DUURZAAM PLANTAARDIG OP WERELDSCHAAL

GIDS VOOR INTERNATIONAAL KETENBEHEER IN DE EIWITTRANSITIE

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Deel I: Verantwoorde plantaardige ketens: wat, hoe en waarom?

Deel II: Analyse van 16 internationale plantaardige ketens in de eiwittransitie

Je vindt de tekst en individuele factsheets (ook) op onze website:

https://www.iucn.nl/publicatie/gids-eiwittransitie-internationale-ketens

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Inhoudsopgave

Deel I: Verantwoorde plantaardige ketens: wat, hoe en waarom?

1. Korte ketens – snel klaar? Introductie

We houden het kort. Niet alleen de ketens waar we het over hebben, maar ook deze gids, want het doel is vooral: doen. Met de eiwittransitie willen we naar een betere balans tussen de consumptie en productie van dierlijk en plantaardig eiwit, namelijk 40% dierlijk en 60% plantaardig. En als IUCN NL voegen we daar expliciet en vrijwel in elk gesprek aan toe: duurzaam geproduceerd, overal ter wereld.

Want duurzaam, betekent dat alleen grondstoffen van dicht bij huis? Niet vanzelfsprekend. Deze gids heeft een internationaal perspectief, omdat we weten dat vele plantaardige ketens hun oorsprong in landen ver weg hebben, waar mensen *ook* eerlijke arbeidsomstandigheden willen, de bodem en omgang met chemicaliën aandacht nodig heeft en de bossen en andere natuur gespaard moeten worden.

Kikkererwten zonder kinderarbeid

Klimaat, biodiversiteit, maar ook menselijkheid: zij zijn overal belangrijk, en internationale handel kan beslist ook een rol spelen hierin. Juist ook in de productie en handel van plantaardige alternatieven voor dierlijke eiwitproducten willen we zorg dragen voor de planeet en haar bewoners door te kiezen voor gecontroleerd verantwoorde teelt, waar ook vandaan.

Kikkererwten zonder kinderarbeid, soja zonder natuurverlies, amandelen zonder wateruitputting, en cashewnoten zonder vervuiling zijn slechts enkele voorbeelden. In deze gids behandelen we 16 ketens. Dit zijn niet allemaal eiwitrijke ketens (zoals kokos), maar wel ingrediënten die in vegetarische producten een rol spelen om ze niet alleen eiwitrijk, maar ook divers, aantrekkelijk en smakelijk te maken.

Vanuit een vogelvlucht is plantaardige consumptie duurzamer op wereldschaal door een – in vele gevallen – efficiënter landgebruik, minder water- en energiegebruik of een lager stikstofoverschot. Wereldwijd is de productie van dierlijk eiwit verantwoordelijk voor meer dan de helft van de broeikasgasuitstoot door voedsel, in Nederland is dat zelfs driekwart. Bovendien is 80% van de wereldwijde landbouwgrond bestemd voor vlees- en zuivelproductie, inclusief voederproductie[1].

Dit betekent stevige concurrentie om land met natuurbescherming en voedsellandbouw voor directe menselijke consumptie. Het kan en moet minder. Hoe efficiënt de voederconversie van sommige dieren, zoals kip en vis ook is, de directe route is meestal niet te verslaan.

Balans tussen dierlijke en plantaardige eiwitten

Qua efficiënt landgebruik zijn er zeker uitzonderingen. Zo kan vooral vee op natte graslanden of in juist hele droge gebieden gebruikmaken van wat er groeit. Ook kunnen landbouwhuisdieren uitstekende restverwerkers zijn van plantaardige productie en kunnen zij akkerbouwgrond door begrazing en mest vitaler en vruchtbaarder houden, bijvoorbeeld door middel van afwisseling tussen begrazing en beplanting[2].

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[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

Het gaat bij de eiwittransitie daarom juist om een goede *balans* tussen dierlijke en plantaardige eiwitten, zowel in productie als consumptie. Het internationale klimaatpanel IPCC[3] en EAT Lancet[4], maar ook ons eigen Voedingscentrum en de Schijf van Vijf erkennen het allemaal: compleet veganistisch is niet noodzakelijk, minder dierlijk eiwit wel. Eiwitconsumptie in Nederland mag sowieso ook wel iets minder. Plantaardige producten kunnen een belangrijke bijdrage leveren aan 'deze voedseltransitie, maar dan wel duurzaam geproduceerd, wereldwijd.

Samen met een grote groep maatschappelijke organisaties in Nederland (PlantTheFutureNL) en met bedrijven zoals verenigd in de Green Protein Alliance[5] hopen we van 60:40 (dierlijk: plantaardig) naar 40:60 te gaan. Een stap verder dan de Nederlandse overheid, die de verhouding 50:50 als doelstelling voor 2030 heeft.

Verantwoorde productie in elke keten

Waar het in *deze* gids om gaat is dat in *elke* keten verantwoorde productie nodig is. We merken dat dit voor sommigen in de vega(n) sector nog minder vanzelfsprekend is: veganistisch is toch beter voor de planeet? De voorbeelden in paragaaf vijf en de factsheets in het tweede deel van deze gids laten zien dat duurzame productie voor de planeet en haar bewoners lang nog niet overal het geval is.

> Voorkomen van schade is beter dan genezen, zeker als we de eiwittransitie richting (veel) meer plantaardig willen opschalen.

Meer inzetten op Nederlandse en Europese productie is zeker nuttig. Maar deze aanpak heeft letterlijk grenzen. Weggaan uit andere landen of ketens is vaak niet nodig, en is ook in lang niet alle gevallen beter. Duurzaam handelen, dat willen we wel, overal, onze veranderkracht juist inzetten daar waar het nodig is. Zodat wereldwijd mensen en gebieden profiteren van de eiwittransitie. Ook in, bijvoorbeeld, India, Peru, Bolivia, Vietnam, Oekraïne, China, Senegal en Ivoorkust. Met lokale, regionale, maar ook internationale markten waar boeren, bedrijven en consumenten van kunnen profiteren, voor een eerlijke prijs en onder duurzame omstandigheden.

