-style-type: none"> (a) Market readiness, with evidence of consumer acceptance studies or pilot programmes showcasing the product's viability for replacing animal-sourced foods. (b) Compliance with applicable food safety and regulatory standards. (c) Verification of production scalability and affordability, enabling broad adoption as a substitute for animal-sourced foods. <p>See Appendix 3 for more information.</p> <p>See Appendix 2 in background paper for list of recommended projects.</p>	
Life cycle GHG emissions	5.5.2	Research, applied research and experimental development of solutions, processes, technologies, business models and other products dedicated to the substantial reduction, avoidance or removal of GHG emissions from alternative proteins.	<p>Must comply with the R&D Criteria within the CBS V4.2. See Section 2.2.8 on pp.11 of the CBS.</p> <p>TRL 1 to TRL 5: Early-stage R&D may be considered eligible if aiming to bring the solution, product, or technology to TRL 6.</p> <p>TRL 6: Projects require that the technology is fine-tuned to a variety of operating conditions; the process is reliable and the performances match the expectations; interoperability with other connected technologies is demonstrated; the</p>	

			<p>manufacturing approach is clearly defined and that all environmental, regulatory, and socio-economic issues are addressed. The project brings the solution, process, technology, business model or other product through TRL 1-5;</p> <p>TRL 6 or 7: Where the researched, developed or innovated technology, product or other solution is at TRL 6 or 7, life- cycle GHG emissions are evaluated in simplified form by the entity carrying out the research. The entity demonstrates one of the following, where applicable:</p> <ul style="list-style-type: none"> (a) A patent not older than 10 years associated with the technology, product or other solution, where information on its GHG emission reduction potential has been provided. (b) A permit obtained from a competent authority for operating the demonstration site associated with the innovative technology, product or other solution for the duration of the demonstration project, where information on its GHG emission reduction potential has been provided. <p>TRL 8: Where the researched, developed or innovated technology, product or other solution is at TRL 8 or higher, life- cycle GHG emissions are calculated using Recommendation 2013/179/EU or, alternatively, using ISO 14067:2018 or ISO 14064-1:2018 and are verified by an independent third party.</p>	
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			See Appendix 4 for more information. See Appendix 2 in background paper for list of recommended projects.	
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4.3.2 Eligibility requirements for Asset Certification for specialised alternative protein producers

Based on current science, specialised alternative protein producers aiming to encourage adoption of alternative proteins or mitigate GHG emissions of alternative protein production can apply to Certify the assets summarised in Table 6 as eligible. These assets could be Certified, subject to meeting the specific Criteria described the Climate Bonds Standard and in Chapter 6 of this document.³⁵

In addition to meeting the climate mitigation requirements in Table 6, the applicant must meet:

- The pre-conditions requirements (see Section 4.2); and
- The adaptation and resilience (A&R) requirements (see Section 6 for details); and
- The safeguards on biodiversity, water, social aspects, animal welfare and nutrition (see Section 6 for details).

Table 6. Asset Certification. Eligible measures for specialised alternative protein production

Asset Certification: eligible measures for specialised alternative protein production				
Route(s) of Certification	Eligible measure		Requirement	Demonstration of compliance
Table 6: Section 1 - Encouraging substitution of traditional animal-sourced foods				
Upscaling production	6.1.1	<p><u>Processing equipment</u> for all stages of alternative protein production, including but not limited to protein extraction, concentration, isolation, bioprocessing, structuring, texturising fermentation, cultivation, drying, cooling, cell isolation, cell storage, cell proliferation, and upstream and downstream processing (e.g., fermenters, centrifuges, homogenisers, separators, filtration systems, mechanical processing of muscle fibres, extrusion systems, 3D printers, and other advanced manufacturing systems). This list is non-exhaustive, and other justifiable equipment used in these processes may also be eligible.</p> <p>(This measure is repeated in the energy section as it also relates to reducing energy demand.)</p>	Equipment falls in top 25% of energy efficiency rates for equipment available.	Evidence of energy efficiency ratings.

	6.1.2	Existing assets for alternative protein product or ingredient production, including but not limited to adapting existing food and non-food processing infrastructure (e.g., dairy processing, bioethanol plants or brewery facilities) for alternative protein use. This list is non-exhaustive, and other justifiable equipment used in these processes may also be eligible. (This measure is repeated in the energy section as it also relates to reducing energy demand.)	Equipment falls in top 25% of energy efficiency rates for equipment available.	Evidence of energy efficiency ratings.
	6.1.3	Control and monitoring systems for optimising production parameters (e.g., AI-driven process control, automated bioprocessing systems, machine learning for formulation optimisation, digital twins for process simulation). This list is non-exhaustive and for illustration only, additional control and monitoring innovations that contribute to efficiency improvements and emissions reductions may also qualify.	Equipment falls in top 25% of energy efficiency rates for equipment available.	

Table 6: Section 2 - Energy source and intensity

Green energy sourcing	6.2.1	Onsite renewable or non-emitting energy generation including solar, wind, marine, hydropower, geothermal, and bioenergy.	Certifiable under the corresponding Climate Bonds Criteria.	
Reducing energy intensity	6.2.2	Energy-efficient equipment for all stages of alternative protein production, including but not limited to protein extraction, concentration, isolation, bioprocessing, structuring, texturing, fermentation, cultivation, drying, cooling, cell isolation, cell storage, cell proliferation, and upstream and downstream processing. Other energy-efficient technologies that demonstrably reduce emissions and improve efficiency may also be eligible. (This asset is repeated in the substitution section as it also relates to scaling production.)	Equipment falls in top 25% of energy efficiency rates for equipment available.	Evidence of energy efficiency ratings.
	6.2.3	Equipment to retrofit of existing infrastructure to reduce energy intensity e.g., passive or semi-passive cooling systems to lower energy demand.	Retrofitted equipment falls in top 25% of energy efficiency rates for equipment available.	Evidence of energy efficiency ratings.

Table 6: Section 3 - Raw materials

Increasing capacity	6.3.1	Plant protein extraction facilities e.g., milling; seed dehulling; solvent and/or supercritical extraction; fractionation and functionalisation; air classification, chemical and/or biological extraction.	Equipment falls in top 25% of energy.	Evidence of energy efficiency ratings.
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4.4 Measures eligible for diversified alternative protein producers

4.4.1 Eligibility requirements for Use of Proceeds Certification for diversified alternative protein producers

Based on current science, diversified alternative protein producers aiming to encourage adoption of alternative proteins or mitigate GHG emissions of alternative protein production can apply eligible measures summarised in Table 7. These measures could be part of a Certified UoP instrument (debt or loan) subject to meeting the specific Criteria described the Climate Bonds Standard and in Chapter 6 of this document.³⁶

In addition to meeting the climate mitigation requirements in Table 7, applicants must meet:

- The pre-conditions requirements (see Section 4.2); and
- The adaptation & resilience requirements (see Section 6 for details); and
- The safeguards on biodiversity, water, social aspects, animal welfare and nutrition (see Section 6 for details).

Certification of the financing of multiple measures and/projects expanding the Alternative Proteins scope may also require compliance with other Sector Criteria to be eligible for Climate Bonds Certification. For example, for a bond included in the purchase of on-site renewable energy technology it would be necessary for the issuer to prove compliance with both the Climate Bonds Alternative Proteins Criteria and the respective Climate Bonds Renewable Energy Criteria (e.g., solar, wind, hydropower, etc.).

Table 7. UoP Certification: Eligible measures for diversified alternative protein production

UoP Certification: Eligible measures for diversified alternative protein production				
Route for Certification		Eligible measure	Requirement	Demonstration of compliance
Table 7: Section 1 - Encouraging substitution of traditional animal-sourced foods				
Upscaling production	7.1.1	Installation, upgrade, and operation of processing equipment for all stages of alternative protein production, including but not limited to protein extraction, concentration, isolation, bioprocessing, structuring, texturing, fermentation, cultivation, drying, cooling, cell isolation, cell storage, cell proliferation, and upstream and downstream processing (e.g., fermenters, centrifuges, homogenisers, separators, filtration systems, mechanical processing of muscle fibres, extrusion systems, 3D printers, and other advanced manufacturing systems). This list is non-exhaustive, and other justifiable equipment used in these processes may also be eligible.	Equipment falls in top 25% of energy efficiency rates for equipment available.	Evidence of energy efficiency ratings.

		(This measure is repeated in the energy section as it also relates to reducing energy demand).		
	7.1.2	<p>Acquisition and/or retrofitting of existing assets for alternative protein product or ingredient production, including but not limited to adapting existing food and non-food processing infrastructure (e.g., dairy processing, bioethanol plants or brewery facilities) for alternative protein use.</p> <p>This list is non-exhaustive, and other justifiable equipment used in these processes may also be eligible.</p> <p>(This measure is repeated in the energy section as it also relates to reducing energy demand.)</p>	Equipment falls in top 25% of energy efficiency rates for equipment available.	Evidence of energy efficiency ratings.
	7.1.3	<p>Installation, upgrade, and operation of control and monitoring systems for optimising production parameters (e.g., AI-driven process control, automated bioprocessing systems, machine learning for formulation optimisation, digital twins for process simulation). This list is non-exhaustive and for illustration only, additional control and monitoring innovations that contribute to efficiency improvements and emissions reductions may also qualify.</p>	Equipment falls in top 25% of energy efficiency rates for equipment available.	Evidence of energy efficiency ratings.
Encouraging substitution	7.1.4	<p>Developing and delivering marketing/communications strategy for alternative protein products that appeal to mainstream consumers.</p>	<p>Inclusive of at least one of the following:</p> <ul style="list-style-type: none"> • Choice architecture (product attributes, labelling, location, etc.), • Messaging, • Packaging design, • Advertising. 	Investment plan for marketing alternative protein products.
	7.1.5	<p>Reformulating existing products to replace 60% or more of animal-sourced ingredients with alternative proteins.</p>	Animal-sourced ingredients must be reduced by at least 60%.	Weighted ingredient list before and after reformulation.
	7.1.6	<p>Expansion of alternative protein product offering and broadening the product portfolio through organic or inorganic growth strategies e.g., M&A/vertical integration with alternative protein companies or developing new alternative protein products.</p>	The alternative protein producer must be eligible through the Climate Bonds Criteria.	Alternative protein product must fit into the scope of this Criteria (Section 3.1) and must pass both the deforestation and conversion precondition (Section 4.2.1) and the carbon Intensity precondition (Section 4.2.2).

	7.1.7	Conducting market research to understand sensory and nutritional preferences, consumer behaviour, and barriers to adoption. This list is non-exhaustive and other market insights initiatives that facilitate product improvements and increase alternative protein uptake are also eligible.	The aim of the research is to inform either or both product formulation and targeted marketing/communications.	Investment plan for marketing alternative protein products.
	7.1.8	Scenario analysis and risk management.	Must follow the Task Force on Climate-Related Financial Disclosures framework. ³⁷	Application of the framework.
	7.1.9	Build internal and/or external systems for tracking and disclosing metrics.	<p>At a minimum, must disclose all of these from the FAIRR and GFI Alternative Proteins ESG Reporting Framework:</p> <ul style="list-style-type: none"> • The scope 1, 2 and 3 emissions (tCO₂e, by gas, and methodology). • GHG emissions intensity ratio (tCO₂e per l or kg, scopes included). • Direct total energy consumption (GJ). • How much of the direct total energy consumption comes from renewable sources (Renewable energy) (KWh, and % total energy). <p>Recommended to follow the GFI & FAIRR Alternative Protein ESG Framework.</p>	Application of the FAIRR and GFI Alternative Proteins ESG Reporting Framework
	7.1.10	Research initiatives that support policy advocacy for alternative protein adoption, including, but not limited to, studies on consumer behaviour, regulatory frameworks, and sustainability impacts.	<p>Focus of the project is to increase the shift to alternative protein products.</p> <p>AND</p> <p>Must comply with the R&D Criteria within the CBS V4.2. See Section 2.2.8 on pp.11 of the CBS.</p>	
	7.1.11	Collaboration with institutions to incorporate alternative proteins into public food procurement strategies, school meals, or corporate canteens.	Aim of the measure must be designed to increase institutional adoption of alternative proteins.	Formal agreements, procurement policies, or programme

				implementation reports.
	7.1.12	Investment in technology, research, and reporting practices that enable clear and verifiable supply chain traceability e.g., life-cycle analysis, toxicology tests, or digital supply chain tracking.	Records demonstrating data use for transparency improvements.	
	7.1.13	Utilisation of digital and interoperable supply chain technologies, such as blockchain, AI-powered analytics, and cloud-based traceability solutions, to enhance ingredient-level transparency.	Implementation plan and technology adoption evidence.	
Green energy sourcing	7.2.1	On-site renewable or non-emitting energy generation including solar, wind, marine, hydropower, geothermal, and bioenergy.	Certifiable under the corresponding Climate Bonds Criteria.	
Reducing energy intensity	7.2.2	Installation of energy-efficient equipment for all stages of alternative protein production, including but not limited to protein extraction, concentration, isolation, bioprocessing, structuring, fermentation, cultivation, drying, cooling, and upstream and downstream processing. Other energy-efficient technologies that demonstrably reduce emissions and improve efficiency may also be eligible. (This asset is repeated in the substitution section as it also relates to scaling production.)	Equipment falls in top 25% of energy efficiency rates for equipment available.	Evidence of energy efficiency ratings.
	7.2.3	Retrofit of existing equipment to reduce energy intensity e.g., introduction of passive or semi-passive cooling systems to lower energy demand.	Retrofitted equipment falls in top 25% of energy efficiency rates for equipment available.	Evidence of energy efficiency ratings.

Table 7: Section 2 - Energy source and intensity

Upscaling production	7.3.1	Expanding the range of ingredient/feedstock/input options for product development and supply chain diversification. Including but not limited to including cell line or scaffolding development, the use of novel feedstocks and sustainable sourcing (e.g., algae, seaweed, non-commodity crops, agricultural by-products, precision-fermented ingredients). Other feedstock/ingredient/input innovations that support diversification and sustainability objectives may also qualify e.g., developing supply chains utilising crop waste and food by-products as feedstocks, or utilising non-commodity	Must expand primary ingredient supply beyond soy protein concentrate, soy proteins isolate, wheat gluten, pea protein, coconut oil, canola oil, sunflower oil, and cocoa butter.	Evidence of formulation changes or product testing that integrates non-standard ingredients as primary components, or investment plan for supply chain diversification.
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		crops like sorghum, seaweed and chickpea as key ingredient options; or trials with different proteins to test functionality such as texture, binding, rising, flavour, and nutritional properties.		
	7.3.2	Plant protein extraction facilities e.g., milling; seed dehulling; solvent and/or supercritical extraction; fractionation and functionalisation; air classification, chemical and/or biological extraction.	Equipment falls in top 25% of energy efficiency rates for equipment available.	Evidence of energy efficiency ratings.
	7.3.3	Increasing plant protein production to meet demand.	Certifiable under the Climate Bonds Agrifood Criteria.	

