
SUSTAINABLE PLANT-BASED FOOD WORLDWIDE



A GUIDE FOR INTERNATIONAL VALUE CHAIN MANAGEMENT IN THE PROTEIN TRANSITION

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Part I: Responsible plant-based value chains: what, how and why?

Part II: Analysis of 16 international plant-based value chains in the protein transition

You can (also) find the text and the individual factsheets on our website:

<https://www.iucn.nl/en/publication/a-guide-for-international-value-chain-management-in-the-protein-transition>

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Part I: Responsible plant-based chains: what, how and why?

1. Short value chains – quick and clean? Introduction

Let's keep it short. Not just the value chains we are talking about, but also this guide, because the goal is above all: doing. With the protein transition, we want to achieve a better balance between the consumption and production of animal and vegetable protein, namely 40% animal and 60% plant-based, turning around the current ratio. And as IUCN NL in virtually every conversation we add: sustainably produced, wherever its origin.

Because does sustainable mean that we only use raw materials from close to home? Not necessarily. This guide has an international perspective, because we know that many plant-based value chains have their origins in countries far away, where people also want fair labour conditions, soil and chemicals handling need attention and forest and other nature need to be spared.

Chickpeas without child labour

Climate, biodiversity, but also human rights: they are important everywhere, and international trade can certainly also play a role in this. Especially in the production and trade of plant-based alternatives to animal protein products, we want to take care of the planet and its inhabitants by choosing controlled responsible cultivation, wherever it comes from.

Chickpeas without child labour, soy without loss of nature, almonds without water depletion, and cashew nuts without pollution are just a few examples. In this guide, we cover 16 value chains. These are not all protein-rich chains (such as coconut), but are ingredients that play a role in vegetarian products to make them not only protein-rich, but also diverse, appealing and tasty.

From a bird's eye view, plant-based consumption is more sustainable on a global scale because of – in many cases – more efficient land use, less water and energy use, or a lower nitrogen surplus. Globally, animal protein production is responsible for more than half of the greenhouse gas emissions from food; in the Netherlands it is as much as three-quarters. Moreover, 80% of global agricultural land is devoted to meat and dairy production, including feed production for livestock¹.

This means stiff competition for land with nature conservation and food agriculture for direct human consumption. It could and should be less. No matter how efficient the feed conversion of some animals, such as chicken and fish, the direct route usually cannot be beaten.

Balance between animal- and plant-based proteins

In terms of efficient land use, there are certainly exceptions. Livestock can, for example, make use of what grows on wet grasslands or in very dry areas. Farm animals can also be excellent residual processors of plant production and can keep arable land more vital and fertile through grazing and manure, for example by alternating between grazing and planting².

¹ IPCC (2021) Climate Change, the physical science basis; EAT Lancet (2019) The Planetary Health Diet; WNF (2021) Eetplan voor de Planeet; Feedback EU (2021) Minder vlees en zuivel.

² <https://www.wur.nl/en/article/producing-food-and-saving-the-earth.htm>

The protein transition is therefore about a good *balance* between animal and plant protein, both in production and consumption. The international climate panel IPCC³ and EAT Lancet⁴, as well as the Dutch Nutrition Centre all acknowledge it: complete veganism is not necessary, less animal protein is. Protein consumption in many countries – like the Netherlands – could be reduced anyway. Plant-based products can make an important contribution to this food transition, but then sustainably produced, worldwide.

In the Netherlands together with a group of civil society organisations and companies, such as those united in the Green Protein Alliance⁵, we hope to go from 60:40 (animal:plant-based) to 40:60 in 2030 with an in-between step of 50:50 in 2025. This goes beyond the target of the Dutch government, which aims for a 50:50 ratio by 2030.

Responsible production in every chain

What *this* guide is about is that responsible production is needed in *every* chain. We find that for some in the vegan sector this is less obvious: vegan must be better for the planet by all means? The examples in section five and the fact sheets in the second part of this guide show that sustainable production for the planet and its inhabitants is far from being a reality in many cases

Prevention of damage is better than cure, especially if we want to scale up the protein transition towards (much) more plant-based food.