Deze gids biedt inzicht in de belangrijkste ingrediënten om een keten verantwoord te kunnen noemen. We presenteren de risico's van 16 belangrijke (vaak) eiwitrijke internationale plantaardige ketens die we in veganistische producten terugzien, en bespreken de manieren om deze risico's te beheersen.

[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. Genezen of voorkomen?

Is het nodig dat iedere MKB-er of supermarkt inkoper nagaat waar precies alle ingrediënten vandaan komen, er zelf heen reist en de mensen en lokale omstandigheden kent? Nee: bedrijven moeten kunnen vertrouwen op een aantal goede controleurs, wat in de biologische sector al heel lang een breed geaccepteerd gegeven is. Dat geldt ook voor andersoortige (eisen aan) ketens, en daar gaan we over adviseren. Van een aantal ketens weten we nu al vrij veel, waardoor we vanaf de eerste stap risico's kunnen controleren en beheersen. We hoeven daardoor niet 16 keer opnieuw het wiel uit te vinden.

Stappen in zorgvuldigheid: *due dilligence*

Een goed bedrijfsbeleid mitigeert natuurlijk wel actief de risico's voor alle ketens waarmee gewerkt wordt, ook de ketens die minder bekend zijn. Heel kort daarom de stappen van gepaste zorgvuldigheid of '*due diligence*':

1) Integreer maatschappelijk verantwoord ondernemen in je bedrijf;
2) identificeer en beoordeel negatieve gevolgen;
3) stop, voorkom en beperk negatieve gevolgen;
4) volg de invoering en de resultaten;
5) communiceer hoe je de risico's aanpakt;
6) zorg voor herstelmaatregelen of werk hieraan mee indien nodig.

Zie de website van RVO voor deze algemene aanpak van gepaste zorgvuldigheid[6]. Om dat te kunnen doen is transparantie in de keten ook belangrijk: waar komen je ingrediënten vandaan? Helaas is een *due diligence* proces in de praktijk vaak nog vooral schandaal gedreven. Heeft een NGO er een rapport over geschreven en je naam en het product van je bedrijf bekritiseerd, een klant of bank je erop gewezen of stond er een nieuwsbericht in de krant? Zo'n schandaal willen we liefst voor zijn.

Voorkomen – op alle aspecten van duurzaamheid – is veel beter dan genezen. Niet alleen het voorkomen van schade aan mens en natuur, maar ook voorkomen van reputatie en financiële schade aan je bedrijf en aan de reputatie van de vega(n) sector.

> Door een voorbeeld te stellen met jouw verantwoorde inkoop en duurzaamheidsmaatregelen in teeltgebieden of verwerking, kun je er ook voor kiezen om de keten actief te verbeteren.

Wie of wat kan helpen bij het actief voorkomen en mitigeren van risico's, en wat zijn de ingrediënten voor verantwoord beheer van ketens? Dit behandelen we in de volgende paragraaf.

[6] https://www.rvo.nl/blogs/op-weg-naar-duurzaam-ondernemen-due-diligence-6-stappen

3. Verantwoorde ketens: de minimum ingrediënten

We gebruiken hier de term verantwoorde – in plaats van duurzame – ketens omdat het soms om complexe productiesystemen gaat, die een vergaande agro-ecologische benadering nodig hebben om ze volledig duurzaam te maken. We moeten er in elk geval voor zorgen dat internationale plantaardige ketens, vaak ketens die de eiwittransitie *wel* smakelijk, divers en aantrekkelijk maken, zo snel mogelijk aan een aantal *minimum eisen* voldoen. En verdergaan dan dat waar we kunnen.

Vijf minimumeisen

Het uitsluiten van ontbossing en omzetting van natuurgebieden in landbouwgrond is in een heel belangrijke eis. Op dit moment meer dan ooit, door klimaat verandering en het verlies van belangrijke natuur. Daarnaast is het van groot belang om het risico op misbruik van arbeid en landrechtenschendingen (ook vaak bij ontbossing) uit te sluiten. Zo is er nog een aantal risico's waarnaar gekeken moet worden bij de productie van plantaardige ingrediënten.

Minimum eisen zijn niet vrijblijvend en daarom zetten we ze graag – enigszins versimpeld in 5 punten- op een rijtje:

1. **Voldoen aan de lokale wet**. Dit klinkt logisch, maar is ingewikkeld, gebeurt in veel gevallen niet vanzelfsprekend en gecontroleerd worden.
2. **Verantwoorde omgang met natuur**. Dat er voor de productie niet ontbost of natuur verdwenen is lijkt logisch, maar ook dit moet je *echt* laten controleren. Staat het in de eisen van het contract en wordt dit goed gecontroleerd? In sommige gevallen staat er alleen dat 'hoogwaardige natuur' of 'High Conservation Value Areas' moeten worden gespaard. Dit heeft wel prioriteit, maar het bepalen van deze gebieden vereist een goede lokale analyse, wat (bijvoorbeeld door hoge kosten) niet altijd gebeurt. "Geen conversie van natuurlijke ecosystemen" is een heldere eis.
3. **Verantwoorde landbouwpraktijken** waar de bodem, lucht, water en het klimaat niet onder lijden. Dit betekent bijvoorbeeld geen of een verantwoorde omgang met chemicaliën en een goed beheer van bodem, water en afval.. Staat het in de eisen?
4. **Eerlijke arbeidsomstandigheden.** Hier zijn allerlei regels voor, waarbij de ene duurzaamheidsstandaard verder gaat dan de andere. Een actueel aandachtspunt is een leefbaar loon (*living wage*): verdient een werknemer of boer(in) genoeg om van rond te komen? Dit is vaak (nog) geen onderdeel van duurzaamheidsstandaarden, waardoor je er alert op moet zijn als dit in het betreffende land een probleem kan zijn.
5. **Respectvolle omgang met omwonenden.** Worden de rechten van de omwonenden niet geschonden? Is hun land niet op illegale wijze ingenomen en lijden ze niet onder het gebruik van pesticiden? Dat zijn belangrijke vragen. Maar stel bijvoorbeeld ook de vraag of er een klachtenmechanisme is om zich te melden als ze ervaren dat het misgaat met de duurzaamheid op een plantage.