Table 7: Section 4 - Waste

Circular economies	7.4.1	Optimisation of co-products, by-products and wastes from alternative protein production to strengthen circularity e.g., plant starch left over after protein extraction utilised as feedstock for fermentation, or protein extracts/hydrolysates from plant-based agro-industrial waste (soybean meal and peanut meal) utilised to replace foetal bovine serum.	At least 50% of a waste stream goes back into a production system. If the production system is bioenergy, it must follow Climate Bonds Bioenergy Criteria.	
	7.4.2	Sourcing of ingredients/feedstocks from co-products, by-products and wastes from alternative protein production, other agrifood system, or non-food systems to promote circularity. This includes but is not limited to treatment and waste valorisation of protein extracts or hydrolysates from plant-based agro-industrial waste, utilisation of fermentation by-products, upcycling plant starch residues, repurposing biomass for alternative protein inputs, carbon capture and reuse within production. This list is non-exhaustive and other waste valorisation and circular economy initiatives contributing to sustainability may also be considered.	At least 50% of an ingredient supply must be sourced from co-products, by-products, and wastes from another system.	Supplier records outlining the origins of the ingredients. This could include: <ul style="list-style-type: none"> • contracts, • certifications, • invoices.
Efficient resource use	7.4.3	Introducing continuous or semi-continuous harvest practices in cultivated meat production.	At least 50% of an ingredient supply must be sourced from co-products, by-products and wastes from another system.	
	7.4.4	Treatment and valorisation of waste materials for safe disposal and circularity.	Must ensure safe and responsible waste treatment and disposal/utilisation with measurable environmental benefits.	Waste management plan, records of implementation, and compliance documentation.

Waste reduction	7.4.54	Implementing waste reduction strategies.	Must ensure measurable reductions in food waste and support community or sustainability goals.	Documentation of real or expected waste reduction outcomes.
Table 7: Section 5 - Research and development				
Technological and economic feasibility	7.5.1	Research, applied research, and experimental development of solutions, processes, technologies, business models, and other products dedicated to improving the technological and economic feasibility of alternative proteins for the purpose of substituting animal-sourced foods.	<p>Must comply with the R&D Criteria within the CBS V4.2. See Section 2.2.8 on pp.11 of the CBS.</p> <p>TRL 1 to TRL 5: Early-stage R&D may be considered eligible if aiming to bring the solution, product, or technology to TRL 6.</p> <p>TRL 6: Projects require that the technology is fine-tuned to a variety of operating conditions, the process is reliable, and the performance meets expectations. Interoperability with other connected technologies must be demonstrated, the manufacturing approach clearly defined, and all environmental, regulatory, and socio-economic issues addressed. The project should aim to improve the scalability, affordability, and sensory attributes of alternative proteins to ensure their potential to substitute animal-sourced foods effectively.</p> <p>TRL 6 or 7: Where the researched, developed, or innovated technology, product, or other solution is at TRL 6 or 7, the project demonstrates advancements in one or more of the following areas: (a) Achieving parity or superiority in sensory,</p>	

			<p>nutritional, or functional characteristics compared to animal-sourced foods.</p> <p>(b) Evidence of scalability and cost-effectiveness in production systems to make the alternative protein competitive with animal-based counterparts.</p> <p>(c) Integration with existing supply chains to improve accessibility and adoption of alternative proteins.</p> <p>TRL 8: Where the researched, developed, or innovated technology, product, or other solution is at TRL 8 or higher, the entity must demonstrate the following:</p> <p>(a) Market readiness, with evidence of consumer acceptance studies or pilot programmes showcasing the product's viability for replacing animal-sourced foods.</p> <p>(b) Compliance with applicable food safety and regulatory standards.</p> <p>(c) Verification of production scalability and affordability, enabling broad adoption as a substitute for animal-sourced foods.</p> <p>See Appendix 3 for more information. See Appendix 2 in background paper for list of recommended projects.</p>	
Life-cycle GHG emissions	7.5.2	Research, applied research, and experimental development of solutions, processes, technologies, business models and other products dedicated to the substantial reduction, avoidance or removal of GHG emissions from alternative proteins.	<p>Must comply with the R&D Criteria within the CBS V4.2. See Section 2.2.8 on pp.11 of the CBS.</p> <p>TRL 1 to TRL 5: Early-stage R&D may be considered</p>	

			<p>eligible if aiming to bring the solution, product or technology to TRL 6.</p> <p>TRL 6: Projects require that the technology is fine-tuned to a variety of operating conditions; the process is reliable and the performances match the expectations; interoperability with other connected technologies is demonstrated; the manufacturing approach is clearly defined and that all environmental, regulatory and socio-economic issues are addressed. The project brings the solution, process, technology, business model or other product through TRL 1-5.</p> <p>TRL 6 or 7: Where the researched, developed or innovated technology, product or other solution is at TRL 6 or 7, life-cycle GHG emissions are evaluated in simplified form by the entity carrying out the research. The entity demonstrates one of the following, where applicable:</p> <ul style="list-style-type: none"> (a) A patent not older than 10 years associated with the technology, product or other solution, where information on its GHG emission reduction potential has been provided. (b) A permit obtained from a competent authority for operating the demonstration site associated with the innovative technology, product or other solution for the duration of the demonstration project, where information on its GHG emission reduction potential has been provided. 	
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			<p>TRL 8: Where the researched, developed or innovated technology, product or other solution is at TRL 8 or higher, life-cycle GHG emissions are calculated using Recommendation 2013/179/EU or, alternatively, using ISO 14067:2018 or ISO 14064-1:2018 and are verified by an independent third party.</p> <p>See Appendix 4 for more information.</p> <p>See Appendix 2 in background paper for list of recommended projects.</p>	
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4.4.2 Eligibility requirements for Asset Certification for diversified alternative protein producers

Based on current science, diversified alternative protein producers aiming to encourage adoption of alternative proteins or mitigate GHG emissions of alternative protein production can apply eligible measures summarised in Table 8. These assets could be Certified, subject to meeting the specific Criteria described the Climate Bonds Standard and in Chapter 6 of this document.³⁸

In addition to meeting the climate mitigation requirements in Table 8, the applicant must meet:

- The pre-conditions requirements (see Section 4.2); and
- The adaptation and resilience (A&R) requirements (see Section 6 for details); and
- The safeguards on biodiversity, water, social aspects, animal welfare and nutrition (see Section 6 for details).

Table 8. Asset Certification: Eligible measures for diversified alternative protein production

Asset Certification for diversified alternative protein production				
Route for Certification		Eligible measure	Requirement	Demonstration of compliance
Table 8: Section 1 - Encouraging substitution of traditional animal-sourced foods				
Upscaling production	8.1.1	Processing equipment for all stages of alternative protein production, including but not limited to protein extraction, concentration, isolation, bioprocessing, structuring, texturing, fermentation, cultivation, drying, cooling, cell isolation, cell storage, cell proliferation, and upstream and downstream processing. (e.g., fermenters, centrifuges, homogenisers, separators, filtration systems, mechanical processing of muscle fibres, extrusion systems,	Equipment falls in top 25% of energy efficiency rates for equipment available.	Evidence of energy efficiency ratings.

		3D printers, and other advanced manufacturing systems). This list is non-exhaustive, and other justifiable equipment used in these processes may also be eligible. (This asset is repeated in the energy section as it also relates to reducing energy demand.)		
	8.1.2	Existing assets for alternative protein product or ingredient production, including but not limited to adapting existing food and non-food processing infrastructure (e.g., dairy processing, bioethanol plants or brewery facilities) for alternative protein use. This list is non-exhaustive, and other justifiable equipment used in these processes may also be eligible. (This asset is repeated in the energy section as it also relates to reducing energy demand.)	Equipment falls in top 25% of energy efficiency rates for equipment available.	Evidence of energy efficiency ratings.
	8.1.3	Control and monitoring systems for optimising production parameters e.g., AI-driven process control, automated bioprocessing systems, machine learning for formulation optimisation, digital twins for process simulation). This list is non-exhaustive and for illustration only, additional control and monitoring innovations that contribute to efficiency improvements and emissions reductions may also qualify.	Equipment falls in top 25% of energy efficiency rates for equipment available.	Evidence of energy efficiency ratings.

Table 8: Section 2 - Energy source and intensity

Green energy sourcing	8.2.1	On-site renewable or non-emitting energy generation including solar, wind, marine, hydropower, geothermal, and bioenergy.	Certifiable under the corresponding Climate Bonds criteria.	
Reducing energy intensity	8.2.2	Energy-efficient equipment for all stages of alternative protein production, including but not limited to protein extraction, concentration, isolation, bioprocessing, structuring, texturising, fermentation, cultivation, drying, cooling, cell isolation, cell storage, cell proliferation, and upstream and downstream processing. Other energy-efficient technologies that demonstrably reduce emissions and improve efficiency may also be eligible. (This asset is repeated in the substitution section as it also relates to scaling production.)	Equipment falls in top 25% of energy efficiency rates for equipment available.	Evidence of energy efficiency ratings.
	8.2.3	Equipment to retrofit of existing infrastructure to reduce energy intensity e.g., passive or semi-passive cooling systems to lower energy demand.	Retrofitted equipment falls in top 25% of energy efficiency rates for equipment available.	Evidence of energy efficiency ratings.

Table 8: Section 3 - Raw materials

Increasing capacity	8.3.1	Plant protein extraction facilities e.g., milling; seed dehulling; solvent and/or supercritical	Equipment falls in top 25% of energy	Evidence of energy efficiency ratings.
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	extraction; fractionation and functionalisation; air classification, chemical and/or biological extraction.	efficiency rates for equipment available.	
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4.5 Measures eligible for alternative protein distributors

4.5.1 Eligibility requirements for Use of Proceeds Certification for alternative protein distributors

Based on current science, distributors of alternative proteins aiming to encourage adoption of alternative proteins can apply eligible measures summarised in Table 9. These measures could be part of a Certified UoP instrument (debt or loan), subject to meeting the specific Criteria described the Climate Bonds Standard and in Chapter 6 of this document.³⁹

In addition to meeting the climate mitigation requirements in Table 9, the applicant must meet:

- The pre-conditions requirements (see Section 4.2); and
- The adaptation & resilience requirements (see Section 6 for details); and
- The safeguards on biodiversity, water, social aspects, animal welfare and nutrition (see Section 6 for details).

Certification of the financing of multiple measures and/projects expanding the alternative proteins scope may also require compliance with other Sector Criteria to be eligible for Climate Bonds Certification. For example, for a bond included the purchase of on-site renewable energy technology, it would be necessary for the issuer to prove compliance with both the Climate Bonds Alternative Proteins Criteria and the respective Climate Bonds Renewable Energy Criteria (e.g., solar, wind, hydropower, etc.).

Table 9. UoP Certification: Eligible measures for alternative protein distributors.

Eligibility requirements for Use of Proceeds Certification for alternative protein distributors				
Route for Certification		Eligible measure	Requirement	Demonstration of compliance
Table 9: Section 1 - Encouraging substitution of traditional animal-sourced foods				
Table 9: Section 1.1 - Diversification of protein products				
Food service and restaurants only For retailers developing own product lines, see Diversified Alternative Protein Producer Criteria	9.1.1.1	Reformulation programs aimed at reducing or removing animal-derived ingredients in dishes while increasing the amount of alternative proteins.	Animal-sourced ingredients must be reduced by at least 60%.	Weighted ingredient list before and after reformulation.
	9.1.1.2	Allocation of internal resources towards R&D to expand the product line-up, including but not limited to developing new alternative protein dishes in underrepresented food and beverage categories, or introducing alternative protein alternatives to popular meat-based dishes/products. This list is non-exhaustive and other measures reasonably aimed at expanding product variety are eligible.	Focus of the project is to increase shifting to alternative protein products. AND Must comply with the R&D Criteria within the CBS V4.2. See Section 2.2.8 on pp.11 of the CBS.	Investment plan for R&D into developing new alternative protein dishes.

	9.1.1.3	Allocation of internal resources towards R&D to enhance the product line-up including, but not limited to, improvements in flavour, texture, and appearance of alternative protein dishes.	Focus of the project is to increase shifting to alternative protein products. AND Must comply with the R&D Criteria within the CBS V4.2. See Section 2.2.8 on pp.11 of the CBS.	Investment plan for R&D into one or more of these key adoption barriers.
	9.1.1.4	Train chefs and food preparation staff on how to cook and prepare these dishes and provide them with information about the health and environmental benefits of alternative proteins.	Can be used for: <ul style="list-style-type: none"> Establishing training programmes. Developing curricula. Funding staff to attend existing training programmes. 	
	9.1.1.5	Provide chefs and food preparation staff access to the necessary resources to prepare alternative protein dishes.	Can be used for: <ul style="list-style-type: none"> Tools Equipment Ingredients 	A plan demonstrating the 60% reduction using the tools and equipment.
	9.1.1.6	Sensory testing and consumer trials comparing alternative protein dishes to traditional meat-based dishes or best-in-class alternatives.	The focus of the project is to provide a sensory competitive benchmark.	Investment plan for research into sensory benchmarking.
Trade, retail, food service and restaurants	9.1.1.7	Expansion of alternative protein product offering and broaden the product portfolio through organic or inorganic growth strategies e.g., M&A/vertical integration with alternative protein companies, build long-term off taker relationships with alternative protein product suppliers, or develop new alternative protein dishes.	The alternative protein producer must be eligible through the Climate Bonds Criteria. It is encouraged, but not required, that the ultimate goal would be to achieve an animal products replacement target of the entire portfolio, not just single products.	Alternative protein product must fit into the scope of this Criteria (Section 3.1) and must pass both the deforestation and conversion precondition (Section 4.2.1) and the carbon intensity precondition (Section 4.2.2).
	9.1.1.8	Increase the variety of alternative protein dishes/products on offer e.g., introduce alternative protein alternatives to popular meat-based dishes/products not already offered by the retailer/restaurant.	The alternative protein producer must be eligible through the Climate Bonds Criteria.	Application of the Climate Bonds Criteria.