Putting more effort into European protein crop production is certainly helpful. But this approach, quite literally, has its limits. Moving away from non European countries or value chains is often not necessary, nor is it always better. We do want to act sustainably, everywhere, deploying our power of change precisely where it is needed. So that people and regions worldwide benefit from the protein transition. Also in, for example, India, Peru, Bolivia, Vietnam, Ukraine, China, Senegal and Ivory Coast. With local, regional, but also international markets from which farmers, businesses and consumers can benefit, for a fair price and under sustainable conditions.

This guide offers insight into the key ingredients to be able to call a value chain responsible. We present the risks of 16 key (often) protein-rich international plant-based value chains found in vegan products, and discuss ways to manage these risks.



³ <https://www.wur.nl/nl/nieuws/onmiddellijke-versnelling-mondiale-klimaatactie-nodig-om-doel-15-graden-nog-te-kunnen-halen.htm>

⁴ <https://eatforum.org/eat-lancet-commission/the-planetary-health-diet-and-you/>

⁵ <https://greenproteinalliance.nl/strategie/>

2. Cure or prevention?

Is it necessary for every SME or supermarket buyer to check where exactly all the ingredients come from, travel there themselves and know the people and local conditions? It's not: companies should be able to rely on some good controllers, which has long been a widely accepted fact in the organic sector. This also applies to other kinds of (requirements for) value chains, and that's what our advice will be targeted to. We already know quite a lot about a number of value chains, which allows us to control and manage risks from step one. As a result, we don't have to reinvent the wheel 16 times.

Steps in due diligence

Of course, a good company policy does actively mitigate the risks for all value chains that it works with, including those that are less well known. Very briefly, therefore, the steps of due diligence:

- 1) Integrate corporate social responsibility into your business;
 - 2) Identify and assess negative impacts;
 - 3) Stop, prevent and mitigate negative impacts;
 - 4) Track implementation and results;
 - 5) Communicate how you address risks;
 - 6) Provide or collaborate on remedial measures if necessary
- See the OECD supply chain due diligence for a general approach⁶.

In order to do so, transparency in the chain is also important: where do your ingredients come from? For those in the EU: of the 16 chains analysed in this guide, only soy and palm oil will be subject to the EU Deforestation Regulation (EUDR). According to the EUDR traders from 2025 onwards have to know every polygon of production in their supply chain and have to declare that production has been done according to the law and without deforestation. However, all supply chains should be subject to sustainable corporate due diligence according to the broader EU's upcoming due diligence directive.

Unfortunately, in practice a due diligence process is often still mostly scandal-driven. Has an NGO written a report about it and criticised your name and your company's product, has a customer or bank pointed it out to you, or was there an article in the newspaper? We would prefer to be ahead of such a scandal and actively manage risks, including but surely beyond deforestation.

Prevention – in all aspects of sustainability – is far better than cure. Not only preventing damage to people and nature, but also preventing reputational and financial damage to your business and to the reputation of the vegetarian/vegan sector.

By setting an example with your responsible sourcing and sustainability measures in areas of cultivation or processing, you can also choose to actively improve the value chain.

Who or what can help to actively prevent and mitigate risks, and what are the ingredients for responsible management of chains? We address these questions in the next section.



⁶ <https://www.oecd.org/daf/inv/investment-policy/rbc-agriculture-supply-chains.htm>

3. Responsible value chains: minimum ingredients

We use the term responsible – rather than sustainable value chains here because they often originate from complex production systems that might need a far-reaching agro ecological approach to make them fully sustainable. In any case, we must ensure that international plant-based value chains, often value chains that do make the protein transition tasty, diverse and attractive, meet some *minimum requirements* as soon as possible. And to go beyond this minimum wherever we can.

Five minimum requirements

Ruling out of deforestation and conversion of natural areas to agricultural land is a very important requirement. Right now this is more important than ever, due to climate change and the loss of natural areas important for biodiversity. It is also very important to rule out the risk of labour abuse and land rights violations; the latter also often linked to deforestation. As such, there are a number of other risks that need to be considered in the production of plant-based ingredients.