De RSB standaard voor biomaterialen is een voorbeeld van hoe stevig eisen kunnen zijn. We raden je aan hier meer over te lezen, zeker als je keten in arme of kwetsbare gebieden begint[7]. Maar er zijn ook andere standaarden die al meer worden toegepast.

Robuuste duurzaamheidsstandaarden zoals verenigd onder de ISEAL Alliantie hebben stevige eisen op bovenstaande vijf basisthema's. Bovendien *controleren* ze deze in de meeste gevallen op een onafhankelijke en kwalitatief goede manier, wat kan omdat er ook daarvoor duidelijke criteria zijn. In een internationale omgeving is dit niet altijd eenvoudig, maar dit begint bij de voorwaarden. Een wegwijzer.

[7] https://rsb.org/wp-content/uploads/2020/06/RSB-STD-01-001_Principles_and_Criteria-DIGITAL.pdf

4. Wegwijs door de labeljungle

Kun je keurmerken of duurzaamheidsstandaarden vertrouwen? Welke en waarom?

Je hoort in publieke opinie soms kritiek op certificering. Het kan fundamentele problemen zoals niet-duurzaam landgebruik in sojalanden of sociale onrechtvaardigheid in palmolie landen niet oplossen, daar is veel meer voor nodig. Echter, een stevige duurzaamheidstandaard *controleert* als het goed is wel onafhankelijk op deze fundamentele kwesties, i.i.g. op plantage niveau, en *communiceert* zo deze boodschap aan producenten ook in landen waar goed landbeheer schaars is.

Duurzaamheidsstandaarden zijn geen oplossing op zichzelf, maar een richtlijn voor productcriteria, en ook een controle-instrument voor diezelfde criteria in de gereedschapskist van duurzaam bedrijfsbeleid. De sterkste standaarden komen voort uit inbreng van meerdere stakeholders en stevige onderhandelingen tussen ngo's, producenten en bedrijven. Er zitten vaak kosten aan, voor boer en afnemer, en het is terecht om (zeker kleine) boeren voor de extra duurzaamheidsinspanningen te belonen.

Voor wie alternatieven voor dierlijke eiwitten produceert of promoot, en op deze manier qua voetafdruk meehelpt aan oplossen van structurele klimaatproblemen, is een controle door een duurzaamheidsstandaard soms de *missing link* om te weten of je *ook* goed zit met de (andere) sociale- en milieueisen in je ketens. Helaas is daar nog veel onduidelijkheid over, zowel bij het brede publiek als bij de ketenspelers zelf.

Kwaliteit van standaarden

Wat maakt de kwaliteit van een duurzaamheidsstandaard en wat heb je hiervoor nodig?

ISEAL, een platform voor kwaliteit waar standaarden zoals Fairtrade International en Rainforest Alliance lid van zijn, spreekt zich uit over optimale eisen aan duurzaamheidstandaarden[8]. Wie een kwalitatief stevige standaard wil inzetten checkt eerst deze website en de duurzaamheidsstandaarden die aan de ISEAL normen voldoen.

Bij ISEAL is helaas geen biologische standaard te vinden, terwijl biologisch in de vega(n) sector juist zo bekend is. Biologische standaarden hebben hun eigen samenwerkingsverbanden en zelfs een op Europees niveau vastgelegde norm, maar hebben meestal geen integrale sociale- en milieueisen zoals ISEAL dat vraagt. Het goed controleren van biologische standaarden is breed geaccepteerd; dit zou ook moeten gelden voor andere aspecten van duurzaamheid.

Voor de Nederlandse consument – overigens ook nuttig voor producenten- adviseert Milieucentraal over voedingskeurmerken. , en ze scheiden daarin kaf en koren. Zij leggen bv goed uit wat biologisch inhoudt en wat niet. Biologische standaarden – primair gericht op gezondheid van consument en bodem – hebben hun eigen kwaliteitscontroles met verreikende eisen aan bijvoorbeeld bodembeheer en het gebruik van chemicaliën[9]. Maar vanuit ons internationaal perspectief van duurzame handel voldoen ze zeker niet op bv sociaal vlak, of qua eisen m.b.t. ontbossing.

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[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/

Een voorbeeld van een standaard die nuttig is op het gebied van bodembeheer en chemicaliën is EU Biologisch (EU Organic)[10] , maar deze besteedt geen enkele aandacht aan ontbossing, mensenrechten of arbeidsrechten. Dat is voor veel van de door ons onderzochte internationale ketens volstrekt onvoldoende. Het EKO-keurmerk vraagt voor sommige ketens (voor deze gids alleen voor de cashewnotenketen) een aanvullende sociale audit.

Combinaties van bestaande standaarden

Ons advies voor de meeste van de besproken ketens is: zorg voor een stevige standaard controle op milieu *en* sociaal vlak. En wil je biologisch: maak dan combinaties. Bv bijvoorbeeld het EKO-keurmerk of EU Biologisch en Rainforest Alliance[11] of Fairtrade.

Deze combinaties zijn nuttig voor veel van de besproken ketens, omdat ze veel sociale risico's met zich meebrengen, maar ook andere milieurisico's dan bodemgebruik en de gevolgen van chemicaliën, zoals ontbossing en het vrijkomen van andere giftige stoffen. Zo vraagt Fairtrade boeren om natuur en milieu te beheren, maar heeft natuurlijk ook sociale eisen. Hun notenstandaard voor kleine producenten vraagt bijvoorbeeld om beschermende kleding voor werknemers die cashewnoten pellen en stelt eisen aan de prijzen en wijze van betaling van notenproducenten[12]. Ook hebben ze specifieke eisen voor kokosnoten, olijven en sojateelt voor menselijke consumptie[13]. We gaan hier in paragraaf vijf verder op in.