Table 9: Section 1.2 - Promotion and communication				
Food service and restaurants only	9.1.2.1	Implement a dedicated day where all dishes served feature alternative proteins, encompassing both whole plant-based foods and/or innovative protein sources, while excluding conventional animal-sourced proteins.	At least one day per week dedicated to increasing adoption of alternative proteins e.g., meat-free Mondays which replace all meat and seafood products but leave dairy and egg-based options.	Roll-out plan including timelines, locations, and the number of meals served on these days.
	9.1.2.2	Run cross-product promotions on alternative protein dishes and selected drinks, side dishes, or desserts.	Must run in 50% of relevant sites.	Roll-out plan including timelines, locations, and the details of the promotions.
	9.1.2.3	Redesign menus to increase update of alternative proteins.	<p>Redesign must include at least one of the following:</p> <ul style="list-style-type: none"> • To make alternative proteins the default option. • Use language on menus to emphasise the positive attributes of alternative protein dishes. • List alternative protein dishes in the main body of a menu, not in a separate 'vegetarian' box or 'specials' section. • Use language on menus to recommend alternative protein dishes. • Remove unappealing language from menus. <p>Other evidence-based approaches may be</p>	Copy of menus before and after redesign.

			taken in addition to the above.	
Trade, retail, food service and restaurants	9.1.2.4	Market and consumer research to better understand the drivers and barriers to adoption of alternative proteins e.g., this could include research into localised messaging, culturally relevant product positioning, or tailored sensory appeals to enhance adoption of alternative proteins in certain regions.	The focus of the project is to increase the shift to alternative protein products.	Investment plan for R&D into one or more key adoption drivers or barriers.
	9.1.2.5	Facilitating price parity between alternative protein products and their animal-based counterparts.	At least 50% of alternative protein products are the same price or lower than their animal origin counterpart.	Pricing plan which compares the prices of animal origin and alternative protein foods.
Retail, food service and restaurants	9.1.2.6	Consumer education initiatives, including, but not limited to, in-store tastings, digital engagement campaigns, or partnerships with influencers.	Must be supported by market research or prior evidence of effectiveness.	Roll-out plan including timelines, locations, and the details of the promotions.
	9.1.2.7	Run marketing campaigns for alternative protein products/dishes in store, out of home, and via traditional and social media.	The focus of the campaign is to increase the shift to alternative protein products.	Roll-out plan including timelines, locations, and the details of the promotions.
	9.1.2.8	Create an environment spotlighting alternative protein products and conveying product features to drive customer attention.	Update can cover aspects such as: <ul style="list-style-type: none"> • Design improvements • Marketing language • Signage • Shelf tags • Open • Sensory engagement • Open kitchens or food preparation areas for alternative proteins 	A documented plan outlining the intended enhancements to the displays, including descriptions of how the funds will be used to make the displays more engaging.
	9.1.2.9	Organising promotional events or campaigns, including, but not limited to, dedicated alternative protein feature days, price promotional deals, month-long promotions, or themed menu offerings e.g., highlighting	The focus of the project is to increase shifting to alternative protein products.	A documented plan outlining the intended promotional campaigns along with timelines, locations,

		alternative protein products in Kwanzaa themed promotion during December and offer opportunities for paid promotion.		and the details of the promotions.
	9.1.2.10	Integrating alternative proteins and recipes into health, wellness, and education programmes e.g., recommending beans in pamphlet about heart healthy foods in hospital canteens.	The focus of the project is to increase shifting to alternative protein products.	A documented plan outlining the intended health, wellness, and education programmes along with timelines, locations, and the details of the programmes.
	9.1.2.11	Highlighting alternative protein products across multiple channels, including, but not limited to, websites, apps, online ordering platforms, advertisements, and magazine features.	Must be supported by market research or prior evidence of effectiveness.	Marketing plan and expenditure breakdown.
	9.1.2.12	Research initiatives that support policy advocacy for alternative protein adoption, including, but not limited to, studies on consumer behaviour, regulatory frameworks, and sustainability impacts.	Focus of the project is to increase shifting to alternative protein products. AND Must comply with the R&D Criteria within the CBS V4.2. See Section 2.2.8 on pp.11 of the CBS.	

Table 9: Section 1.3 - Nudge tactics

Food service and restaurants only	9.1.3.1	Redesign menus to increase uptake of alternative proteins.	Redesign can include the following: <ul style="list-style-type: none"> To make alternative proteins the default option. Use language on menus to emphasise the positive attributes of alternative protein dishes. List alternative protein dishes in the main body of a menu, not in a separate 'vegetarian' box 	Copy of menu before and after redesign.
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			<p>or ‘specials’ section.</p> <ul style="list-style-type: none"> • Use language on menus to recommend alternative protein dishes. • Remove unappealing language from menus. 	
	9.1.3.2	Make dishes alternative protein by default e.g., create main dishes without animal-origin foods and allow diners to add animal source foods to an alternative protein dish for a surcharge. Alternatively, when catering ask consumers to opt-in to meat-based dishes rather than out.	At least 60% of meals made alternative protein by default.	Copy menu/display before and after redesign.
Retail, food service and restaurants	9.1.3.3	Increase the amount of a self-service display (e.g., buffets, shelves, food carts, or stations) that are dedicated to alternative protein dishes.	Self-service display space dedicated to alternative protein increased by 60%.	Documentation of floor/store layout design before and after implementation.
	9.1.3.4	Update self-service alternative protein food displays (e.g., buffets, shelves, food carts, or stations) to make them more engaging and appealing. e.g., using prominent positions, eye-catching displays, or encouraging language.	Update can cover aspects such as: design improvements, marketing language, strategic placement.	A documented plan outlining the intended enhancements to the displays, including descriptions of how the funds will be used to make the displays more engaging.
	9.1.3.5	Implement strategic pricing, placement, and messaging techniques to increase alternative protein uptake.	Must be supported by market research or prior evidence of effectiveness. Redesign at minimum must include:	Documentation of pricing, placement, and messaging strategies.
Retail only	9.1.3.6	Redesign store layout to nudge consumers towards swapping from traditional animal-sourced foods to alternative proteins.	<ol style="list-style-type: none"> 1. Redesign at minimum must include: Placing alternative proteins with similar animal-based products. 2. Placing alternative proteins in prime locations such as at eye level or in endcaps. 	

Table 9: Section 1.4 - Transparency

Trade, retail, food service, and restaurants	9.1.4.1	Scenario analysis and risk management	Must follow the Task Force on Climate-Related Financial Disclosures framework. ⁴⁰	Application of the framework.
	9.1.4.2	Build internal and/or external systems for tracking and disclosing metrics.	At a minimum, must disclose all of these from the FAIRR and GFI Alternative Proteins ESG Reporting Framework: <ul style="list-style-type: none"> • The scope 1, 2 and 3 emissions (tCO₂e, by gas, and methodology). • GHG emissions intensity ratio (tCO₂e per l or kg, scopes included). • Direct total energy consumption (GJ). • How much of the direct total energy consumption comes from renewable sources (Renewable energy) (KWh, and % total energy). Recommended to follow the GFI & FAIRR Alternative Protein ESG Framework.	Application of the framework.
	9.1.4.3	Investment in technology, research, and reporting practices that enable clear and verifiable supply chain traceability e.g., life-cycle analysis, toxicology tests, or digital supply chain tracking	Records demonstrating data use for transparency improvements.	
	1.9.4.4	Utilisation of digital and interoperable supply chain technologies, such as blockchain, AI-powered analytics, and cloud-based traceability solutions, to enhance ingredient-level transparency.	Implementation plan and technology adoption evidence.	

Table 9: Section 1.5 - R&D

<p>Trade, retail, food service and restaurants</p>	<p>9.1.5.1</p>	<p>Research, applied research, and experimental development of solutions, processes, technologies, business models and other products dedicated to the substantial reduction, avoidance or removal of GHG emissions from alternative proteins.</p>	<p>Must comply with the R&D Criteria within the CBS V4.2. See Section 2.2.8 on pp.11 of the CBS.</p> <p>TRL 1 to TRL 5: Early-stage R&D may be considered eligible if aiming to bring the solution, product or technology to TRL 6.</p> <p>TRL 6: Projects require that the technology is fine-tuned to a variety of operating conditions; the process is reliable and the performances match the expectations; interoperability with other connected technologies is demonstrated; the manufacturing approach is clearly defined; and that all environmental, regulatory and socio-economic issues are addressed. The project brings the solution, process, technology, business model or other product through TRL 1-5.</p> <p>TRL 6 or 7: Where the researched, developed or innovated technology, product or other solution is at TRL 6 or 7, life-cycle GHG emissions are evaluated in simplified form by the entity carrying out the research. The entity demonstrates one of the following, where applicable: (a) A patent not older than 10 years</p>	<p>Verified investment plan.</p>
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			<p>associated with the technology, product or other solution, where information on its GHG emission reduction potential has been provided.</p> <p>(b) A permit obtained from a competent authority for operating the demonstration site associated with the innovative technology, product or other solution for the duration of the demonstration project, where information on its GHG emission reduction potential has been provided.</p> <p>TRL 8: Where the researched, developed or innovated technology, product or other solution is at TRL 8 or higher, life-cycle GHG emissions are calculated using Recommendation 2013/179/EU or, alternatively, using ISO 14067:2018 or ISO 14064-1:2018 and are verified by an independent third party.</p> <p>See Appendix 3 for more information.</p> <p>See Appendix 2 in background paper for list of recommended projects.</p>	
	9.1.5.2	Research, applied research, and experimental development of solutions, processes, technologies, business models, and other products dedicated to improving the technological and economic feasibility	Must comply with the R&D Criteria within the CBS V4.2. See Section 2.2.8 on pp.11 of the CBS.	Verified investment plan.

		<p>of alternative proteins for the purpose of substituting animal-sourced foods.</p>	<p>TRL 1 to TRL 5: Early-stage R&D may be considered eligible if aiming to bring the solution, product, or technology to TRL 6.</p> <p>TRL 6: Projects require that the technology is fine-tuned to a variety of operating conditions, the process is reliable, and the performance meets expectations. Interoperability with other connected technologies must be demonstrated, the manufacturing approach clearly defined, and all environmental, regulatory, and socio-economic issues addressed. The project should aim to improve the scalability, affordability, and sensory attributes of alternative proteins to ensure their potential to substitute animal-sourced foods effectively.</p> <p>TRL 6 or 7: Where the researched, developed, or innovated technology, product, or other solution is at TRL 6 or 7, the project demonstrates advancements in one or more of the following areas:</p>	
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			<p>(a) Achieving parity or superiority in sensory, nutritional, or functional characteristics compared to animal-sourced foods.</p> <p>(b) Evidence of scalability and cost-effectiveness in production systems to make the alternative protein competitive with animal-based counterparts.</p> <p>(c) Integration with existing supply chains to improve accessibility and adoption of alternative proteins.</p>	
			<p>TRL 8: Where the researched, developed, or innovated technology, product, or other solution is at TRL 8 or higher, the entity must demonstrate the following:</p> <p>(a) Market readiness, with evidence of consumer acceptance studies or pilot programmes showcasing the product's viability for replacing animal-sourced foods.</p> <p>(b) Compliance with applicable food safety and regulatory standards.</p> <p>(c) Verification of production scalability and affordability, enabling broad</p>	

			<p>adoption as a substitute for animal-sourced foods.</p> <p>See Appendix 4 for more information.</p> <p>See Appendix 2 in the background paper for a list of recommended projects.</p>	
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4.6 Supporting activities eligible in or outside of alternative protein production units

4.6.1 Eligibility requirements for Use of Proceeds Certification for supporting activities

In addition to eligible measures in alternative protein production units, supporting activities and related services that enable alternative protein production by third-party applicants (outside of production units) can be Certified. These activities help strengthen the alternative protein value chain, enhance sustainability, and improve resilience. Eligible supporting activities are listed in

Table 10. UoP Certification: Eligible measures for supporting activities aimed at enabling alternative protein production outside of the production unit(s).

UoP Certification: Eligible measures for supporting activities aimed at enabling alternative protein production outside of the production unit(s)

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UoP Certification: Eligible measures for supporting activities aimed at enabling alternative protein production outside of the production unit(s)			
Route for Certification	Eligible measure	Requirement	Demonstration of compliance
Upscaling production	Introduction or expansion of bioprocessing infrastructure.	Facilities and their outputs are demonstrated to be fit for purpose for alternative proteins.	Verified facility development plan, including specifications on how

	For, for example, the development of facilities for cell-line development, cell culture media, feedstocks or other inputs that increase supply chain capacity. This list is non-exhaustive.		the infrastructure supports alternative protein production.
Increasing capacity	Development of supporting technologies and inputs such as novel processing or bioprocessing equipment, scaffolding, culture media, and cell-line advancements. This list is non-exhaustive.	Outputs are demonstrated to be fit for purpose for alternative proteins.	Technical validation reports showing that the developed technology or input meets or is expected to meet industry standards for use in alternative protein production.
Circular economies	Activities which support the valorisation of side streams and waste reduction in ingredient processing.	Activities must enable at least 50% of an ingredient supply to be sourced from co-products, by-products and wastes from another system.	Verified supply chain documentation showing that at least 50% of the ingredient supply comes from co-products, by-products, or waste streams from another system.
Efficient resource use	Activities which support then optimisation of bioprocessing efficiency and input sourcing.	Activities must be expected to at least provide 50% improvement in efficiency.	Technical reports or modelling showing real or projected efficiency gains.
Services contributing to deforestation- and natural ecosystem conversion-free sourcing	Supply chain monitoring and traceability for upstream ingredient sourcing.	Technologies such as satellite monitoring, blockchain, and software platforms ensuring deforestation- and conversion-free sourcing for alternative protein inputs.	Verified implementation plan and estimations of benefits for DCF sourcing.
Greening energy sources	Activities which support the transition to renewable energy for alternative protein producers.	The renewable energy technology transitioned to must be Certifiable under the corresponding Climate Bonds Criteria.	Application of the corresponding Climate Bonds Criteria.

<p>Reducing energy intensity</p>	<p>The development of low-energy intensity manufacturing and processing solutions, and activities which support the adoption of low-energy intensity manufacturing the processing equipment.</p>	<p>Equipment must fall in or be expected to fall in the top 25% of energy efficiency rates for equipment available.</p>	<p>Evidence of energy efficiency ratings.</p>
<p>Transparency and reporting</p>	<p>The delivery of information services that can enhance the transparency and reporting within alternative protein production and distribution, for example, technical consultants offering life-cycle assessments, environmental impact evaluations, or sustainability certification support. This list is non-exhaustive.</p>		
<p>R&D Life-cycle GHG emissions</p>	<p>Research, applied research and experimental development of solutions, processes, technologies, business models and other products dedicated to the substantial reduction, avoidance or removal of GHG emissions from alternative proteins.</p>	<p>Must comply with the R&D Criteria within the CBS V4.2. See Section 2.2.8 on pp.11 of the CBS.</p> <p>TRL 1 to TRL 5: Early-stage R&D may be considered eligible if aiming to bring the solution, product or technology to TRL 6.</p> <p>TRL 6: Projects require that the technology is fine-tuned to a variety of operating conditions; the process is reliable and the performances match the expectations; interoperability with other connected technologies is demonstrated; the manufacturing approach is clearly defined and that all environmental, regulatory, and socio-economic issues are addressed. The project brings the solution, process, technology, business model or other product through TRL 1-5.</p> <p>TRL 6 or 7: Where the researched, developed or innovated technology, product or other solution is at TRL 6 or 7, life-cycle GHG emissions are evaluated in simplified form by the entity carrying out the research. The entity demonstrates one of the following, where applicable:</p>	

		<p>(a) A patent not older than 10 years associated with the technology, product or other solution, where information on its GHG emission reduction potential has been provided.</p> <p>(b) A permit obtained from a competent authority for operating the demonstration site associated with the innovative technology, product or other solution for the duration of the demonstration project, where information on its GHG emission reduction potential has been provided.</p> <p>TRL 8: Where the researched, developed or innovated technology, product or other solution is at TRL 8 or higher, life-cycle GHG emissions are calculated using Recommendation 2013/179/EU or, alternatively, using ISO 14067:2018 or ISO 14064-1:2018 and are verified by an independent third party.</p> <p>See Appendix 4 for more information.</p> <p>See Appendix 2 in background paper for list of recommended projects.</p>	
<p>R&D Technological and economic feasibility</p>	<p>Research, applied research, and experimental development of solutions, processes, technologies, business models, and other products dedicated to improving the technological and economic feasibility of alternative proteins for the purpose of substituting animal-sourced foods.</p>	<p>Must comply with the R&D Criteria within the CBS V4.2. See Section 2.2.8 on pp.11 of the CBS.</p> <p>TRL 1 to TRL 5: Early-stage R&D may be considered eligible if aiming to bring the solution, product, or technology to TRL 6.</p> <p>TRL 6: Projects require that the technology is fine-tuned to a variety of operating conditions, the process is reliable, and the performance meets expectations. Interoperability with other connected technologies must be demonstrated, the manufacturing approach clearly defined, and all environmental, regulatory, and socio-economic issues addressed. The project should aim to improve the scalability, affordability, and sensory attributes of alternative proteins to ensure their potential to substitute animal-sourced foods effectively.</p> <p>TRL 6 or 7: Where the researched, developed, or innovated technology, product, or other solution is at TRL 6 or 7, the project demonstrates advancements in one or more of the following areas:</p>	

		<p>(a) Achieving parity or superiority in sensory, nutritional, or functional characteristics compared to animal-sourced foods.</p> <p>(b) Evidence of scalability and cost-effectiveness in production systems to make the alternative protein competitive with animal-based counterparts.</p> <p>(c) Integration with existing supply chains to improve accessibility and adoption of alternative proteins.</p> <p>TRL 8: Where the researched, developed, or innovated technology, product, or other solution is at TRL 8 or higher, the entity must demonstrate:</p> <p>(a) Market readiness, with evidence of consumer acceptance studies or pilot programmes showcasing the product's viability for replacing animal-sourced foods.</p> <p>(b) Compliance with applicable food safety and regulatory standards.</p> <p>(c) Verification of production scalability and affordability, enabling broad adoption as a substitute for animal-sourced foods.</p> <p>See Appendix 3 for more information.</p> <p>See Appendix 2 in background paper for list of recommended projects.</p>	
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Section 5: Entity Certification and SLD Certification

5.1 Entity and Sustainability-Linked Debt Certification

The Alternative Proteins Criteria detailed in this section can be used to Certify:

- a whole entity (in this case, a specialised alternative protein producer);
- sustainability-linked debt (SLD) issued by an entity exclusively dedicated to producing alternative proteins.