These minimum requirements come down to – somewhat simplified – the next five points:

1. Complying with the local law. This sounds logical, but is complicated, often does not happen naturally and is not monitored in many cases. Good ground control is often indispensable.
2. Care for nature. That no deforestation or loss of nature should take place for production seems logical, but again you *really* need to have this checked. Is it in the requirements of the contract and is this properly checked? In some cases, it just says that "high-value nature" or "High Conservation Value Areas" must be spared. While this indeed is a conservation priority, determining these areas requires proper local analysis, which –for example, due to high costs of consultancies– does not always happen. "No conversion of natural ecosystems" is a clearer requirement, even if rigid.
3. Responsible agricultural practices in which soil, air, water and climate do not suffer. This means, for example, no use of chemicals or only responsible handling of chemicals, and a proper management of soil, water and waste. Is it in the requirements?
4. Fair labour conditions. There are all kinds of rules for this, with some sustainability standards going further than others. A current extra point of attention is a living wage: does an employee or farmer earn enough to make ends meet? This is often not (yet) part of sustainability standards, so you have to be alert if this can be a problem in the country concerned.
5. Respectful relations with local residents. Are the rights of local residents not being violated? Has their land not been taken illegally and are they not suffering from the use of pesticides? These are important questions. But also ask, for example, whether there is a complaint mechanism to report to if residents observe unsustainable practices on a plantation.

Robust sustainability standards such as united under the [ISEAL](#) Alliance have robust requirements on the abovementioned five basic themes. Moreover, in most cases they *verify* them in an independent and high quality manner, which is possible because there are clear criteria for this as well. In an international environment, this is not always easy to practice, but this starts with the requirements in the standard itself. A guidance follows below.

4. A guide to the label jungle

Proper verification of organic agriculture criteria is widely accepted in the vegan world; the robust verification however should also apply to other crucial aspects of sustainability. But to what extent can you trust labels or sustainability standards? Which ones and why?

On its own certification of products or supply chains cannot solve *fundamental* problems such as unsustainable land use or social injustice; much more is needed for that. However, a solid sustainability standard does *check* independently for these fundamental issues, at least at plantation level or throughout the supply chain, and thus *communicates* this message to producers also in countries where good land management is scarce.

Sustainability standards are not a solution in themselves, but a guideline for farm, product and supply chain criteria. Then, also a monitoring and verification tool for those same criteria in the toolbox of sustainable business policies. The strongest standards are built on input from multiple stakeholders and robust negotiations between NGOs, producers and companies⁷. There are often costs involved with certification, for farmers and buyers, and it is only right to reward (especially small) farmers for their additional sustainability efforts and related costs.

For those who produce or promote alternatives to animal proteins, and in this way hope to contribute to solving structural climate problems in terms of footprint, an audit by a quality sustainability standard is sometimes the *missing link* to know whether you are *also* on the right track with the (other) social and environmental requirements in your chains. Unfortunately, there is still a lack of understanding about the importance of these steps, both among the general public, NGOs and the chain players themselves.

Quality of standards

What makes the quality of a sustainability standard and what do you need for this?

ISEAL, a platform for quality of which standards such as Fairtrade International and Rainforest Alliance are members, speaks on optimal requirements for sustainability standards⁸. Those who want to deploy a quality standard first check this website and the sustainability standards that meet the ISEAL standards.

Unfortunately, no organic standard can be found at ISEAL, while organic is so well known in the vegetarian and vegan sector. Organic standards have their own partnerships and even a standard established at the European level, but usually do not have the integral social and environmental requirements that ISEAL requires.

The Dutch organization Milieucentraal advises on food labels for the Dutch consumer – also useful for producers, by the way. For example, they explain very well what organic means and what it does not mean. Organic standards – primarily focused on consumer and soil health – have their own quality controls with far-reaching requirements on, for example, soil management and the use of chemicals⁹. But from our international perspective of sustainable trade, they certainly do not meet requirements on social issues, for example, or on deforestation.

⁷ This is based on various benchmarking studies of palm oil and soy standards that we have commissioned or carried out.

⁸ www.isealalliance.org

⁹ Milieucentraal, <https://keurmerkenwijzer.nl/keurmerken/eu-biologisch-groente-en-fruit/>
<https://keurmerkenwijzer.nl/keurmerken/eu-biologisch-koffie-thee-en-chocolade/>

An example of a standard that is useful in terms of soil management and chemicals is EU Organic¹⁰, but it does not pay any attention to deforestation, human rights or labour rights. For many of the international chains we examined, this is totally inadequate. The Dutch EKO label requires an additional social audit for some chains (for this guide only for the cashew nut chain).