Controles en adviezen voor verbetering

Aan de hand van audits (controlerende veldbezoeken) wordt bij een kwaliteitslabel de praktijk van teelt en verwerking getoetst. Daarna kunnen tijdgebonden eisen voor verbetering volgen. Deze zijn bindend voor certificering, maar eisen en adviezen kunnen ook een traject voor verbetering initiëren in gebieden of bij producenten die (nog) niet klaar zijn om gecertificeerd te worden. Participatie van kleine boeren, boerinnen en ondernemers vraagt namelijk vaak om extra aandacht en steun. Hiervoor heeft Rainforest Alliance speciale trainingen en processen om boeren wegwijs te maken en de kans geven om stapsgewijs te verbeteren[14]

Soms gaat er wat mis in de controle op certificering, zoals in de complexe palmolieketen. Het is belangrijk om te beseffen dat certificering een instrument is dat deel uitmaakt deel van je beleid waarvan je *zelf* eindverantwoordelijk bent. Zo kun je als je veel uit bepaalde landschappen haalt extra controles laten uitvoeren op de grootste risico's, bijvoorbeeld op het gebied van arbeid of natuurbeheer. Hier komen we later in deze gids op terug.

In geval van gebruik van een lokale, niet internationaal erkende standaard in een project of keten is het van belang deze met internationaal geaccepteerde kwaliteitslabels te vergelijken. Je kunt een extra lokale risico analyse (laten) uitvoeren om te zien of verbetering van de lokale standaard of extra controle op risico's in veld en fabriek nodig is[15].

Het internationale milieukeurmerk On the Way to Planet Proof is ook in Nederland in opmars en wordt in diverse Europese landen toegepast. Het is gebaseerd op het eerdere Milieukeur en heeft alleen natuur- en milieucriteria, en dus geen eisen op het gebied van mensen- land - arbeidsrechten. On the Way to Planet Proof voorziet in criteria voor energie en klimaat, gewasbescherming, invloed op biodiversiteit, bodemkwaliteit, bemesting, water en materialen en

[10] https://www.rijksoverheid.nl/documenten/publicaties/2021/12/23/nieuwe-europese-bio-verordening, in NL gecontroleerd door 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/

afval. Deze standaard heeft opvallend sterke criteria op het gebied van energie en klimaat. Aan de andere kant zijn de 'keuzemaatregelen' voor de invloed op biodiversiteit interessant maar wel erg vrijblijvend [16].Die flexibiliteit heeft voordelen, maar het is misschien toch verfrissend op te merken dat dit keurmerk van de boer 5% oppervlak aan natuur en landschapselementen eist (plus enkele keuze-elementen), waar van een Braziliaanse sojaboer volgens de lokale wet, afhankelijk van het ecosysteem waar hij/zij werkt, 20 tot 80% bosbedekking wordt gevraagd.

Kunnen we, ook in Europa, niet *veel* meer doen voor de biodiversiteit, ook in plantaardig ketenbeheer?

5. De belangrijkste ketens, herkomst en risico's: hoe te beheren.

Voor deze gids hebben we zestienplantaardige ketens die belangrijk zijn voor de eiwittransitie laten doorlichten. De factsheets in deel twee van de gids Hieronder geven we vast een aantal voorbeelden.

Aandachtspunten per keten in een *nutshell*

Voor de productie van **kidneybonen en witte bonen** zien we stevige ontbossingsrisico's in vijf landen: Brazilië, Myanmar, Democratische Republiek Congo, Mozambique en India. Bij de productie van **amandel**drinks is het belangrijk om alert te zijn op wateruitputting en een risico op groeiend gebruik van chemicaliën in de amandelteelt, onder andere de Verenigde Staten en Spanje. Zo ook op de bijbehorende gezondheidsrisico's voor werknemers en (oa) bijenpopulaties.

Gezondheidsrisico's zijn ook een belangrijk aandachtspunt in de **cashewnotenketen**. Dit is een belangrijke keten in Nederland, waarbij veel cashewnoten uit Viet Nam komen. Cashewappels en -schillen bevatten een giftige stof die water en bodem kan vervuilen, maar ook ernstige gezondheidsklachten bij werknemers kan veroorzaken, zoals huid- oog- en ademhalingsproblemen. Dit betekent dat kaas op basis van cashewnoten niet per definitie – of op alle aspecten beter is voor mens of milieu dan kaas gemaakt van koeienmelk als je dit soort risico's niet uit de keten haalt!

Bij de productie van **hazelnoten** is er risico op misbruik van migrantenarbeid en kinderarbeid met blootstelling aan zware arbeid en chemicaliën in Turkije**. Linzen of kikkererwten** uit bijvoorbeeld India of Turkije? Ook in deze ketens is het belangrijk om alert te zijn op arbeidsrechten en kinderarbeid. In de **kokosketen** treffen we potentiele corruptie of arbeidsveiligheidsrisico's in onder andere de Filippijnen, maar ook ontbossing in het recente verleden.

Aandacht voor minder zichtbare groepen

Gender en leeftijdsaspecten zijn belangrijke aandachtspunten in arbeidsomstandigheden: lopen vrouwen en kinderen extra risico? Vaak is dit het geval, door minder zichtbaarheid, minder formele arbeidscontracten, hogere kwetsbaarheid voor geweld en een gebrek aan beschermende kleding bij chemicaliëngebruik.

[16] https://www.planetproof.eu/zakelijk/certificeren/plantaardig/

We kunnen het belang van een stevige betrokkenheid bij en controle op sociale en natuur- en milieurisico's niet genoeg benadrukken. Kies voor verdere ketenanalyses waar mogelijk en eventueel voor combinaties van kwaliteitssystemen die zowel het sociale als natuur- en milieuspectrum aan risico's afdekken.

Er zijn ook nog heel veel blinde vlekken in de ketens. We weten het gewoon deels nog niet. Deel dus je aanvullende kennis als je die hebt.