In both cases, the entity can be a company or a segment of the company acting as a specialised alternative protein producer.

The sections below contain methodological notes applicable to these Criteria.

See also the Climate Bonds Standard v4.2 for the cross-sectoral requirements for Entity Certification and SLD Certification relating to transition plans, disclosure for the Certified entity, and requirements relating to the parent group. These cross-sectoral requirements must be met in addition to the specific requirements described here for alternative protein production.

Note: Current proposals allow for the Certification of part of a company or group of companies, or SLD, that relate to part of a company or group of companies (see the Climate Bonds Standard 4.2 for full details in appendices). This flexibility enables Certification of the part of a company or group of companies relating to producing alternative proteins, separate from the Certification of other group or company activities of which it forms a part.

5.1.2 Who is it for?

Entity and SLD Certification is only for specialised alternative protein producers.

Specialised alternative protein producers within the scope of these Criteria include those whose core focus is alternative proteins (as defined below) and whose company fits in one of the following organisational types:

- protein producer,
- food manufacturer.

For specialised alternative protein producers seeking Entity or SLD Certification, the term alternative protein products refers to products processed after the farm gate which fall into the following categories:

- Analogues that directly substitute animal-derived products or ingredients (via plant-based, fermentation-enabled, cultivated, or hybrid food technologies).
- Traditional plant-based protein products (e.g., tofu, seitan, tempeh and others).
- Plant-based and fungi-based wholefood proteins and fats (e.g., legumes, pulses, nuts) with some processing beyond the farm gate.
- Blended products which combine alternative proteins (as above) and traditional animal-sourced foods.

5.2 Alternative Proteins Criteria for Entity Certification

Certification requires compliance with the Climate Bonds Standard Alternative Proteins Criteria (explained in this document). Two levels of Entity Certification are available, depending on when the climate mitigation performance targets align with the Climate Bonds Standard and these Alternative Proteins Criteria.

Box 1. Two levels of Entity Certification under the Climate Bonds Standard

- Level 1 – ‘Aligned’: The climate mitigation performance targets align with the Criteria at the time of Certification and thereafter until the date these targets represent net-zero emissions or 2050, whichever is sooner.
- Level 2 – ‘Transition’: The climate mitigation performance targets do not align with the Criteria at the time of Certification but align by 31 December 2030 and thereafter until the date the these targets represent net-zero emissions or 2050, whichever is sooner.

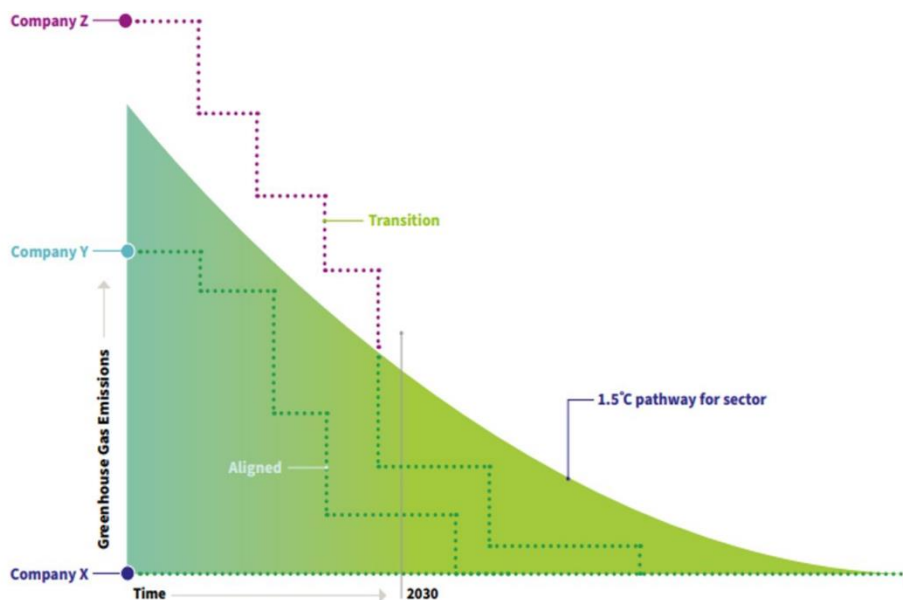


Figure 3. Aligned and transition pathways
Source: Climate Bonds

Table 11. Entity Certification requirements for Aligned and Transition

Entity & SLD Certification Tier	Entity & SLD Certification Requirements
Level 1: Aligned	<p>1. Climate Mitigation Criteria</p> <ul style="list-style-type: none"> At the time of Certification, the entity can demonstrate that its supply chain is deforestation- and conversion-free since 2020. The entity verifies that the purpose of their alternative proteins is to substitute traditional animal-sourced foods. At the time of Certification, the entity’s average emission intensity meets the sector-specific Criteria transition pathway, and its future climate mitigation performance targets continue to align with the transition pathway through to 2050. <p>2. Adaptation and Resilience Safeguard</p> <ul style="list-style-type: none"> The Certified entity meets the adaptation and resilience safeguard which is reassessed and reconfirmed every five years. <p>3. Environmental and Social Safeguards</p> <ul style="list-style-type: none"> Biodiversity Water Social Nutrition Animal welfare (if applicable: only for cultivated meat and blended product production units).

	See Figure 4
Level 2: Transition	<p>The Criteria are the same as for Level 1, except:</p> <ul style="list-style-type: none"> The Certified entity's average emission intensity does NOT meet the sector-specific Criteria transition pathway at the time of Certification, but the future climate mitigation performance targets align by 31 December 2030 and continue to align thereafter through to 2050. <p>See Figure 4</p>

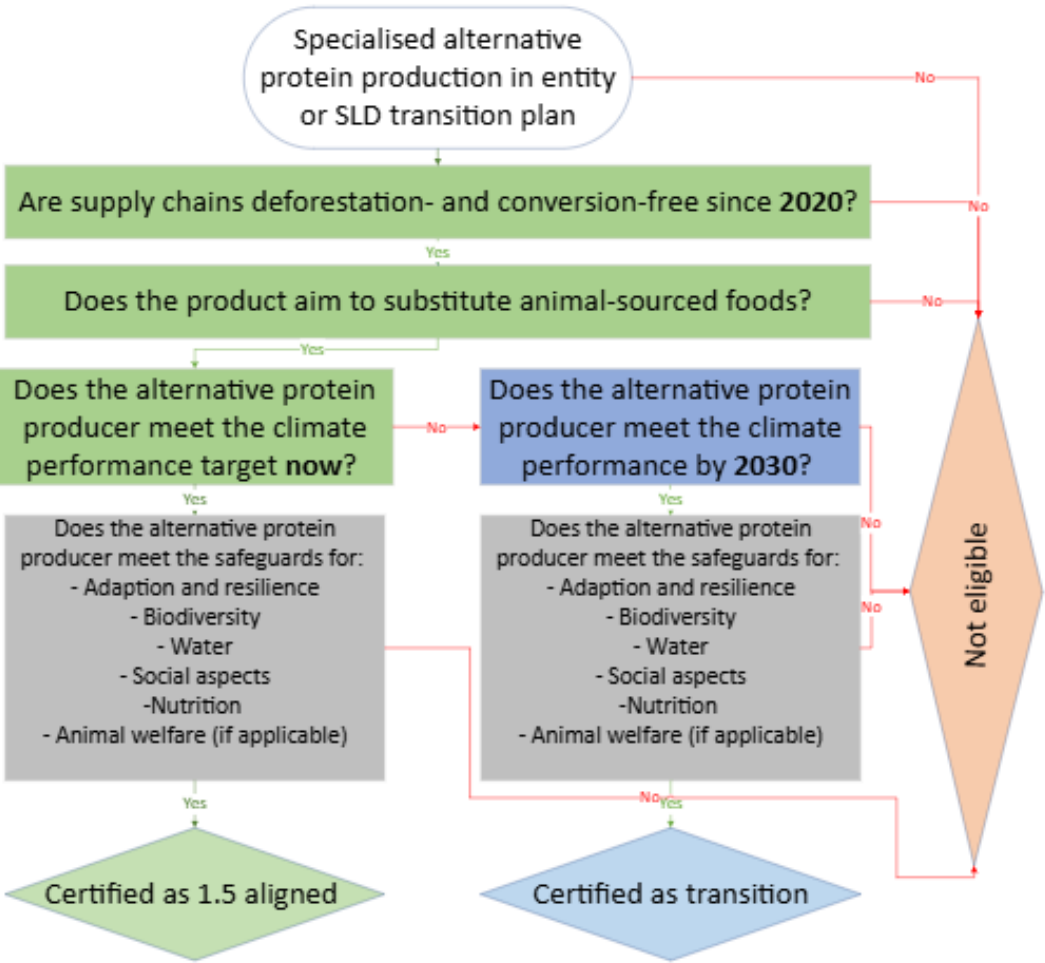


Figure 4. Flowchart of the Criteria for specialised alternative protein producer Entity and SLD Certification.

5.3 Precondition: deforestation- and conversion-free agriculture production system

The entity's supply chain must be free from deforestation and conversion of natural ecosystems since the cut-off 31 December 2020.

Any entity must fulfil this requirement and provide evidence of compliance as a precondition for Certification for all the production units in its supply chain. This is in line with the Climate Bonds Deforestation- and Conversion-Free Sourcing Criteria (see Table 3).⁴¹

5.4 Precondition: substitution intent

To be eligible for Certification under the Alternative Proteins Criteria pathway, the alternative proteins production portfolio must demonstrate a clear intent to substitute animal-sourced foods. Substitution intent refers to the reasonable likelihood that production portfolio of the entity or transition plan will replace animal-sourced foods in consumers' diets'. This precondition applies to both Entity and SLD Certification.

Verification requirements:

Substitution intent must be verified to ensure that the Certified alternative protein production portfolio aligns with the objective of replacing animal-sourced foods. Substitution intent will be verified based on a detailed justification provided by the producer, explaining how the production portfolio aligns with the goal of replacing animal-sourced foods. The verifier will assess the portfolio's characteristics and market context to ensure it meets the substitution objective. Producers are encouraged to justify their case based on their specific context. Both qualitative and quantitative data are acceptable, provided they demonstrate the production portfolio's alignment with substitution intent.

Examples of how verification may be demonstrated:

1. Documents, such as R&D reports or internal design briefs, highlighting the product(s) have been explicitly developed to mimic the sensory, nutritional, or functional attributes of animal-based foods or to provide a viable alternative product.
2. Records of sensory panels, consumer taste tests, or focus groups conducted during the development phase to ensure the product's replacement of animal-based equivalents.
3. Product design that clearly positions the product as an animal-sourced food replacement such as meat-patty-like shapes or functional elements such as melting or scrambling.
4. Marketing materials, product labels, packaging design, or claims explicitly stating the product is an alternative to animal-sourced foods such as the use of dairy-like tubs or cartons for plant-based yoghurt or milk.
5. Retail/food service placement is in product categories traditionally dominated by animal-based foods.
5. Surveys or studies showing that the product is being purchased as a substitute for animal-based equivalents such as frozen bean tamales being purchased as a direct alternative to frozen pork or cheese tamales.

7. Market data or research reports showing growing consumer trends in replacing animal-based products with the relevant alternative protein, for example, indicating that tempeh is often chosen in place of chicken in Indonesian dishes like nasi goreng.

5.5 System boundaries for Entity Certification

These Criteria are for alternative protein production entities (and their debt) with production portfolios as follows:

- Alternative proteins and fats produced for human food are included, but alternative proteins and fats exclusively for non-food uses are excluded. Exclusions therefore include alternative proteins produced for medical purposes, bioenergy, animal feed, or as pet food.
- Analogues that directly substitute animal-derived products or ingredients (via plant-based, fermentation-enabled, cultivated, or hybrid food technologies).
- Traditional plant-based protein products (e.g., tofu, seitan, soy milk, tempeh).
- Plant-based whole food proteins and fats (e.g., legumes, pulses, nuts).
- Blended products which combine both alternative proteins (as listed above) with animal-sourced foods.
- Insects are excluded (see Table 12).

These Criteria focus on agrifood systems so entities producing non-food products are currently excluded from these guidelines.