Proper verification of organic agriculture criteria is widely accepted in the vegan world; the robust verification however should also apply to other crucial aspects of sustainability.

Combinations of existing standards

Our advice for most of the chains discussed is: make sure you have solid, standardized environmental and social controls. And if you want organic: make combinations. E.g. the EU Organic with Rainforest Alliance¹¹ or Fairtrade.

These combinations are useful for many of the chains analysed, because they involve many social risks, but also environmental risks other than soil use and the effects of chemicals (scrutinised by organic standards), including ecosystem conversion and the release of other toxins. Fairtrade, for example, asks farmers to manage nature and the environment, but of course has social requirements as well. For example, their standard on nuts for small producers calls for protective clothing for workers peeling the –toxic shells of– cashews and sets requirements for prices and methods of payment for nut producers¹². They also have specific requirements for coconuts, olives and soybean cultivation for human consumption¹³. We discuss these in more detail in section five.

Inspections and advice for improvement

Quality labels use audits (supervisory field visits) to test the practices of cultivation and processing. Time-bound requirements for improvement may follow. These are binding for certification, but requirements and recommendations can also initiate a path for improvement in areas or among producers who are not (yet) ready for certification. Indeed, participation of small farmers, ranchers and entrepreneurs often requires additional attention and support. For this purpose, Rainforest Alliance has special training courses and processes to guide farmers and give them the opportunity to improve step by step¹⁴.

Sometimes things go wrong in the verification needed for certification, such as in the complex chain of palm oil. It is important to realise that certification is a tool that is part of your policy for which *you* are ultimately responsible. For example, if you source a lot from certain landscapes, you can have *additional* checks done on the biggest risks, such as labour or wildlife management. We'll come back to this later in this guide.

In the case of using a local, not internationally recognised standard in a project or chain, it is important to compare it with internationally accepted quality labels. You can perform an additional local risk analysis to see if improvement of the local standard or additional control of risks in field and factory is necessary¹⁵.

The Dutch eco-label On the Way to Planet Proof is on the rise in the Netherlands and is applied in several European countries. It only has natural and environmental criteria, and thus no requirements in the area of human, land- and labour rights. On the Way to Planet Proof provides

¹⁰ <https://www.rijksoverheid.nl/documenten/publicaties/2021/12/23/nieuwe-europese-bio-verordening>, in NL checked by SKAL

¹¹ <https://www.rainforest-alliance.org/commodity/nuts/>

¹² https://files.fairtrade.net/standards/Nuts_SPO_EN.pdf, pg 5.

¹³ https://files.fairtrade.net/standards/OilseedsAndOleaginousFruit_SPO_EN.pdf

¹⁴ Rainforest Alliance Learning Network: <https://learn.ra.org/>

criteria for energy and climate, crop protection, impact on biodiversity, soil quality, fertilisation, water and materials and waste. This standard has remarkably strong criteria on energy and climate. On the other hand, the "voluntary, or "choice" measures" for impact on biodiversity are interesting but very non-committal¹⁶. This flexibility has advantages, but it is perhaps refreshing to note that this label requires the farmer to have 5% area of nature and landscape elements (plus some choice elements), where a Brazilian soybean farmer is required by local law, depending on the ecosystem where they work, to have 20 to 80% forest cover.

Can't we, also in Europe, do *much* more for biodiversity, also in plant-based value chain management?

5. The most important value chains, origins and risks: how to manage.

For this guide, we commissioned sixteen plant-based value chains that are important to the protein transition. The factsheets can be found in part two of the guide. Below we provide some examples:

Issues per chain in a nutshell

For the production of kidney beans and white beans, we see serious deforestation risks in five countries: Brazil, Myanmar, Democratic Republic of Congo, Mozambique and India. In almond drink production, it is important to be alert to water depletion and a risk of growing use in chemicals in almond cultivation, including in the United States and Spain. Important too are associated health risks to workers and (among others) bee populations.