Risico's bij opschaling: een breed perspectief

Opschaling van productieketens creëert vaak indirecte effecten. Dit hebben we gezien in de soja- en palmolie opschaling, waarbij ontbossing verdroging heeft veroorzaakt en waarbij landrechtenconflicten plaatsvinden. Maar hoe zit dit met kleinere ketens?

Quinoa is een ander voorbeeld van een keten waarbij opschaling tot problemen leidde. Peruaanse en Boliviaanse boeren gingen over op monocultuur, waardoor ze afhankelijk werden van dit gewas, bodemuitputting een probleem werd en deze boeren problemen kregen met lamaboeren die graaslanden nodig hebben.

Ben je daar als inkoper verantwoordelijk voor? Niet direct, maar een breder perspectief helpt. Het is juist de *opschaling* van de productie van veganistische producten die we in gedachten hebben als we op keten en op landschapsrisicos's wijzen. Een goede voorbereiding is het halve werk. Het mooie is wel dat je in veel gevallen ook een positieve invloed kunt hebben ter plekke, door jouw betrokkenheid en keuzes. Zo begon Max Havelaar koffie ook. Een paar goede voorbeelden vind je straks in paragraaf zeven.

Ondersteuning vanuit afnemers is vaak nodig om de transitie naar meer duurzaam voor elkaar te krijgen, en het is niet terecht dat boeren en leveranciers *alleen* voor de kosten opdraaien. Consumenten hierin meenemen kan het begrip voor de eventueel hogere kosten van gecontroleerd duurzame teelt vergroten. en kan hen inzicht geven in hoe dit ten goede kan komen aan de natuur, boeren en transitieprocessen.

Gewoon doen of daarnaast werken aan een positieve 'storytelling'? We horen het graag.

6. Eerste hulp aan landschappen

IUCN NL steunt al decennia lokale natuurbeschermingsorganisaties in tropische landen. Wij zijn verbonden, om redenen van biodiversiteit *en* solidariteit, met het werk van deze mensen. Ze vragen onder andere steun om te investeren in natuurbescherming en goed beheer in kwetsbare landschappen en in natuurvriendelijke productiewijzen, zowel voor lokale, regionale als globale markten.

Volgens internationale verantwoorde standaarden inkopen kan zeker bijdragen aan het uitsluiten van natuurvernietiging. Bovendien laat het zien dat er steun is voor verantwoorde productie. Maar er is *meer* nodig om de natuur in risicosectoren en –gebieden te beschermen.

Landschapsplanning: schaal en corridors

Eerder hebben we het belang van een goede controle op de wet in de productiestreek besproken. Andere stappen ter plaatse die belangrijk zijn voor een duurzame productie: het maken van een goede planning van landgebruik, inclusief de schaal van productie, , en investeren in natuur die bijdraagt aan het verbinden van beschermde gebieden, ook wel 'corridors' genoemd. Deze corridors zorgen ervoor dieren voedsel kunnen zoeken en zich voort kunnen planten, en houden de biodiversiteit in de natuur rondom de landbouwgebieden vitaal. Dit moet goed onderzocht en gepland worden: een plukje groen hier of daar is vaak niet levensvatbaar.

Oplossingen voor natuurbehoud

Wie veel inkoopt uit een bepaalde streek doet er daarom goed aan contact te maken met lokale natuurorganisaties en boeren. Je kunt daar de vraag stellen of er iets extra's gedaan worden voor de natuur en wat jij als koper daaraan bij kan dragen. Hier is geen blauwdruk voor – elke situatie en elk gebied is anders.

In sojagebieden wordt geëxperimenteerd met betalingen voor ecosysteemdiensten en aantrekkelijke leningen voor boeren die niet ontbossen wanneer dit volgens de lokale wet wel mag. Een andere oplossing is het investeren in aankoop van cruciale natuur – bijvoorbeeld een corridor – en dat in beheer laten geven van een betrouwbare lokale natuurorganisatie[17].

Landaankoop is soms een ultiem redmiddel als het sparen van belangrijke natuur via de markt of lokale lobby niet kan. Het creëren van corridors gebeurt echter nog te weinig in productielandschappen, waar het *juist* hard nodig is. Bovendien zijn dit relatief kleine projecten, met een grote impact – mits goed opgezet en uitgevoerd. Klimaatfinanciering daarentegen vraagt vaak om heel grootschalige projecten, dit niet passen bij de kleine teelt binnen de plantaardige eiwitketens. De link tussen financiering en lokale projecten leggen vraagt maatwerk[18].

Andere belangrijke lokale zaken: agrodiversiteit, landgebruiksefficiëntie en toegevoegde economische waarde.

Diversiteit van landbouw is belangrijk voor risicospreiding voor de boer(in), en dit geldt ook voor genetische diversiteit in landbouwgewassen (de variatie binnen gewassen). In klimaatgevoelige gebieden, waarvan er steeds meer zijn, is het aan te raden uit vele variaties van gewassen te putten. Komt regen vroeg of laat, of helemaal niet, of zijn er onverwachte plagen en ziektes? De

[17] IUCN NL beheert en landaankoopfonds dat op deze wijze werkt.
[18] Als IUCN NL kunnen we over een aantal van dit soort zaken adviseren, van het gebruik van standaarden, tot landaankoop, tot klimaatfinanciering, en anders verwijzen we door naar leden of andere organisaties

ene variëteit van een bonensoort kan hier beter tegen dan de andere. Ook hier kun je als afnemer of inkoper aan bijdragen: stimuleer agrodiversiteit in je lokale betrokkenheid bij de teelt als je de mogelijkheid hebt.

Een andere mogelijkheid is het landgebruik optimaliseren en zoveel mogelijk economische waarde toevoegen aan lokale ontwikkeling. Kan er bijvoorbeeld lokaal al veel worden verwerkt en verdiend, met gangbare of nieuwe technieken, in plaats van alleen ruwe grondstoffen te exporteren?