Table 12. Alternative proteins products included in the scope of these Criteria for Entity and SLD Certification

Production system	Included	Excluded
Wholefood and non-novel plant- and fungi-based	Products made from protein-rich crops and mycelium with minimal processing or using traditional methods for direct human consumption and with the purpose of proving an alternative to traditional animal-sourced foods e.g., products made from minimally processed nuts or legumes, tofu, seitan and soy milk.	Products intended exclusively for non-food or non-human food uses e.g., animal feed or bioenergy crops.
Novel plant- and fungi-based	Plant- and fungi-based foods made using plant- or fungi-sourced proteins and innovative processing techniques including but not limited to fractionation, extrusion, or 3D printing for direct human consumption and the purpose of providing an alternative to animal-based foods. e.g., plant-based meat analogues, dairy, eggs, alternatives.	Non-food or non-human food uses of novel plant-based materials e.g., packaging, textiles, animal feed or bioenergy.
Fermentation derived	Foods or food ingredients produced through traditional, microbial, biomass or precision fermentation for direct human consumption e.g.,	Fermentation-derived products for non-food or non-human food uses e.g., biofuels, industrial enzymes,

	tempeh, fermented dairy alternatives, mycoprotein, ingredients like heme, or proteins engineered through fermentation for use in other alternative proteins such as plant-based foods or cultivated meat for the purpose of providing an alternative to animal-based foods.	products used solely as animal feed or pet food.
Cultivated meat	Meat products grown from animal cells in a controlled environment (e.g., cultivated beef, chicken, or seafood) for direct human consumption or cultivated meat as an ingredient used in hybrid plant/cell-based products for human consumption for the purpose of providing an alternative to animal-based foods.	Cultivated meat products for non-food or non-human food uses e.g., pet food or cell cultures for medicinal purposes.
Blended products	<p>Blended products that contain at least one of the specified alternative proteins alongside animal-origin products and their purpose is providing an alternative to animal-based foods. Blended products must replace at least 60% of the ingredients that would typically be animal-derived with alternative proteins or whole plant-based foods. This is compared to the original product being reformulated or the average product in the market. When an existing product is used as a benchmark for reformulation, that original product must have been on the market for a minimum of one year.</p> <p>At least 90% of the traditional animal-sourced foods eliminated must be replaced with an alternative protein or whole plant-based foods as defined in the scope of these Criteria.</p> <p>After reformulation, no more than 40% of the product's protein content can be derived from animal sources.</p>	<p>Blended products which replace less than 60% of the ingredients typically from animal origin. Blended in which more than 10% of the substituted traditional animal-sourced foods are replaced with ingredients other than alternative proteins or whole plant-based foods (e.g., starches and other fillers).</p> <p>Blended products where more than 40% of the protein content comes from animal sources.</p> <p>Reformulations of products which have been on the market for less than one year.</p> <p>Blended products intended for non-food or non-human food uses such as blended pet food.</p>
Insect protein	Excluded.	All insect protein.

5.6 Emissions included

All emissions from activities from cradle-to-gate are included in the scope. This includes all the emissions generated during the life cycle of a product up until it exits the factory (the 'gate'). This encompasses raw materials production and transportation, resource extraction, and material processing.

Considering the activity boundary, entity emissions to be included in climate performance target (i.e., as in per emission pathway) are as follows:

Scope 1

- CO₂, CH₄, and N₂O emissions related to on-site energy production (including electricity) and fuel combustion (grouped as CO₂-input, fuel burning).
- Emissions from production-related processes e.g., CO₂ from energy use during ingredient preparation and extrusion cooking if powered by fossil fuels on-site.
- Emissions from microbial respiration during fermentation e.g., CO₂ produced as a by-product of microbial fermentation.
- Emissions from waste handling such as CO₂ from any waste handling that involves energy use or chemical reactions or CH₄ and N₂O if biowaste is composted or treated anaerobically.
- Emissions from refrigeration systems including fluorinated gases (HFCs) if refrigerants leak from cooling systems.

Scope 2

- Emissions from purchased energy generation used at the production unit, CO₂, CH₄, and N₂O depending on the type of energy used.
- Emissions from cooling and refrigeration systems including CO₂, CH₄, and N₂O from electricity generation, as mentioned above.
- Lighting, ventilation, and other utilities including CO₂, CH₄, and N₂O from electricity generation for running facility utilities as mentioned above.

Scope 3

- Emissions from purchased raw materials, ingredients, machinery, fuel, and feedstocks:
 - Emissions from producing ingredients and feedstocks.
 - Emissions from direct or statistically estimated land use change (CO₂ from stock changes, N₂O and CH₄ emissions from natural vegetation burning, CH₄, N₂O, and CO₂ emissions from peat soil burning);⁴²
 - Direct and indirect N₂O emissions from N inputs to agricultural soils (except from N fixation and precipitation);
 - Non-biogenic CO₂ emissions from lime and urea;
 - CH₄ and N₂O emissions from rice cultivation;
 - CH₄ and N₂O emissions from biomass burning;
 - CO₂, CH₄, and N₂O emissions related to on-farm energy production (including electricity) and fuel combustion (grouped as CO₂-input, fuel burning, lime, urea);

- Emissions from manufacture of fertiliser, lime, pesticides, and other agricultural inputs, capital equipment and infrastructure e.g., greenhouses;
 - Emissions from growing of seeds, saplings, and other similar inputs.
- Emissions from processing ingredients and feedstocks e.g., CO₂ from energy used in refining, processing and drying the ingredients before transporting to the production facility.
- Emissions from the transport of raw materials, machinery, fuel, and feedstocks e.g., CO₂ from fuel combustion in trucks, ships, or planes used to transport ingredients and products, or CH₄ and N₂O emitted during the combustion of fossil fuels in diesel-powered transportation vehicles.
- Emissions from purchased food packaging, including average expected end-of-life disposal or recycling.
- Emissions related to food losses through the supply chain up to the processor gate. These should include average expected losses from farm to processor (transport and logistics losses) and losses at the processor stage. In general, losses at the processor stage will be reflected in the quantity of inputs purchases.

Note on Scope 3: *Owing to the carbon intensity of the final alternative product being the metric, facilities responsible for the production/manufacturing stage must partially incorporate scope 3 emissions. However, this is only scope 3 emissions up to the point of the finished alternative protein product not downstream emissions associated with transporting or retailing the product. For example, a specialised alternative protein producer must incorporate upstream scope emissions from agricultural production but not the downstream emissions associated with retailing or food waste.*

This approach follows that used by Poore and Nemecek (2018), which in turn primarily follows the system boundary in the World Food LCA Database.^{43,44}

5.7 Criteria for GHG emissions transition pathway for alternative protein production

Certification at entity-level (and for SLDs instruments) requires a comprehensive accounting and assessment of GHG emissions from the various activities in the alternative protein production unit(s) (with the scope explained above), which must comply with an emissions pathway at the time of Certification and into the future.

As per all sectors, substantial agrifood emissions reductions need to be achieved for 1.5°C-aligned emissions. The transition pathway refers to the speed and timeframe within which this is completed, as explained below.

The Climate Bonds pathway for entities in alternative protein production includes a GHG-emission intensity based on the livestock products they are replacing (i.e., kg CO₂e per kilogram of product) from the current moment until 2050 at least, with a trajectory aligned to the goal of limiting global warming to 1.5°C (see Table 4)

This provides an annual reference point for GHG emissions intensity for each major alternative protein category such that the intensity pathway calculated for each commodity can be scaled up to an entity-level pathway by multiplying the production of each commodity by the emissions intensities for each commodity.

5.8 How the pathway was defined

The Climate Bonds Alternative Proteins Criteria entity pathway was designed to ensure that these emerging food solutions contribute meaningfully to the low-carbon transition of the food system. To establish robust and fair thresholds, the Criteria draw on livestock emissions data and align closely with existing methodologies for assessing environmental impact. The thresholds are based on the average (mean) emission intensity calculated from the Climate Bonds Agriculture Production Criteria pathways for terrestrial livestock meat, milk, egg, seafood, and cheese between 2024–2050. By setting performance benchmarks against the corresponding livestock production pathway, these Criteria ensure that alternative proteins offer a tangible improvement over traditional animal-based products. There are Climate Bonds alternative proteins pathways for meat-, milk-, egg-, seafood-, and cheese-replacements, with the ability to create a unique threshold for blended products based on the composition of their main protein ingredients (see Section 5.10.2 in the background document).

5.9 Criteria for GHG emissions transition pathway for alternative protein production

Some entities (i.e., alternative protein producers) may already perform below this pathway threshold today, while others will require substantial changes to get there. Equally, some alternative protein producers are aligning their activities with such a transition and those that are doing so with a clear plan could potentially achieve Climate Bonds Certification.

To be able to Certify as ‘Aligned’ the eligible entity would need to meet the Climate Bonds pathway at the given annual reference point, with a value that is equal or lower than the emission intensity for that annual reference, up until 2050.

Entities that are not currently aligned, can Certify as ‘Transition’ if they have plans to meet the Climate Bonds pathway in 2030, with a value that is equal or lower than the emission intensity threshold for that annual reference up until 2050.

Box 2. Examples of Transition and Aligned Certifications

Applicants for Entity Certification should meet the Climate Bonds Standard in addition to the rest of the Criteria requirements and safeguards explained in Sections 5 and 6.

For the climate mitigation requirements.

- Time horizon targets: the climate mitigation performance targets cover the time from the date of Certification to the date the activity is intended to meet the 1.5°C transition pathway emissions, or 2050, whichever is sooner.
- Interim climate mitigation performance targets: the climate mitigation performance targets include interim targets on a three-yearly basis for the nine years following the date of Certification and a five-yearly basis thereafter over the full-time horizon.
- Alignment with the Alternative Proteins Criteria transition pathway described in the accompanying Excel tool, where the climate mitigation performance targets are benchmarked against the transition pathway and align with it by 31 December 2030 at the latest.

Example: mitigation compliant ‘Aligned’

A precision fermentation entity applying for Certification in 2024 with a mix of egg and milk replacement (50% of production volume) with the following climate mitigation performance targets.

Climate mitigation performance targets for the entity's commodities (egg- and milk-replacements)

Year	2024	2027	2030	2033	2038	2043
Average emission intensity (egg replacements) (kgCO ₂ e/kg retail weight)	1.49	1.31	1.18	1.12	0.81	0.69
Average emission intensity (milk replacements) (kgCO ₂ e/kg retail weight)	0.70	0.62	0.52	0.50	0.45	0.32

Compared with the Climate Bonds alternative protein production transition pathway.

Alternative Protein Production Criteria as in Climate Bonds transition pathway commodities – egg- and milk- replacements transition pathway

Year	2024	2027	2030	2033	2038	2043
Average emission intensity (egg replacement) (kgCO ₂ e/kg retail weight)	1.78	1.53	1.30	1.16	0.93	0.71
Average emission intensity (milk replacement) (kgCO ₂ e/kg retail weight)	0.92	0.79	0.66	0.59	0.48	0.36

The entity's Certification tier is classified as 'Aligned' because:

- at the time of Certification, the entity's average emission intensity for each product is equal to or lower than the Alternative Proteins Criteria pathway values; and;
- remains aligned until the end of the Certification time horizon.

An annual verification report from an approved verifier is required to maintain the Certification.

Example: mitigation compliant 'Transition'

A cultivated meat entity applying for Certification in 2024 with the following climate mitigation performance targets.

Climate mitigation performance targets for the entity's commodity (seafood replacement)

Year	2024	2027	2030	2033	2038	2043
Average emission intensity (seafood replacement) (kgCO ₂ e/kg retail weight)	2.02	1.70	0.86	0.73	0.50	0.39

Compared with the Climate Bonds Alternative Proteins (seafood replacement) transition pathway.

Climate mitigation performance targets for the entity's commodities (seafood replacement)						
Year	2024	2027	2030	2033	2038	2043
Average emission intensity (seafood replacement) (kgCO ₂ e/kg retail weight)	1.19	1.01	0.86	0.74	0.56	0.41

The Entity Certification tier is classified as 'Transition' because:

- at the time of Certification, the entity's average emission intensity is higher than the Alternative Protein Production Criteria pathway values; but;
- in 2030 the entity is aligned with the transition pathway; and,
- remains aligned until the end of the Certification time horizon.

An annual verification report from an approved verifier is required to maintain the Certification.

Box 3. Beyond efficiency: the need for absolute emissions reductions

While these Criteria highlight the importance of emissions intensity, measuring emissions per unit of production, it is essential for entities to recognise that efficiency alone is not sufficient. The overarching goal should be a clear reduction in absolute emissions, not just improved performance per unit produced.

Companies aiming for sustainable growth must incorporate strategies that go beyond improving intensity metrics to ensure that total emissions decrease over time, even as operations expand. These Criteria use an intensity-based metric because food demand is largely exogenous, and food systems will likely need to expand to meet the needs of a growing population. This approach ensures that companies contributing to feeding this population are not penalised, even if their overall emissions increase due to scaling up production. However, the shift toward efficiency must be balanced with efforts to reduce absolute emissions and explore carbon sequestration to avoid growth in emissions. In addition, investing in solutions that support carbon sequestration can help compensate for unavoidable emissions and contribute to net reductions. Without this combined approach, there is a risk that despite efficiency gains, overall emissions could rise due to increased production scales.

5.10 Excel tool for identifying Climate Bonds emission pathways for alternative protein commodities in scope in the Alternative Protein Production Criteria

A Climate Bonds Excel tool has been made available with the full emission pathway for the alternative proteins covered in the Criteria, where entities can find the annual emission target as CO₂e (plus the breakdown by GHG categories in each pathway). The Criteria require alignment with the aggregated GHG pathway in CO₂e, and not for each specific gas to allow flexibility in how emission thresholds are met. However, the accounting and pathway of separated GHGs should be reported.

This Excel Tool has been built by Joseph Poore, using the same methodology used for the Climate Bond Agriculture Production (Crop and Livestock) Criteria.⁴⁵

5.11 Alternative Protein Production Criteria for Sustainability-Linked Debt Certification

Two levels of Sustainability-Linked Debt (SLD) Certification are available, depending on when the climate mitigation performance targets align with the Climate Bonds Standard Sector Criteria.

Requirements for sustainability-linked debt (SLD) Certification under two levels: ‘Aligned’ and ‘Transition’ with the 1.5°C pathway for alternative proteins production.

Table 13. SLD Certification requirements for ‘Aligned’ and ‘Transition’ labelling

SLD Tier	SLD Certification Requirements
Tier 1: Aligned	<p>1. Climate Mitigation Criteria:</p> <ul style="list-style-type: none"> At the time of Certification, the entity can demonstrate that its agricultural production land to which the debt is linked is deforestation- and conversion-free since 2020; and At the time of Certification, the average emissions intensity of the alternative proteins production unit(s) to which the climate mitigation performance targets of the debt are linked meet the sector-specific Criteria transition pathway and continue to align thereafter through to 2050. <p>2. Adaptation and Resilience Safeguard:</p> <ul style="list-style-type: none"> The Certified entity meets the adaptation and resilience safeguard described in Section 6, which is reassessed and reconfirmed every five years. <p>3.Environmental and social Safeguards:</p> <ul style="list-style-type: none"> Biodiversity, Water, Social, Nutrition, and Animal welfare (if applicable: only for cultivated meat and blended products). <p>See Figure 4</p>
Tier 2: Transition	<p>The criteria are the same as for Level 1, except:</p> <p>At the time of Certification, the average emissions intensity of the agriculture production units to which the climate mitigation performance targets of the debt are linked do not meet the sector-specific Criteria transition pathway, but its future climate mitigation performance targets align by 31 December 2030 and continue to align thereafter through to 2050.</p> <p>See Figure 4</p>

Section 6: Safeguards

6.1 Safeguards introduction

After assessing the requirements of the Criteria (either for UoP or Asset Certification, or on transition pathways for Entity or SLD Certification), alignment must be demonstrated against a set of safeguards on key indicators for environmental and social impacts:

1. Adaptation and resilience (Section 6.3).
2. Water (Section 6.4).
3. Biodiversity (Section 6.5).
4. Social aspects (Section 6.6).
5. Animal welfare (if applicable, Section 6.7).
6. Nutrition safeguard (Section 6.8).

These safeguards aim to ensure eligible activities do not only benefit climate mitigation, but also avoid risks of impacting on other key environmental and social aspects.