Health risks are a major concern in the cashew nut value chain as well. This is an important chain in the Netherlands, with many cashew nuts coming from Vietnam. Cashew shells and husks contain a toxic substance that can pollute water and soil, as well as cause serious health problems for workers, such as skin, eye and respiratory problems. This means that cheese made from cashew nuts is not necessarily – or in all aspects – better for people or the environment than cheese made from cow's milk if you don't remove these kinds of risks from the chain!

In hazelnut production, there is a risk of abusive migrant labour and child labour with exposure to heavy labour and chemicals in Turkey. Lentils or chickpeas from, say, India or Turkey? Also in these chains it is important to be alert to labour rights and child labour. In the coconut value chain, we find potential corruption or labour safety risks in the Philippines, among others, as well as deforestation in the recent past.

Attention to less visible groups

Gender and age issues are important concerns in working conditions: are women and children particularly at risk? They often are, due to less visibility, less formal employment contracts, higher vulnerability to violence and lack of protective clothing when chemicals are used.

¹⁶ <https://www.planetproof.eu/zakelijk/certificeren/plantaardig/>

We cannot overemphasize the importance of firm commitment to and control of social, nature and environmental risks. Opt for further value chain analyses where possible, and possibly for combinations of quality systems that cover both the social, nature and environment spectrum of risks.

There are also still a lot of blind spots in these value chains. We just don't know some of them yet. So please share your additional knowledge if you have it.

Risks in scaling up: a broad perspective

Scaling up production chains often creates indirect effects. We have seen this in the upscaling of soy and palm oil, where deforestation has caused desiccation and conflicts with land rights. But what is the situation with smaller chains?

Quinoa is another example of a value chain where scaling up led to problems. Peruvian and Bolivian farmers moved to monoculture, which caused farmers to become dependent on this crop, created the issue of soil depletion, and resulted in problems for these farmers with llama farmers who need grazing land.

As a buyer, are you responsible for that? Not directly, but a broader perspective helps. It is precisely the *scaling up* of production of vegan products that we have in mind when we point out chain and landscape risks. Good preparation is half the battle. The beauty, though, is that in many cases you can also have a positive influence on the ground through your involvement and choices. That's how Max Havelaar, Fairtrade coffee started, too. You'll find some good examples later in section seven.

Support from buyers is often needed to make the transition more sustainable, and it is not right that farmers and suppliers should bear the costs *alone*. Including consumers in producer engagement can increase understanding of the potentially higher costs of controlled sustainable cultivation, and can give them insight into how this can benefit nature, farmers and transition processes.

Just do it or work on positive storytelling as well? We would love to hear.



6. First aid for landscapes

IUCN NL has been supporting nature conservation organisations in tropical countries for decades. We are connected, for reasons of biodiversity *and* solidarity, to their work. Among other things, they ask for support to invest in nature conservation and good management in vulnerable landscapes and in nature-friendly production methods, both for local, regional and global markets.

Purchasing based on international responsible standards can certainly contribute to ruling out the destruction of nature. Moreover, it shows support for responsible production. But *more* is needed to protect nature in high-risk sectors and areas.

Landscape planning: scale and corridors

Earlier we discussed the importance of proper monitoring of the law in the production area. Other steps on the ground that are important for sustainable production: good land use planning, including the scale of production, and investing in nature that helps connect protected areas, also called corridors. These corridors allow animals to find food and reproduce, and keep biodiversity vital in the nature surrounding agricultural areas. This must be well researched and planned: a tuft of greenery here or there is often not viable.

Solutions for nature conservation

If you source a lot in a certain region, it is a good idea to make contact with local nature organisations and farmers. You can ask them if they are doing something extra for nature and what you as a buyer can contribute. There is no blueprint for this – every situation and area is different.

Soybean areas are experimenting with payments for ecosystem services and attractive loans for farmers who do not deforest, even when local law allows them to do so. Another solution is to invest in buying crucial nature – for example, a wildlife corridor – and letting a reliable local nature organisation manage it¹⁷.

Land acquisition may be seen as a last resort when saving important nature through the market or local lobbying is not possible. However, creating corridors still land acquisition projects are relatively small projects, with a big impact – if well designed and executed. Climate finance, on the other hand, often requires very large-scale projects, and most probably this does not fit the small cultivation within the plant-based protein value chains. Making the link between funding and local projects requires tailor-made work¹⁸.