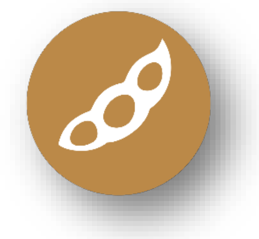
Waar willen we heen? Duurzaam geproduceerde korte ketens met veel toegevoegde maatschappelijke en economische waarde, optimaal land- en grondstoffengebruik en weinig verlies van energie en water[19]. Ook in andere landen zijn er technische en economische kansen voor lokale productie, in plaats van het aanleveren van ruwe grondstoffen. Duurzame tofu van zelfstandige boeren uit (zeg) Bolivia op je menu in 2030 en met een eerlijke prijs? Dit is nog een *hele* verre brug, die niet voor elke ondernemer mogelijk zal zijn, maar wel belangrijk voor de toekomst – ook daar.

Wat is er nu al wel mogelijk, in jouw bedrijfspraktijk, voor boeren dichtbij *en* veraf? We horen graag hoe jij als lezer deze gids ziet.

7. Enkele lopende voorbeelden van inkoopbeleid en initiatieven.

We noemden al een aantal duurzaamheidstandaarden en combinaties ervan, maar hoe passen die in bedrijfsbeleid? En wat voor andere stappen worden er gezet?

Soja in vegan productie



Soja, voor het overgrote deel bestemd voor veevoer, is onder andere bekend geworden door de risico's op ontbossing en conversie van ecosystemen, die je ook in onze factsheet terugziet. Daar worden nu maatregelen tegen getroffen, al is dit zeker nog niet voldoende; een van de redenen om de keten aan Europese wetgeving tegen ontbossing en illegale plantages te onderwerpen. Afronding van deze wetgeving wordt verwacht najaar 2022. Deze wet geldt dan ook voor niet-genetisch gemodificeerde sojateelt voor menselijke consumptie, voor zover dit onder soja 'handelscodes' valt[20].

Voor soja voor menselijke consumptie vraagt men andere eigenschappen dan voor veevoer. Wat gebeurt er nu al aan risicobeheersing voor soja in veganistische sector? Belangrijkste winningsgebieden voor non-GM-soja voor menselijke consumptie zijn Europa, (bijvoorbeeld Frankrijk maar ook Servië), de Verenigde Staten, Canada en China. Sommige producenten van op soja gebaseerde vegan producten willen geen soja die uit Brazilië komt (door ontbossingsrisico) of China (door risico op arbeidsrechtenschending).

Ook worden duurzaamheidsstandaarden gebruikt om zulke risico's te mitigeren. Voorbeelden van wat wij hebben gezien: Vivera koopt non-GM-soja, stimuleert Europese teelt en steunt

[19] Waar we in deze eerste versie van de gids nog niet aan toekomen is de aspecten van eiwitwinning en verwerking, zoals extractie of raffinage.

[20] Over de soja factsheet en de achterliggende methoden: zie bijlage of neem contact met ons op.

daarnaast RTRS met certificering in Latijns-Amerika. Alpro certificeert haar soja met ProTerra, Garden Gourmet en Ojah (gedeeltelijk) met Donau Soja. LikeMeat gebruikt biologische soja. Schouten Europe koopt non-GM-soja van diverse origine, maar niet uit Latijns-Amerika. Wel geeft dit bedrijf voor zijn volledige sojavoetafdruk steun aan verantwoorde sojaproductie in Latijns-Amerika volgens de normen van RTRS. Ook hebben ze een breder *due diligence*-beleid onder andere met betrekking tot kinderarbeid en is zij bezig haar eiwitbronnen te diversifiëren.

We verwijzen terug naar paragraaf vier en vijf voor onze reflectie op het verantwoord gebruik van duurzaamheidsstandaarden in relatie tot bedrijfsbrede *due diligence*.

Andere ketens uitgelicht

Amandelen. De factsheet in onze gids wijst onder andere op problemen van watergebruik en op niet duurzaam gebruik van bijen in de amandelteelt. Alpro's amandelnoten komen uit de mediterrane regio en zijn hoofdzakelijk het product van niet-geïrrigeerde landbouw. Sinds 2018 bestuderen ze samen met het WWF de planetaire grenzen van de teelt van amandelnoten[21]. Alpro probeert met lokale natuurorganisaties en amandelboeren maatregelen te implementeren voor meer biodiversiteit (bijvoorbeeld in de planten, vijvers en heggen in de boomgaarden) en stelt waterdoelstellingen in amandelboomgaarden.

Cashew- en andere noten. De noten zitten vol met nuttige ingrediënten voor de eiwittransitie, maar de productie hiervan zitten soms ook vol risico's. Voorbeelden zijn arbeidsrechtenschending of giftige stoffen die vrijkomen bij verwerking van cashewnoten.

Het Sustainable Nut Initiative is een platform dat ketenspelers samenbrengt die stapsgewijs aan verduurzaming van de notensector willen werken, beginnend met transparantie en traceerbaarheid in de complexe cashew keten en een riisco-gebaseerde benadering[22].

Johnny Cashew heeft een andere aanpak. Dit bedrijf laat de cashewnoten direct in Tanzania verwerken en haalt de Aziatische tussenverwerkers uit de keten. Dat scheelt transportkilometers en voegt economische waarde toe in Afrika. Zij kopen en verkopen de hele noot, dus ook de losse stukjes die anders mogelijk goedkoop op de markt moeten worden gedumpt. Ook compenseert het bedrijf de nog resterende CO2 uitstoot, helpt lokaal met herbebossing en zoekt naar toepassingen van de restproducten van de cashew. Boeren krijgen via Lidl Fairtrade prijzen en premies en er wordt toegewerkt naar een *living wage*. Werknemers krijgen cf Fairtrade en eigen eisen van het bedrijf ruimte, licht, en brillen, handschoenen en ventilatie i.v.m. de giftige stoffen[23]..

[21] Enige jaren oud, maar voor idee van onderzoek: https://www.metabolic.nl/publication/alpro-setting-science-based-targets-for-nature/. NB, IUCN NL was betrokken bij de eerste stappen.

[22] Het bestuur bestaat onder andere uit Intersnack, Olam en Nut2. ComCashew en IDH zijn adviseurs, FairMatch Support het secretariaat. https://www.sustainablenutinitiative.com/tools-and-solutions/

[23] Lees meer op de website van Johnny Cashew.