Particularly, these safeguards ensure:

- a. eligible projects minimise the risks posed by climate change,
- b. eligible projects minimise the risks of harming other aspects of sustainability beyond climate, and
- c. eligible projects minimise the risks of harming the wider system in which they operate.

These safeguards work as a lighter set of requirements compared to climate performance criteria but nevertheless are requirements for obtaining Certification as green or climate-aligned projects.

6.2 Safeguards methodology

Safeguards follow a common methodology for identifying and minimising risks of negative impacts (except for nutrition, and animal welfare) i.e., a 4 step-process requirement adapted to each of these key issues.⁴⁶

1. Understanding and identifying the context: setting boundaries and interdependencies.
2. Identifying specific risks on the given environmental or social aspect.
3. Addressing and mitigating specific risks by undertaking risk-measures and adopting management plans aiming at;
 - a. minimising direct risks from/to eligible projects, and
 - b. minimising the risks of harming the defined system they operate within.
4. Undertaking of regular monitoring and (re)evaluation of the specific performance, adjusting to risk reduction measures over time as needed.

It is important to highlight that these safeguards are not intended as a template for best practice but rather to provide a starting point for Certification applicants to take steps to assess and avoid unintended negative impacts of their projects and activities.

The animal welfare safeguard only applies to activities and/or production with livestock in their supply chain such as cultivated meat or blended products, and it does not follow the 4-step methodology.

6.3 Adaptation and resilience safeguard

The aim of the adaptation and resilience (A&R) safeguard is to ensure that the applicant production unit(s) and/or eligible activities are resilient and adapted to climate and can continue to produce alternative protein commodities under future climate scenarios. This A&R safeguard scorecard has been based on and adapted from two previous Climate Bonds Criteria: Agricultural Production; and Cement.

Climate Bonds proposes the following definition for Resilience: *'the capacity of economic, social or ecological assets or systems to resist, absorb, accommodate, adapt to, transform, and recover from the current and projected impacts of climate change, both direct and indirect, maintaining their basic structure and function'*.⁴⁷

The A&R safeguard component of the eligibility Criteria will be fitted at the appropriate boundary of any applicant and financial tool, including eligible measures and/or projects for Asset, UoP, Entity, and SLD Certification.

For the full A&R safeguard checklist, see Appendix 5.

6.4 Water safeguard

The Water safeguard aims to ensure no significant negative effect on water use and quality derives from the eligible measures within the production unit(s) and/or into the wider landscape (system in which the eligible measures operate).

The requirement is based on a 4-step process of risk assessment and measures to minimise or mitigate those risks. Specific requirements are presented in Table 14.

Table 14. Water safeguard: requirements and demonstration of compliance for any type of issuer

	Steps for water safeguard	Demonstration of compliance
1.	Identify boundaries and interdependencies with regards to water use and water quality risks .	<p>Issuers must define the boundaries of the investment and associated assets and activities, as well as the internal and external interdependencies between the broader system affected by those assets and activities.</p> <p>These boundaries and interdependencies are important for scoping risk and benefit assessments, and ensuring the asset or activity being invested in is fit-for-purpose and does no harm to the system of which it is part.</p> <p>Boundaries of the measures are defined using:</p> <ul style="list-style-type: none"> • a list of all equipment/assets associated with the eligible measure(s) and/or project(s) which require water for processing, cleaning or cooling; • a list of all feedstocks, ingredients or products associated with the eligible measure(s) and/or project(s); • identification of their source or place of origin; • identification of their virtual water footprint; • a list of all waste produced; and • details of how wastes are handled and disposed inclusive of any water recycling activities.
2.	Assessment of the risks on water.	Applicant must demonstrate that a risk assessment on water use and water quality has been undertaken on the potential impacts from the production unit(s) or supply chain over its operating life (applicable at the appropriate

		<p>boundary to any applicant and financial tool, including assets, UoP, entity and SLD).</p> <p>The applicant must follow best-practice standards or similar schemes to conduct the risk assessments, where the applicant can demonstrate the standard has sufficient requirements and thus is robust.</p> <p>At a minimum, water use and water quality critical interdependencies should be considered in terms of the production unit(s) and/or eligible activities to potentially 'do harm' to the system it operates within.</p> <ol style="list-style-type: none"> 1. The effects of water use or pollution on other water users or erosion in the watershed. 2. Relationships of the production unit(s) eligible activities to nearby flood zones. 3. Increased risk of flooding in the production unit(s) or wider landscape. 4. Water-related risks to be considered: <ol style="list-style-type: none"> a. Precipitation; high precipitation, intense rainfall events, waterlogging, flood, drought, freezing rain (hail, ice). b. Water stress; crop water stress (reflecting combination of temperature, precipitation, and wind), ratio of water withdrawals to availability. c. Sea-level; inundation, flooding or storm surges, salinisation due to saltwater intrusion or changing water regimes. d. Glacial melting and lake outbursts; flood, body of water contained by glacier overflows or glacial melts. <p>Note: This list is non-exhaustive and for certain geographies the importance of specific interdependencies may differ, therefore some flexibility can be applied in the structure of the consideration evidence being given.</p>
	<p>Water management plan put in place.</p>	<p>These interdependences and risks should be considered and assessed to produce a water management plan (including internal strategy, policy and/or objectives) with clear steps taken to ensure negative impacts are minimised, and risks mitigated with appropriate sustainable measures.</p> <p>For the development of this management plan, existing market guidance should be used, such as the Science-based Targets for Nature (SBTN) and Taskforce for Nature-related Financial Disclosures (TNFD) for steps and metrics on how to consider such water-related issues.</p>
<p>4.</p>	<p>Measures taken:</p> <ol style="list-style-type: none"> a) Address and mitigate risks on water use and quality. b) Ensure no harm to water availability and water quality at the system (landscape) level. 	<p>Applicant must also demonstrate the following measures have/will be taken:</p> <p>Address and mitigate identified water risks to a level so that the alternative protein production unit/supply chain is 'fit for purpose' over its operational life.</p> <p>Ensure that the production unit/supply chain does no harm to the water availability and water quality of the defined system it operates within, considering the boundaries and critical interdependencies between that system and the alternative protein production unit/supply chain.</p> <p>A water management plan must demonstrate risks are addressed and mitigated. This plan must include qualitative or quantitative evidence that</p>

		gives a description of existing or planned steps taken to ensure risks and interdependencies are addressed.
4.	Ongoing monitoring and evaluation to adjust measures as necessary.	The applicant is required to demonstrate that there will be ongoing monitoring and evaluation of the relevance of the water-related risks and measures and related project adjustments as needed, within a water management plan.

6.5 Biodiversity safeguard

This biodiversity safeguard aims to ensure no significant harm on habitats and species diversity within the production/distribution unit(s) or within their supply chains and into the wider landscape (system in which the eligible activities operate).

As with the other safeguards, the requirement is based on a 4-step-process of risk assessment and measures to minimise or mitigate those risks.

Table 15. Biodiversity safeguard: requirements and demonstration of compliance for any type of issuer

	Steps for biodiversity safeguard	Demonstration of compliance
1.	Identify boundaries and interdependencies with regards to biodiversity risks.	<p>The applicant must define the boundaries of the investment and associated assets and activities, as well as the internal and external interdependencies between the broader system affected by those assets and activities.</p> <p>These boundaries and interdependencies are important for scoping risks and benefits assessments, and ensuring the asset or activity being invested in is fit-for-purpose and does no harm to the system of which it is part.</p> <p>At a minimum this must include:</p> <ul style="list-style-type: none"> • a listing of all feedstocks, ingredients or products associated with the eligible measure(s) and/or project(s); • identification of their source or place of origin; • a listing of all waste produced; • details of how waste is handled and disposed of.
2.	Assessment of the risks on biodiversity.	The applicant must demonstrate that a biodiversity risk assessment has been undertaken on the potential impacts from the production/distribution unit(s) and supply chain over its operating life (applicable at the appropriate boundary to any applicant and financial tool, including assets, UoP, entities, and SLD).

		<p>At a minimum, these biodiversity critical interdependencies should be considered in terms of the production/distribution unit, its supply chain and/or eligible activities to potentially ‘do harm’ to the system it operates within.</p> <ol style="list-style-type: none"> 1. Introduction of pests and diseases. 2. Reduction in pollinating insects and birds. 3. Biodiverse-habitat destruction or degradation by the production facilities or in the neighbouring landscape. 4. Consideration of relationship of operations with potential extinction risk for endangered species. 5. Overuse of inputs, including pesticides, herbicides, veterinary products, and others. 6. Use of chemicals listed in the Stockholm Convention, or (1a) or (1b) in the WHO classification of pesticides by hazard, or not in compliance with the Rotterdam Convention, is not allowed in eligible activities or projects.^{48,49,50,51} <p>The applicant must follow best-practice standards or similar schemes to carry on the risk assessments, where the applicant can demonstrate the standard has sufficient requirements and thus is robust.</p>
3.	<p>Measures taken:</p> <ol style="list-style-type: none"> a. Address and mitigate risks on biodiversity. b. Ensure no harm to biodiversity at the system (landscape level). 	<p>The applicant must also demonstrate that measures have or will be taken to:</p> <ol style="list-style-type: none"> 1. address and mitigate those identified biodiversity risks to a level so that the production/distribution unit and its supply chain is ‘fit for purpose’ over its operational life; and 2. to ensure that the production/distribution unit and its supply chain does no harm to the biodiversity of the defined system it operates within, considering the boundaries and critical interdependencies between that system and the production/distribution unit and its supply chain.
4.	<p>Ongoing monitoring and evaluation to adjust measures as necessary.</p>	<p>The applicant is required to demonstrate that there will be ongoing monitoring and evaluation of the relevance of the biodiversity risks and measures, and related project adjustments as needed.</p>

6.6 Social safeguard

The social safeguard aims to ensure no significant negative effect on people’s livelihood and wellbeing derives from the eligible activities within the production unit(s), supply chains and/or into the wider landscape (system in which the eligible activities operate).

The social safeguard requires that issuers meet the following **three minimum preconditions** for all eligible Certifications (detailed list and requirements are given in Table 3):

1. formally adhere **international labour conventions**;
2. provide an annual statement on steps taken to **ensure no modern slavery, child labour or human trafficking** has occurred through the business activities; and
3. where appropriate, follow guidance with **respect to indigenous peoples and local community rights**.

At a minimum this will need to include the recognition of several principles and conventions including:

- International Bill of Human Rights.⁵²
- Free, Prior and Informed Consent (FPIC).⁵³
- ILO Declaration on the Fundamental Principles and Rights at Work and Social Policy.⁵⁴
- UN Guiding Principles on Business and Human Rights.⁵⁵
- ILO Tripartite.⁵⁶

There are additional requirements based on a 4-step process of risks assessment and measures to minimise or mitigate those risks, specific requirements are presented in (Table 17).

For entity transition plans and sustainability-linked debt (SLD), entities must provide evidence of social policies or qualitative proof that social aspects are integrated into their business transition plans, together with environmental targets. The social components of the transition plan should include the following minimum commitments:

- Upholding human rights and labour standards (including those listed in Table 16).
- Addressing both social risks and opportunities.
- Ensuring meaningful participation and partnerships.
- Promoting gender equality.

Minimum social safeguard preconditions that should be demonstrated for any certification of eligible activities.

Table 16. Minimum social safeguard preconditions that should be demonstrated for any Certification of eligible activities or entities

Preconditions on social safeguard	International Labour conventions that need to be adhered to and formally recognised	Details/Reference
International Bill of Human Rights	International Bill of Human Rights ICESCR	ICESCR (including but not limited to): <ul style="list-style-type: none"> • freedom from discrimination, • right to equality between men and women, • right to work, • freedom to choose and accept work, • right to just and favourable conditions at work, • right to form trade unions,

		<ul style="list-style-type: none"> • right to strike, • right to social security, • right of mothers to special protection before and after birth, • freedom of children from social and economic exploitation, • right of authors to moral and material interests from work, • freedom to undertake scientific research and creative activity. <p>ICCPR (including but not limited to):</p> <ul style="list-style-type: none"> • freedom from discrimination, • right to equality between men and women, • right to life, • freedom from slavery, • right to liberty and security of person, • freedom of movement, • freedom of non-citizens from arbitrary expulsion, • right to fair trial, • right to recognition before the law, • right to privacy, • freedom of religion and belief, • freedom of expression, • right of peaceful assembly, • freedom of association, • right to participate in public affairs, • right to equality before the law, • minority rights.
International labour conventions.	ILO Declaration on the Fundamental Principles and Rights at Work and Social Policy; and the ILO Tripartite.	<p>Fundamental principles and rights at work:</p> <ul style="list-style-type: none"> • freedom of association and the effective recognition of the right to collective bargaining, • the elimination of all forms of forced or compulsory labour, • the effective abolition of child labour, and • the elimination of discrimination in respect of employment and occupation.⁵⁷
Ensure no modern slavery, child labour or human trafficking.	UN Guiding Principles on Business and Human Rights.	<p>Business and Human Rights Resource Centre. (2019). UN Guiding Principles. www.business-humanrights.org/en/un-guiding-principles</p> <p>Provide a slavery and human trafficking statement with steps taken to ensure modern slavery is not occurring.⁵⁸</p>
Respect to indigenous peoples and local community rights.	Free, Prior and Informed Consent (FPIC).	<p>AFi best practice in securing the free, prior, and informed consent (FPIC) of Indigenous Peoples and local communities.⁵⁹</p> <p>IFC Performance Standard 7 on Indigenous peoples.⁶⁰ Issuers are required to ensure no violation of land, cultural, and natural resource rights of indigenous peoples and local communities (IPLCs) in production or distribution units, or supply chains.</p>

Social safeguard: requirements and demonstration of compliance for any type of issuer.