Other important local issues: agro diversity, land use efficiency and economic value added.

Agricultural diversity is important for risk diversification for the farmer, and so is genetic diversity in the agricultural crops themselves (the variation within crops). In climate-sensitive areas, of which there are more and more, it is advisable for producers to draw from many variations of crops. Does rain come early or late, or not at all, or are there unexpected pests and diseases? One variety of bean can withstand this better than another. You can also contribute to this as a buyer

¹⁷ IUCN NL manages a Land Acquisition Fund that works this way.

¹⁸ As IUCN NL, we can advise on some of this type of cases, from using standards, to land acquisition, to climate financing, and otherwise we will refer you to our members or other organizations.

or purchaser: encourage agro-diversity in your local involvement in cultivation if you have the opportunity.

Another possibility is to optimise land use and add as much economic value as possible to local development. For example, can the crop already be processed and can more be earned locally, using common or new techniques, rather than just exporting sheer raw materials?

Where do we want to go with this? Sustainably produced short chains with high social and economic added value, optimal use of land and raw materials and little loss of energy and water¹⁹. There are also technical and economic opportunities in other countries for local production, instead of just supplying raw materials. Sustainable tofu from independent farmers from (say) Bolivia on your menu in 2030 and with a fair price? There is still a *very* long way to go, which not every entrepreneur will be able to pass, yet such ideals are important to imagine the future – worldwide.

What is already possible now, in your business practice, for farmers near *and*/far? We'd love to hear how you, the readers, view this guide.

7. Some current examples of procurement policies and initiatives.

We already mentioned a number of sustainability standards and combinations of them, but how do they fit into corporate policies? And what other steps are being taken? Here, we hope to add more European examples in this English guide, so do contribute!

Soy in vegan production



Soy, the vast majority of which is designated for animal feed, has become known, among other things, for the risks of deforestation and conversion of ecosystems, which you can also see in our fact sheet. Measures are now being taken against this, although this is certainly not yet sufficient; one of the reasons for subjecting this chain to European legislation against deforestation and illegal plantations. The EU Deforestation Regulation will be implemented from 2025 onwards. It also applies to non-GM soy cultivation for human consumption, insofar as this falls under soy 'trading codes'²⁰.

Soy for human consumption requires different properties than for livestock feed. What is already happening in risk management for soy in the vegan sector? Main extraction areas for non-GM soy for human consumption are Europe, (e.g. France but also Serbia), the United States, Canada and China. Some producers of soy-based vegan products do not want soy coming from Brazil (due to deforestation risk) or China (due to risk of labour rights violations). Another choice would be to buy deforestation free sustainable soy from such areas (eg ProTerra) and invest in risk landscape programmes.

Sustainability standards are used to mitigate such risks. Examples of what we have seen: Vivera buys non-GM soy, promotes European cultivation and also supports RTRS with certification in Latin America. Alpro certifies its soy with ProTerra, Garden Gourmet and Ojah (partially) with Danube Soy. LikeMeat uses organic soy. Schouten Europe buys non-GM soy from various origins, but not from Latin America. However, this company does support responsible soy production in

¹⁹ What we haven't gotten to in this first version of the guide is the aspects of protein extraction and processing, such as extraction or refining.

²⁰ About the soy fact sheet and underlying methods: see attachment or contact us.

Latin America according to RTRS standards to compensate its soy footprint. They also have broader due diligence policies, including on child labour, and are diversifying their protein sources.

We refer back to sections four and five for our reflection on the responsible use of sustainability standards in relation to company-wide due diligence.

Other chains highlighted



Almonds. Among other things, the fact sheet in our guide points out problems of water use and unsustainable use of bees in almond farming. Alpro's almonds come from the Mediterranean region and are mainly the product of non-irrigated agriculture. Since 2018, together with WWF, they have been studying the planetary limits of almond nut cultivation²¹. Alpro tries to implement measures with local nature organisations and almond farmers for more biodiversity (for example, in the plants, ponds and hedges in the orchards) and sets water objectives in almond orchards.



Cashew and other nuts. Nuts are full of useful ingredients for the protein transition, but their production is sometimes fraught with risks. Examples include labour rights violations or toxic substances released when cashew nuts are processed.