Kidneybonen. Onze gids wijst op ontbossings- en andere risico's in de kidneybonenteelt. Hoewel we in deze gids ons richten op het verbeteren van *internationale* ketens, kun je ook Nederlandse boeren op een nieuw spoor zetten en daarmee bijdragen aan meer lokale teelt en verdienmodellen. Zo heeft HAK na een succesvolle proef besloten al haar grote rode kidneybonen voor potten en stazakken uit Nederland te gaan halen. De eerste lichting kreeg On the Way to PlanetProof certificering (zie paragraaf vier). Deze stap sluit aan bij de 'Bean Deal', een green deal die in juli dit jaar werd gesloten tussen het Ministerie van Landbouw, Natuur en Voedselkwaliteit (LNV) en 56 samenwerkingspartners, om Nederland meer zelfvoorzienend te malen in eiwitrijke gewassen.

Meer weten? Wij ook.

We noemen er maar een paar en weten *zeker* niet alles wat er aan initiatieven gebeurt. Breng en houd ons op de hoogte! In de volgende versie van deze gids zul je hopelijk meer initiatieven vinden en voorbeelden zien van robuust bedrijfsbeleid op natuur-, milieu- en sociale aspecten.

Is er nog geen ervaring met het verduurzamen van de ketens waar jij in werkt? Of wil je er zelf verder induiken? Dan kun je zelf op onderzoek gaan, iemand benaderen of inhuren en/of zelf de omstandigheden helpen creëren om verantwoord te (laten) produceren. In heel veel gevallen is extra onderzoek en het kiezen voor een goede standaard nodig, en daarnaast het contact maken met organisaties in het landschap waar je het ingrediënt vandaan haalt.

We hopen dat deze gids en de 16 sheets die je hierna aantreft je hebben geïnspireerd, maar we geven ook graag advies. Houd ons op de hoogte, want deze gids gaat een vervolg krijgen. Met een internationale blik *en* met het oog op de toekomst. Misschien kunnen we zelfs samenwerken voor een nieuwe stap.

- Schrijf voor feedback, suggesties en aanvullingen naar: Heleen.vandenhombergh@iucn.nl

In het volgende deel / op de website vind je een overzichtssheet en factsheets per keten plus een korte uitleg van de methodologie. We bespreken (in het engels) amandelen, cashewnoten, kokos, kikkererwten, koeienbonen, droge bonen (oa kidney en witte bonen), fababeans, hazelnoten. linzen, haver, palm olie, erwten, quinoa, soja, tapioca en tarwe.

- Je vindt de tekst en individuele factsheets op onze website: https://www.iucn.nl/publicatie/gids-eiwittransitie-internationale-ketens

Deel II Analyse van 16 ketens belangrijk in de vega(n) 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.

Thresholds	Carbon footprint (kg CO2eq/kg)	Water footprint (m3/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

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

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

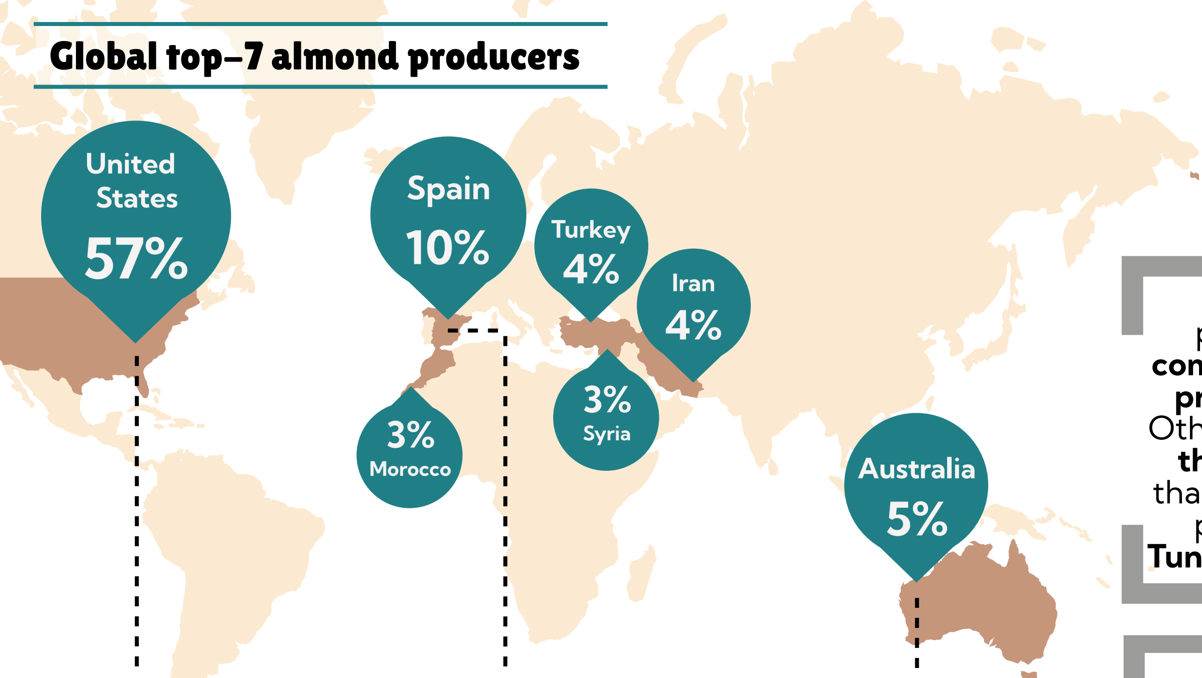
The table displays producer countries at risk of social issues linked to the production of the selected commodities. Due diligence should be at least implemented for the attention areas highlighted. However, not being flagged as an attention area does not mean social risks are absent nor does flagging 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.