Table 17. Social safeguard: requirements and demonstration of compliance for any type of issuer

	Steps for social safeguard	Demonstration of compliance
1.	Identify boundaries and interdependencies with regards to social risks (people's livelihoods).	<p>Issuers must define the boundaries of the investment and associated assets and activities, as well as the internal and external interdependencies between the broader system affected by those assets and activities.</p> <p>These boundaries and interdependencies are important for scoping risks and benefits assessments, and ensuring the asset or activity being invested in is fit-for-purpose and does no harm to the system of which it is part.</p> <p>With regards to social aspects, including, but not limited to modern slavery statement, labour standards, indigenous peoples and local community rights, human rights, and livelihoods.</p>
2.	Assessment of the risks on social aspects.	<p>Applicant must demonstrate that a risk assessment on social aspects has been undertaken on the potential impacts from the alternative protein production/distribution unit(s) or supply chains over its operating life (applicable at the appropriate boundary to any applicant and financial tool, including assets, UoP, entity, and SLD).</p> <p>The applicant must follow best-practice standards or similar schemes to carry on the risk assessments, where the applicant can demonstrate the standard has sufficient requirements and thus is robust.</p>
3.	<p>Measures taken to:</p> <ul style="list-style-type: none"> a. address and mitigate risks on social aspects, b. ensure no harm to social aspects at the system level. 	<p>Applicant must also demonstrate that measures have or will be taken to:</p> <ul style="list-style-type: none"> • address and mitigate identified social risks to a level so that the production/distribution unit or supply chain is 'fit for purpose' over its operational life; and • to ensure that the production unit does no harm to the social aspects/people's livelihoods of the defined system it operates within, considering the boundaries and critical interdependencies between that system and the production/distribution unit(s) or supply chains.
4.	Ongoing monitoring and evaluation to adjust measures as necessary.	<p>The applicant is required to demonstrate that there will be ongoing monitoring and evaluation of the relevance of the social risks and measures and related project adjustments as needed, within a social risks management plan.</p> <p>For entities and SLD certification, annual verifications need to demonstrate that the social risks are being monitored and where appropriate, acted upon.</p>

6.7 Animal welfare safeguard

If applicable to their production and/distribution portfolio, applicants are required to obtain confirmation of certification to schemes that require sufficient high standards of animal welfare from suppliers for supply chains which involve livestock such as for cultivated meat or blended products. The following schemes have been selected as suitable for this purpose:

- (Asia and Australia) Humane Farm Animal Care Certified Humane <https://certifiedhumane.org>
- (UK) RSPCA Assured www.rspcaassured.org.uk/farm-animal-welfare/rspca-welfare-standards
- (UK and EU) Animal Welfare Approved by A Greener World <https://agreenerworld.org/certifications/animal-welfareapproved>
- (EU) Beter Leven levels 2&3 <https://beterleven.dierenbescherming.nl>
- (USA, Latin America and Canada) G.A.P Steps 4 and above for cattle are acceptable. All levels are acceptable for other species. <https://globalanimalpartnership.org>
- (Global) World Animal Protection – Business Benchmark on Farm Animal Welfare (BBFAW) tiers 1 & 2 <https://www.bbfa.com/benchmark/>

If the applicant demonstrates that none of these schemes certify in the country where the suppliers are located, then assessment should be undertaken using the requirements (principles and the relevant species-specific mitigation criteria) detailed in the FARMS Initiative Responsible Minimum Standards (RMS).⁶¹

For suppliers farming using extensive agriculture systems, welfare considerations still apply. However, if not readily available, there is no burden of proof required for extensive agricultural systems to demonstrate animal welfare standards certification, although it is expected that welfare standards would still apply e.g., no dehorning, disbudding at the earliest possible age and with extensive pain relief.

6.7.1 Foetal bovine serum

To align with high animal welfare standards, cultivated meat production must transition away from the use of **foetal bovine serum (FBS)**, which is derived from unborn calves and raises ethical concerns.

Requirements.

1. **Disclosure:** entities must disclose whether FBS is used in their production processes.
2. **Reduction Targets:** entities seeking Certification must demonstrate an active plan to reduce FBS reliance, with a preference for ethically sourced, non-animal-derived growth media.
3. **Phase-Out Commitment:** by 2030, all certified cultivated meat production must be FBS-free, replacing it with validated alternatives such as recombinant proteins, plant-based growth factors, or cell-conditioned media.

6.8 Nutrition safeguard

To ensure consumers are not nutritionally disadvantaged when substituting traditional animal products with alternative proteins, this nutrition safeguard employs a structured approach that mirrors other safeguards, using a

four-step process for risk assessment and mitigation. A key tool in this assessment is the Nutri-Score, which evaluates the nutritional value of a product based on its ingredients and assigns it a grade from A to E, guiding producers and consumers toward healthier choices.

6.8.1 Nutri-Score

A Nutri-Score calculation pinpoints the nutritional value of a product (based on the ingredients) and assigns it to one of the five colour-coded letter grade classes (A, B, C, D, or E). Products that get an A score have the highest nutritional value and those that score an E have the lowest nutritional value.

High-quality nutrients such as protein, fibre, fruits, vegetables, nuts, legumes; and olive, walnut, and rapeseed oils, earn negative points for the product (from 0 to -5, depending on the overall percentages and grams per 100 grams).

Low-quality nutrients such as energy dense, sugars, saturated fatty acids, and salt, rack up positive points (from 0 to 10, again depending on grams or KJs per 100 grams). The scoring changes based on the ingredient condition, manufacturing process, variety, and other factors.⁶²

There are five categories with slightly different algorithms, which include:

1. general foods;
2. red meat;
3. cheese;
4. fats, oils, nuts and seeds; and
5. beverages.

The Nutri-Score calculators can be found in a spreadsheet here: <https://www.santepubliquefrance.fr/en/nutri-score>

Table 18. Four-step process for nutrition safeguard

	Steps for nutrition safeguard	Demonstration of compliance
1.	Identify if a nutrition risk could be posed.	<p>The applicant must assess whether the alternative protein product poses a dietary risk.</p> <p>This is confirmed if the product:</p> <ul style="list-style-type: none"> • is commercially available, • can be reasonably assumed to be consumed regularly (more than once a week), either as a standalone product or as an ingredient. <p>If a dietary risk is present, proceed with the application of the safeguard. If no dietary risk is present, the safeguard does not apply.</p>
2.	Assessment of the nutrition risk.	<p>Ensure that the alternative protein product's Nutri-Score does not exceed:</p> <ul style="list-style-type: none"> • +7 points more than an equivalent traditional animal sourced food/ingredient, • +3 points more than an equivalent animal sourced beverage. <p>Points may be deducted for key micronutrient contributions, up to a maximum of 5 points. To qualify for amending points for fortification, the product must achieve a minimum Category C or higher in the Nutri-Score model. Only products meeting this requirement are eligible for amended points through fortification.</p>

		<p>The following are the applicable nutrients and their thresholds:</p> <table border="1"> <thead> <tr> <th>Micronutrient</th> <th>Points</th> <th>15%</th> </tr> </thead> <tbody> <tr> <td>Vitamin D</td> <td>-1</td> <td>≥0.75 µg</td> </tr> <tr> <td>Calcium</td> <td>-1</td> <td>≥120 mg</td> </tr> <tr> <td>Vitamin E</td> <td>-1</td> <td>≥1.8 mg</td> </tr> <tr> <td>Folic acid</td> <td>-1</td> <td>≥30 µg</td> </tr> <tr> <td>Omega-3</td> <td>-1</td> <td>≥0.24 g</td> </tr> <tr> <td>Magnesium</td> <td>-1</td> <td>≥56.25 mg</td> </tr> <tr> <td>Iron</td> <td>-1</td> <td>≥2.1 mg</td> </tr> <tr> <td>Zinc</td> <td>-1</td> <td>≥1.5 mg</td> </tr> <tr> <td>Iodine</td> <td>-1</td> <td>≥22.5 µg</td> </tr> <tr> <td>Vitamin B12</td> <td>-1</td> <td>≥0.38 µg</td> </tr> </tbody> </table>	Micronutrient	Points	15%	Vitamin D	-1	≥0.75 µg	Calcium	-1	≥120 mg	Vitamin E	-1	≥1.8 mg	Folic acid	-1	≥30 µg	Omega-3	-1	≥0.24 g	Magnesium	-1	≥56.25 mg	Iron	-1	≥2.1 mg	Zinc	-1	≥1.5 mg	Iodine	-1	≥22.5 µg	Vitamin B12	-1	≥0.38 µg
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3.	Measures taken to address and mitigate nutrition risks.	If an alternative protein product, dish, or ingredient is found to pose a nutritional risk and exceeds +7 points for foods/ingredients or +3 points for beverages, the applicant must demonstrate that appropriate measures have been or will be taken to mitigate these risks to ensure that the product could not nutritionally disadvantage consumers and is considered 'fit for purpose'.																																	
4.	Ongoing monitoring and evaluation to adjust measures as necessary.	The applicant must demonstrate that ongoing monitoring and evaluation will be conducted to assess the relevance of identified nutrition risks and the effectiveness of mitigation measures. This process should include making necessary adjustments to the project as new information or conditions arise.																																	

Note: Climate Bonds will conduct a review of the nutrient profiling systems used in this safeguard during the next revision of the Criteria. This review will assess the relevance, scientific validity, and regional applicability of the selected system(s) to ensure it/they remain aligned with best practices in public health and nutrition policy.

Section 7: Appendices

7.1 Appendix 1: TWG members and IWG members

Climate Bonds Coordinators:		
India Langley	Sustainability Analyst, Climate Bonds Initiative	
Mari Chrys Pablo	Agrifood Program Coordinator, Climate Bonds Initiative	
Technical Lead:		
Reyes Tirado	Agrifood Lead, Climate Bonds Initiative	
Consultant:		
Joseph Poore	HESTIA Project, Oxford Martin School, University of Oxford	
TWG Members:		
Jo Raven	FAIRR	UK
Dana Wilson	FAIRR	UK
Tom Chapman	GFI	Kenya
Rosie Wardle	Synthesis Capital	UK
Duncan Williamson	Rainforest Alliance	UK
Dave Luo	Asia Research and Engagement	Singapore
Aditi Mukherji	Climate Change Impact Platform, CGIAR	India
Joyashree Roy	Asian Institute of Technology	Thailand
Cleo Verkuil	Stockholm Environment Institute	US
Joanna Wolstenholme	UNEP-WCMC	UK
Joanna Trewern	ProVeg International	Spain
Parag Acharya	Greenwich University	UK
Li Wenxin	Global Environment Facility	USA
IWG Members:		
Carrie Chan	Avant / World Economic Forum	Singapore
Didier Toubia	Aleph	Israel
Eugene Wang	Sophie Bio nutrients	Netherlands
Ira van Eelen	Cellulaire Agricultuur Nederland / EAT JUST	Netherlands
Yulia Solomina	ING EMEA	Europe
Katherine Foster	World Economic Forum / EIT Food	Switzerland
Lorena Savani	Protein Diversification Think Tank	Spain
Grace Liu	GFI Consultancy	China
Indy Kaur	Plant Futures	UK
Sarah Gaunt	SPG Innovation Ltd / Rootiful	UK
Tais Toledo	Global Methane Hub	Brazil
Vanessa De La Ossa	ING America	USA
Jeff Doyle	Plant Based Foods Association	USA
Jonathan Avesar	Lever	USA
Sid Mehta	Greenworks Inc.	Canada
Lisa Sweet	Tilt Collective	Switzerland
Julie Emmett	Plant Based Foods Association	USA
Melanie Levine	World Business Council for Sustainable Development	USA
Jette Young	Protein Diversification Think Tank / Aarhus University	Denmark
Daniz Koca	Protein Diversification Think Tank / Lund University	Sweden
Marie-Pierre Bousquet-Lecomte	Ex-Danone	France

7.2 Appendix 2: Deforestation- and conversion-free sourcing

Table 19. Deforestation- and Conversion-free Sourcing Criteria in full

	Eligibility criteria	Requirements	Details
1	Cut-off date	31 December 2020	Free from deforestation and conversion of natural ecosystems in the supply chain of certifiable entities since the cut-off date.
2	Risk classification of origin	<ul style="list-style-type: none"> - High-risk origin - Low-risk origin. 	<p>The criteria will follow agrifood commodity risk classification in EUDR* for cattle, cocoa, coffee, palm oil, pulp and paper and soy and Climate Bonds list for deforestation risk for other commodities.⁶³</p> <p>*Until the EUDR Risk Classification is published, follow Climate Bonds list (see Climate Bonds Deforestation- and Conversion-Free Sourcing Criteria).⁶⁴ For conversion risk, list will be updated once information is available.</p> <p>Under these Criteria, any countries or parts thereof which are considered under 'standard risk' category for EUDR, will be considered under the 'high-risk' category. According to the EUDR, standard-risk 'refers to countries or parts thereof which do not fall in either the category "high-risk" or the category "low-risk".'</p>
3	Traceability	<p>Full traceability of sourcing is required for all agrifood commodities representing at least 1% of procurement spend by the entity, with two levels:</p> <ul style="list-style-type: none"> - High-risk origin and for cattle, cocoa, coffee, palm oil, pulp and paper, and soy (of any origin): geolocation to the original production land plot (polygon for > 4ha or single point for < 4 ha). - Low-risk origin (except cattle, cocoa, coffee, palm oil, pulp and paper, and soy): traced to country of origin or primary processing facility. 	<p>For high-risk origin with less than 4 ha, the recommendation is to move towards sharing full polygon geolocation, as have done many smallholders (e.g., Indonesia) already.</p> <p>Low-risk origin is with the commitment that by 2030, all agrifood commodities sourced will be traced to the geolocated plot of production.</p>

4	Due diligence	Two levels of due diligence requirements, depending on agrifood commodity origin: - High-risk origin: systems in place to obtain sufficient evidence that demonstrate that agrifood commodities are traceable to their production units and free from deforestation and conversion since December 31 2020. This includes having risks assessment and risk mitigation systems in place, where needed. - Low-risk origin: systems in place to obtain sufficient evidence that demonstrate that agrifood commodities originate from low-risk countries.	A simplified due diligence can be followed for products or commodities from low-risk origins. For reference, under the EU Deforestation Regulation (EUDR), as defined in Article 13 of EUDR ‘the obligations under Articles 10 and 11 [Risk Assessment and Risk Mitigation] where, after having assessed the complexity of the relevant supply chain and the risk of circumvention of this Regulation or the risk of mixing with products of unknown origin or origin in high-risk or standard-risk countries or parts thereof, they have ascertained that all relevant commodities and relevant products have been produced in countries or parts thereof that were classified as low risk.’ In short, for low-risk origin, due diligence needs to show evidence that the commodity originating from low-risk has not been mixed with commodities from high-, standard- or unknown-risk origins.
5	Monitoring	High-risk origin: systems in place to monitor the geolocated production land plots for deforestation and the conversion of other natural ecosystems.	
6	Reporting	Publicly disclose on an annual basis: • Annual verification reports under these Criteria and Climate Bonds Standard. • Tier 1 supplier lists for each agrifood commodity originating from high-risk countries.	
7	Verification	Climate Bonds approved verifiers should have access to full documentation of evidence (checklist to be provided).	Guidance on selective sampling by verifiers is also provided under the Criteria.
8	Third-party certification	Proxy for compliance of commodities within the supply chain.	Third-party certification can only be used as a proxy if any given label meets or exceeds all Climate Bond Agrifood DCF Sourcing Criteria including segregated and traceable supply (e.g., no mass balance).
9	Human Rights	Only Agrifood entities with existing programmes that contain producer-level human rights and IPLC safeguards can qualify for Certification.	At a minimum this will need to include the recognition of several principles and conventions including FPIC, IBHR, ILO, UN, and OECD principles. In the context of suppliers operating with vulnerable groups and smallholders, these provisions shall include investments and capacity building.

7.3 Appendix 3: R&D requirements for improving the technological and economic feasibility of alternative proteins for the purpose of substituting animal-sourced foods

TRL 1 to TRL 5:

Early-stage R&D may be considered eligible if aiming to bring the solution, product, or technology to TRL 6.

TRL 6:

Projects require that the technology is fine-tuned to a variety of operating conditions, the process is reliable, and the performance meets expectations. Interoperability with other connected technologies must be demonstrated, the manufacturing approach clearly defined, and all environmental, regulatory, and socio-economic issues

addressed. The project should aim to improve the scalability, affordability, and sensory attributes of alternative proteins to ensure their potential to substitute animal-sourced foods effectively.