The Sustainable Nut Initiative is a platform that brings together value chain players who want to work step by step to make the nut sector more sustainable, starting with transparency and traceability in the complex cashew chain and a risk-based approach²².

Johnny Cashew has a different approach. This company has its cashews processed directly in Tanzania and removes the Asian intermediate processors from the chain. This saves transport kilometres and adds economic value in Tanzania. They buy and sell the whole nut, including the individual pieces that might otherwise have to be dumped cheaply on the market. The company also offsets the remaining CO₂ emissions, supports reforestation locally and seeks applications for the residual products of the cashew. Farmers receive Fairtrade prices and premiums through Lidl (in specific countries) and a living wage is being worked towards. Employees receive the Fairtrade trademark and the company's own requirements for space, light, and glasses, gloves and ventilation in connection with the toxic substances²³.

²¹ A bit dated, but for research purposes: <https://www.metabolic.nl/publication/alpro-setting-science-based-targets-for-nature/>. NB, IUCN NL was involved in the first steps.

²² The board includes, among others, Intersnack, Olam and Nut2. ComCashew and IDH are advisors, FairMatch Support the secretariat. <https://www.sustainablenutinitiative.com/tools-and-solutions/>

²³ Read more on the website of [Johnny Cashew](#).



Kidney beans. Our guide points out deforestation and other risks in kidney bean cultivation. Although in this guide we focus on improving international value chains, it is also possible to put local farmers on a new track and thereby contribute to more local cultivation and business models. For example, after a successful trial, the Dutch HAK company decided to source all of its large red kidney beans for pots and stand-up pouches from the Netherlands. The first batch received On the Way to Planet Proof certification (see paragraph four). This move ties in with Dutch Bean Deal, a green deal signed in July this year between the

Ministry of Agriculture, Nature and Food Quality (LNV) and 56 cooperation partners, to make the Netherlands more self-sufficient in protein-rich crops.

Want to know more? We do too.

We only mention a few and *certainly* don't know every initiative out there. Please inform us! In the next version of this guide you will hopefully find more initiatives and see examples of robust corporate policies on natural, environmental and social aspects. What good examples does your country have? Let us know to insert 1-2 extra examples in the version for your network.

Not yet experienced in making the chains you work in more sustainable? Or do you want to dive in further yourself? Then you can do your own research, approach or hire someone and/or help create the conditions for responsible production yourself. In many cases, additional research and selecting a good standard is necessary, as well as making contact with organisations in the landscape where you source your ingredients.

We hope this guide and the 16 sheets you find below have inspired you. Keep us posted in return. Maybe we can even work together on a new step.

- ▶ For feedback, suggestions and additions write to:
Heleen.vandenhomborgh@iucn.nl

In the next section/on the website you will find an overview sheet and fact sheets for each chain plus a brief explanation of the methodology. We discuss almonds, cashews, coconut, chickpeas, cow beans, dry beans (aka kidney and white beans), fababeans, hazelnuts, lentils, oats, palm oil, peas, quinoa, soy, tapioca and wheat.

- ▶ You can find this text and individual fact sheets on our website:
<https://www.iucn.nl/en/publication/a-guide-for-international-value-chain-management-in-the-protein-transition>

Part II Analysis of 16 important chains in the vegetarian and vegan sector



Overview

Environmental Risks

Carbon Footprint

Water Footprint

Deforestation Risk

Biodiversity Loss

Contamination

Almonds	1.90	16,095	5,973	!	
Fababeans	0.56	2,018	36,614		
Cashew	1.56	14,218	382,541		!
Chickpeas	0.67	4,177	111,049		
Coconut	1.78	2,687	290,699	!	
Cow peas	0.48	6,906	123,591		
Dry beans	0.67	10,515	1,065,640		
Hazelnut	1.07	5,053	2,193	!	!
Lentils	1.03	5,874	26,443		
Oats	0.70	1,788	13,953		!
Palm oil	0.80 / 2.32*	1,098 / 4,971*	6,277,933	!	!
Peas	0.58	1,979	53,875		
Quinoa	0.96	3,306	41,253	!	
Soy	0.60 / 2.30*	2,145	4,793,011	!	
Tapioca	0.32	2,818	2,092,113		!
Wheat	0.67	1,827	471,894		!

Beef**	27.72	15,415	29,806,822***
Butter	9.90	5,553	no data
Cheese	9.29	5,060	no data
Chicken	4.24	4,325	no data
Egg	3.23	3,265	no data
Lamb	27.21	10,411	no data
Milk	2.10	921	no data
Pork	5.79	5,988	no data

! High-risk attention areas

* The figures reported correspond to footprints linked to, respectively, the production of crop (nuts or beans) and the oil.

** Several animal products are included for comparison.

*** Cattle is known to be the largest contributor to global deforestation.

**** The deforestation risk is based on data valid until 2018, lacking therefore updates since that date.

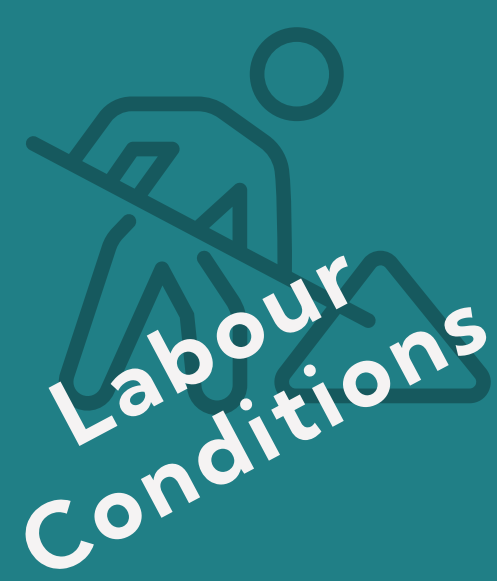
Thresholds

	Carbon footprint (kg CO ₂ eq/kg)	Water footprint (m ³ /ton)	Deforestation risk**** (2005-2018, in ha)
Low	0 - 1.5	0-2,000	0-10,000
Relatively low	1.5 - 2.0	2,000-4,000	10,000 - 40,000
Moderate	2.0 - 4.0	4,000-6,000	40,000 - 80,000
Relatively high	4.0 - 8.0	6,000-8,000	80,000 - 500,000
High	> 8.0	> 8,000	> 500,000

Note: For a full overview of approach and methods used to create this table, including an extensive list of sources, please visit the [website](#).

Overview

Potential Social Risks



Labour Conditions



Child Labour



Gender Issues



Health & Safety



Land Appropriation



Livelihood Issues



Reputational Risk

Almonds	USA, Spain		USA	Global, USA			
Fababeans	Lithuania, UK		Lithuania	Asia, Africa, Mediterranean Basin			
Cashew	Global, India, Vietnam	Vietnam, Guinea, Brazil	India, Benin, Tanzania	Global			
Chickpeas	India	India, Turkey	Global, India				Russia, Ukraine
Coconut	Indonesia, Philippines	Philippines		Global			Philippines (corruption)
Cow peas							
Dry beans	China			Global		Low and middle income countries	
Hazelnut	Turkey	Turkey				Italy	
Lentils	Turkey	Turkey	Global				
Oats					Canada		Russia, Ukraine
Palm oil	Global, Indonesia, Malaysia	Malaysia, Indonesia	Tropical countries	Tropical countries	Tropical countries	Tropical countries	
Peas	China						Russia, Ukraine, Belarus
Quinoa					Peru, Bolivia, Ecuador	Peru, Bolivia, Ecuador	
Soy	Brazil, China			Brazil	Brazil, Paraguay	Brazil, Paraguay	
Tapioca	Thailand, China, Cote d'Ivoire	Thailand	Global	Thailand			
Wheat	Pakistan, India		USA, Global			USA, Global	Russia, Ukraine

The table displays producer countries at risk of social issues linked to the production of the selected commodities. Due diligence should be at least implemented for the attention areas highlighted. However, not being flagged as an attention area does not mean social risks are absent nor does flagging a specific country/region imply that risks are not present in other production areas. It entails simply that such issues were not pervasive and did not become apparent in the overall research. Many social impacts are very delicate, rather invisible, and difficult to measure objectively. Moreover, not all commodity impacts are equally and/or systematically studied and reported.

Note: For a full overview of approach and methods used to create this table, including an extensive list of sources, please visit the [website](#).