TRL 6 or 7:

Where the researched, developed, or innovated technology, product, or other solution is at TRL 6 or 7, the project demonstrates advancements in one or more of the following areas:

- Achieving parity or superiority in sensory, nutritional, or functional characteristics compared to animal-sourced foods;
- Evidence of scalability and cost-effectiveness in production systems to make the alternative protein competitive with animal-based counterparts;
- Integration with existing supply chains to improve accessibility and adoption of alternative proteins.

TRL 8:

Where the researched, developed, or innovated technology, product, or other solution is at TRL 8 or higher, the entity must demonstrate:

- Market readiness, with evidence of consumer acceptance studies or pilot programs showcasing the product's viability for replacing animal-sourced foods;
- Compliance with applicable food safety and regulatory standards;
- Verification of production scalability and affordability, enabling broad adoption as a substitute for animal-sourced foods.

7.4 Appendix 4: R&D requirements for the substantial reduction, avoidance or removal of GHG emissions from alternative proteins

TRL1 to TRL 5:

Early-stage R&D may be considered eligible if aiming to bring the solution, product, or technology to TRL 6.

TRL 6:

Projects require that the technology is fine-tuned to a variety of operating conditions, the process is reliable, and the performance meets expectations. Interoperability with other connected technologies must be demonstrated, the manufacturing approach clearly defined, and all environmental, regulatory, and socio-economic issues addressed. The project should aim to improve the scalability, affordability, and sensory attributes of alternative proteins to ensure their potential to substitute animal-sourced foods effectively.

TRL 6 or 7:

Where the researched, developed, or innovated technology, product, or other solution is at TRL 6 or 7, the project demonstrates advancements in one or more of the following areas:

- Achieving parity or superiority in sensory, nutritional, or functional characteristics compared to animal-sourced foods;
- Evidence of scalability and cost-effectiveness in production systems to make the alternative protein competitive with animal-based counterparts;

- Integration with existing supply chains to improve accessibility and adoption of alternative proteins.

TRL 8:

Where the researched, developed, or innovated technology, product, or other solution is at TRL 8 or higher, the entity must demonstrate:

- Market readiness, with evidence of consumer acceptance studies or pilot programmes showcasing the product's viability for replacing animal-sourced foods;
- Compliance with applicable food safety and regulatory standards;
- Verification of production scalability and affordability, enabling broad adoption as a substitute for animal-sourced foods.

7.5 Appendix 5: Adaptation and resilience safeguard supporting information

To demonstrate compliance, all measures must satisfy the requirements of the checklist detailed in Table 20.

The checklist is a tool to verify that the applicant has implemented sufficient processes and plans in the design, planning, and decommissioning phases of a measure to ensure that the operation and construction of the asset minimises environmental harm; and the asset is appropriately adaptive and resilient to climate change and supports the A&R of other stakeholders in the surrounding system, if applicable.

All elements of the checklist must be addressed, and appropriate evidence provided that these requirements are being met or are not applicable in respect of the specific measure(s) linked to the bond. The applicant’s evidence is expected to encompass a range of assessment and impact reports and associated data, including those required to meet national and local licensing and approval processes. This might include development consent orders, planning regulations adhered to, environmental impact assessments, vulnerability assessments and associated adaptation plans.

It is the applicant’s responsibility to provide the relevant information to the verifier, who must include this information in the scope of verification.

For each question in the scorecard:

- A ‘yes’ indicates sufficient proof given.
- A ‘no’ indicates insufficient proof.
- In case of a ‘n/a,’ a justification of why the question is not applicable.

Table 20. Adaptation and resilience checklist for alternative protein production mitigation measures

No.	Adaptation and resilience checklist for alternative protein production mitigation measures	Proof given	Overall assessment
		For verifier to complete	
Area 1: Clear boundaries and critical interdependencies between the measure and the system it operates within are identified.			

1.1	<p>The applicant must define the boundaries of the investment and associated assets and activities, as well as the internal and external interdependencies between the broader system affected by those assets and activities.</p> <p>These boundaries and interdependencies are important for scoping risk and benefit assessments, and ensuring the asset or activity being invested in is fit-for-purpose and does no harm to the system of which it is part.</p> <p>Boundaries of the measures are defined using the following:</p> <ul style="list-style-type: none"> • A listing of all equipment/assets associated with the relevant application (UoP, assets, entity or SLD). • A map of their location or illustration of their place/role within the overall facility. • Identification of the expected operational life of the equipment/assets. • A listing of all feedstocks, ingredients or products associated with the use of the proceeds. • Identification of their source or place of origin. 		
1.2	<p>Critical interdependencies between the measure(s) and the system within which it/they operate(s) are identified. Identification of these interdependencies should consider the potential for adverse impacts arising from, but not limited to:</p> <ul style="list-style-type: none"> • relationships of the measure(s) and its/their associated ingredients/feedstocks/products to nearby flood zones; • relationships of the measure(s) and its/their associated ingredients/feedstocks or product to surrounding water bodies and water courses; • relationships of the measure(s) and its/their associated ingredients/feedstocks or product to a reduction in pollinating insects and birds; • relationships of the measure(s) and its/their associated ingredients/feedstocks or product to a reduction in biodiversity or High Conservation Value³ habitat; • relationships of the measure(s) and its/their associated ingredients/feedstocks/product to market influences, such as excess supply which drives down prices; • relationships of the measure(s) and its/their associated ingredients/feedstocks or product to the appropriation of land or economic assets from nearby vulnerable groups; • relationships of the measure(s) and its/their associated ingredients/feedstocks or product to price and availability of energy for itself and the wider system. 		
<p>Area 2: An assessment has been undertaken to identify the key physical climate hazards to which the measure will be exposed and vulnerable to over its operating life, as well as the risks posed by the measure to system within which it operates</p>			
2.1	<p>The applicant must demonstrate that a risk assessment has been undertaken of the physical climate hazards to which the production unit(s) will be exposed and vulnerable over its operating life (applicable at the appropriate boundary to any applicant and financial tool, including assets, UoP, entities and SLD).</p> <p>The applicant must follow best-practice standards or similar schemes to carry on the risk assessments, where the applicant can demonstrate the standard has sufficient requirements and thus is robust.</p> <p>Key physical climate risks and indicators of these risks are identified in line with the following guidelines.</p> <p>Risks are identified based on:</p> <ul style="list-style-type: none"> • (A) a range of climate hazards, and • (B) information about risks in the current local context, including reference to any previously identified relevant hazard zones, e.g., flood zones. 		

	<p>In order to be confident that measures are robust and flexible in the face of climate change uncertainties, it is essential that the climate risks being assessed and addressed cover those that are of greatest relevance to alternative protein production equipment and distribution systems.</p> <p>At a minimum, the physical characteristics of climate change that must be considered in the risk assessment include the following.</p> <ul style="list-style-type: none"> ● Temperature rise: <ul style="list-style-type: none"> ○ High temperatures can impact the operation and efficiency of certain types of equipment. ● Increasing intense precipitation events or reduced rainfall: <ul style="list-style-type: none"> ○ Heavy rainfall can result in flash pluvial flooding, which could significantly impact industrial assets. ○ Drought may alter or reduce availability of water with temperature increase. ● Water stress: <ul style="list-style-type: none"> ○ Poses the risk unbalanced ratio of water withdrawals to availability. ○ Poses the risk of supply-chain disruption caused by reduced access to ingredients/feedstocks due to crop water stress. ● Glacial melting and lake outbursts: <ul style="list-style-type: none"> ○ Poses a risk of flooding to industrial, retail and food service assets and premises due to glacier overflows or glacial melts. ● Wind: <ul style="list-style-type: none"> ○ Poses the risk of damage caused to industrial, retail, and food service assets and premises by cyclones (hurricanes, tornadoes, typhoons), dust and sandstorms, blizzards, wind patterns. ○ Poses the risk of supply-chain disruption caused by cyclones (hurricanes, tornadoes, typhoons), dust and sandstorms, blizzards, wind patterns. ● Seasonality changes: <ul style="list-style-type: none"> ○ Poses the risk of supply chain disruptions caused by changes to rain patterns, change in seeding date, length of growing season, change in frost-free days in season, other phenological risks specific to crop type. ● Increased incidence and extent of wildfires: <ul style="list-style-type: none"> ○ Poses a risk to industrial, retail, and food service assets and premises. ● Pests and disease: <ul style="list-style-type: none"> ○ Poses risks to availability of ingredients and feedstocks. ● Changes in cloud cover, wind speed or increasing temperature extremes: <ul style="list-style-type: none"> ○ Poses risks to availability of ingredients and feedstocks. ○ Poses risks to the availability of reliable energy. ● Sea-level rises: <ul style="list-style-type: none"> ○ Potential for flooding of coastal infrastructure and assets at risk from storm surge events. ● Increased soil erosion: <ul style="list-style-type: none"> ○ Risks to the availability of raw materials. ○ Risk to transport routes for supply chains. 		
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2.2	<p>The applicant must demonstrate that a risk assessment has been undertaken of the impact of the equipment/production unit/system itself to identify the risk of harm to the system it is located within, or natural, social, or financial assets of others, according to the principle of best available evidence during the investment period, taking into account the boundaries and critical interdependencies as defined in item 1 in this checklist.</p> <p>Harm is defined as an adverse effect on any of the following items:</p> <ul style="list-style-type: none"> • Adverse effects on local water bodies and water courses; • Air pollution from dust and other pollutants; • Relationships of the measure to nearby flood zones; • Reduction in pollinating insects and birds; • Reduction in biodiversity or High Conservation Value habitat; • Appropriation of land or economic assets from nearby vulnerable groups. 		
Area 3: Address and mitigate identified risks by undertaking risk-measures and adopting management plans			
3.1	<p>The applicant must demonstrate that measures have or will be taken to address and mitigate all identified risks to a level so that both the production unit/equipment/supply chain and the system which it is located in are ‘fit for purpose’ in the face of coming climate change over its operational life.</p>		
3.2	<p>After any mitigation measures are taken, the production unit/equipment/supply chain must be tolerant to the range of climate hazards identified in Area 2 of this checklist and not lock-in conditions that could result in maladaptation.</p>		
3.3	<p>After any mitigation measures are taken, the production unit/equipment/supply chain must not pose significant risk of harm to the system it is located within, or the natural, social, or financial assets of others, according to the principle of best available evidence during the investment period, considering the boundaries and critical interdependencies as defined in item 1 in this checklist.</p> <p>Harm is defined as an adverse effect on any of the following items:</p> <ul style="list-style-type: none"> • Adverse effects on local water bodies and water courses; • Air pollution from dust and other pollutants; • Relationships of the measure to nearby flood zones; • Reduction in pollinating insects and birds; • Reduction in biodiversity or High Conservation Value habitat; • Appropriation of land or economic assets from nearby vulnerable groups. 		
3.4	<p>These risk reduction actions/strategies themselves must be tolerant to a range of climate hazards and not lock-in conditions that could result in maladaptation.</p> <p>If interventions relate to hard infrastructure, the infrastructure must be suitable to climate change conditions over its operational life. The infrastructure must be tolerant to the range of climate hazards identified in Area 2 of this checklist and not lock-in conditions that could result in maladaptation.</p>		
3.1	<p>The applicant must demonstrate that measures have or will be taken to address and mitigate all identified risks to a level so that both the production unit/equipment/supply chain and the system which it is located in are ‘fit for purpose’ in the face of coming climate change over its operational life.</p>		
3.2	<p>After any mitigation measures are taken, the production unit/equipment/supply chain must be tolerant to the range of climate hazards identified in Area 2 of this checklist and not lock-in conditions that could result in maladaptation.</p>		
3.3	<p>After any mitigation measures are taken, the production unit/equipment/supply chain must not pose significant risk of harm to the system it is located within, or natural,</p>		

	<p>social, or financial assets of others, according to the principle of best available evidence during the investment period, taking into account the boundaries and critical interdependencies as defined in item 1 in this checklist.</p> <p>Harm is defined as an adverse effect on any of the following items:</p> <ul style="list-style-type: none"> • Adverse effects on local water bodies and water courses; • Air pollution from dust and other pollutants; • Relationships of the measure to nearby flood zones; • Reduction in pollinating insects and birds; • Reduction in biodiversity or High Conservation Value habitat; • Appropriation of land or economic assets from nearby vulnerable groups. 		
3.4	<p>These risk reduction actions/strategies themselves must be tolerant to a range of climate hazards and not lock-in conditions that could result in maladaptation.</p> <p>If interventions relate to hard infrastructure, the infrastructure must be suitable to climate change conditions over its operational life. The infrastructure must be tolerant to the range of climate hazards identified in Area 2 of this checklist and not lock-in conditions that could result in maladaptation.</p>		
<p>Area 4: The applicant is required to demonstrate that there will be ongoing monitoring and evaluation of the relevance of the risks and resilience measures, and related adjustments to those measures will be taken as needed.</p>			
4.1	Indicators for risks identified under Area 2 in this checklist are provided.		
4.2	Indicators for resilience measures identified under Area 3 in this checklist are provided.		
4.3	Indicators for 'no harm' to relevant system assets identified under Area 3 in this checklist are provided.		
4.4	<p>The applicant has a viable plan to annually monitor:</p> <ul style="list-style-type: none"> (a) climate risks linked to the production unit/equipment/supply chain; (b) climate resilience performance; (c) appropriateness of climate resilience intervention(s), and to adjust as necessary to address evolving climate risks. 		
4.5	Applicant has a process for monitoring and evaluation, and this is done annually.		
4.6	A grievance redress mechanism is in place to enable stakeholders to identify unanticipated adverse impacts, including a bias of investments away from high-risk locations and assets.		

Application of Climate Scenarios

Users can apply climate scenarios based on representative GHG-concentration pathways to ensure consideration of a worst-case scenario for manufacturing processes. This approach allows entities to account for potential disruptions such as changes in energy availability, extreme weather events affecting supply chains, and temperature variations that may impact production facilities.

Utilizing Climate Models

A broad range of climate models can be employed to simulate potential risks to manufacturing operations, such as temperature-induced production inefficiencies, increased water usage, or disruptions in raw material supply chains. These models help entities prepare for changes that could affect production processes and machinery maintenance.

Time horizons for assessing climate risks

Time horizons for assessing climate risks in the production of alternative proteins can be evaluated on shorter timescales, such as five-year intervals, to reflect operational cycles and technology upgrades. Additionally, every ten-year interval can be considered for long-term risks associated with facility maintenance, infrastructure updates, and material sourcing. Where accurate climate projections for manufacturing facilities are unavailable, worst-case scenarios can provide an appropriate risk buffer.

Characterising risks

Risks in alternative protein production can be characterised by the associated annual probability of equipment failure or disruptions in production, as well as the costs of damage to facilities, reduced operational efficiency, or delays in supply chains due to climate impacts.

Tools for assessing climate risks

For assessing climate risks and vulnerabilities in manufacturing facilities, the EU Regional Adaptation Support Tool (Step 2) provides a comprehensive framework.⁶⁵ This tool helps identify and prioritise risks based on location-specific data and projected climate impacts on energy and water use, as well as other production factors.

Additional guidance

For more detailed risk assessment using climate scenarios, the Task Force on Climate-related Financial Disclosures (TCFD) document: *The Use of Scenario Analysis in Disclosure of Climate-Related Risks and Opportunities*, which offers valuable insights on incorporating climate-related risks into corporate decision-making processes for manufacturing companies.⁶⁶

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