ALMONDS

Production & Trade

Global top-7 almond producers

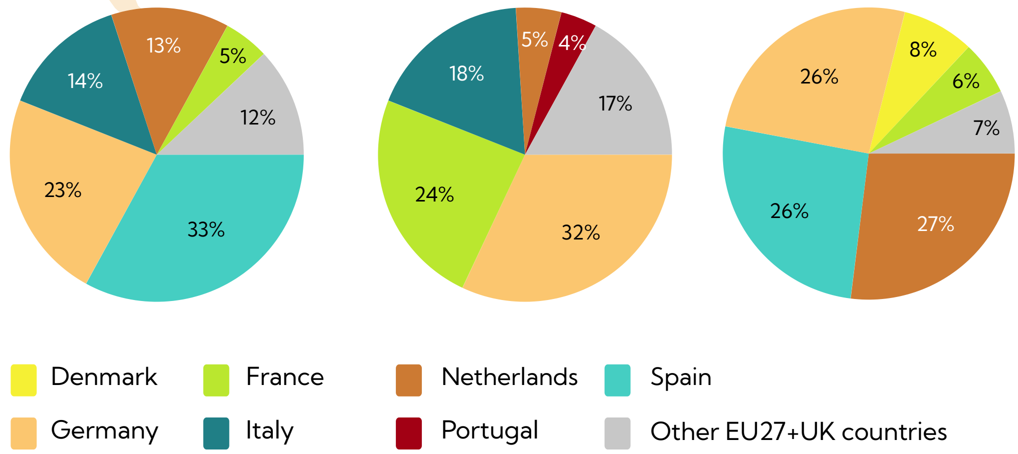


In **2020**, the top 7 producing countries **comprised 87% of almond production worldwide**. Other countries with **more than 1% share** (but less than 2%) in global almond production are **Italy, Tunisia, Algeria, and China**.

Top 5 EU27 + UK recipients of U.S. exports

Top 5 EU27 + UK recipients of Spain exports

Top 5 EU + UK recipients of Australia exports



In the same year, the **US was responsible for more than half of the world's production of almonds**, making it the country's leading tree nut export in both value and volume.

In 2021, most **almond imports** to the **EU27 and the UK originated from the USA** (62% of total almond imports). The second largest exporter to the region is Spain, which is responsible for 17% of total imports.

In Europe, **Spain, Germany, France, and the Netherlands** are among the major importers of almonds. **Spain**, despite being a leading producer of almonds globally (10%), **also imports considerable amounts from the US and Australia**.

Besides **cultivation and harvesting**, almond production also requires **processing** (e.g. hulling and shelling) to obtain the nut meat. This stage occurs in processing facilities where **sustainability issues related, for instance, to air emissions** may still be found.

ALMONDS

Environmental Risks

Almonds have one of the **highest global water footprints** among vegetables and fruits. In almond farms, most freshwater is provided through **irrigation** and it constitutes about **70% of the total water footprint of almonds**. Multi-year droughts in California (2011-2017) have contributed to further **depletion of underground aquifers** and **increased energy consumption due to groundwater pumping** in almond farms in the region. Under increasing global droughts, almonds production may further escalate water stress.

16,095 m3/ton
is the water footprint of (shelled) almonds

Water Footprint

In the U.S., **both pollution and water depletion** associated with almond production have been found to **endanger the survival of local fauna** (e.g., fish).

50 billion
commercial honeybees died in 2018-19 in the U.S.

Since most almond tree varieties in California are not self-fertile, they **depend greatly on pollen transfer being done by pollinators** to produce almonds. Using commercial honeybees for this became common practice in the U.S., where **colonies are rented by almond farms and transported to California from all over the country** during pollination season. This has been considered the largest man-driven pollination event in the world.

Biodiversity Loss

The commercial pollination industry has, however, contributed to the **significant decline of honeybee numbers in the U.S.** due to **higher exposure to pesticides** (on farm) **and diseases** (facilitated by the long-distance movement of the colonies).

Since the beginning of the 2000s, there were overall **increases in the use of pesticides**, **insecticides**, **herbicides**, and **fungicides** in the almond orchards of California. The intensification in the use of these chemicals has been linked to **soil and groundwater contamination** and **higher emissions of nitrogen oxides**.

13+ million kg
of 'active ingredients' were sprayed in almond orchards in the U.S. between 2014 and 2018

Contamination

1.90 kg CO2eq
is the carbon footprint per kg of almonds

Almonds have a **relatively low impact in terms of greenhouse gas emissions (GHG) and energy use**. GHG emissions are largely associated with almond production and processing, originating **mostly from fuel combustion and from soil and nutrient management practices** (e.g., tillage and fertilizer use).

Emissions

ALMONDS

Social Risks

Labor conditions

There is evidence that, **both in the U.S. and in Spain**, the agricultural sector is heavily reliant on **temporary, low-wage and, in many cases, irregular migrant labor.** These workers often endure **coercive and exploitative labor conditions** due to the inherent vulnerability of their migration status and dependence on provisions offered by employers (e.g., housing).

$7,500 /year is the median income of a migrant worker in the agricultural sector in the US.

Long working days, lack of overtime pay and sick leave, and low piece-rate wages (based on value per bin of fruits harvested over the course of a shift) are some of the reported labor issues found in almond operations in the U.S.

Health & Safety

122 µg/m3 are daily levels of PM2.5 (fine dust) to which almond workers are exposed - 3x higher than the recommended standards of the U.S. Environmental Protection Agency

Workers in almond farms face **specific health challenges related to weather conditions** (high temperatures and heat waves) and **exposure to chemicals and dust**. According to reported accounts, exposure to extreme heat in Californian almond orchards has led workers to **heat exhaustion**, which is currently considered more problematic in the sector than pesticide exposure.

In addition, almond harvesting releases high amounts of dust, increasing the levels of harmful particulate matter (solid and liquid particles found in the air, such as fine dust) in the air. These are likely to **have a negative health impacts, particularly in terms of respiratory illnesses** (e.g., chronic cough, persistent wheeze, asthma symptoms).

Gender Issues

In the U.S., **increasing numbers of farmworkers are women,** who are **more vulnerable to sexual harassment and violence**. Incidents of this nature have been reported by women working in almond farms.

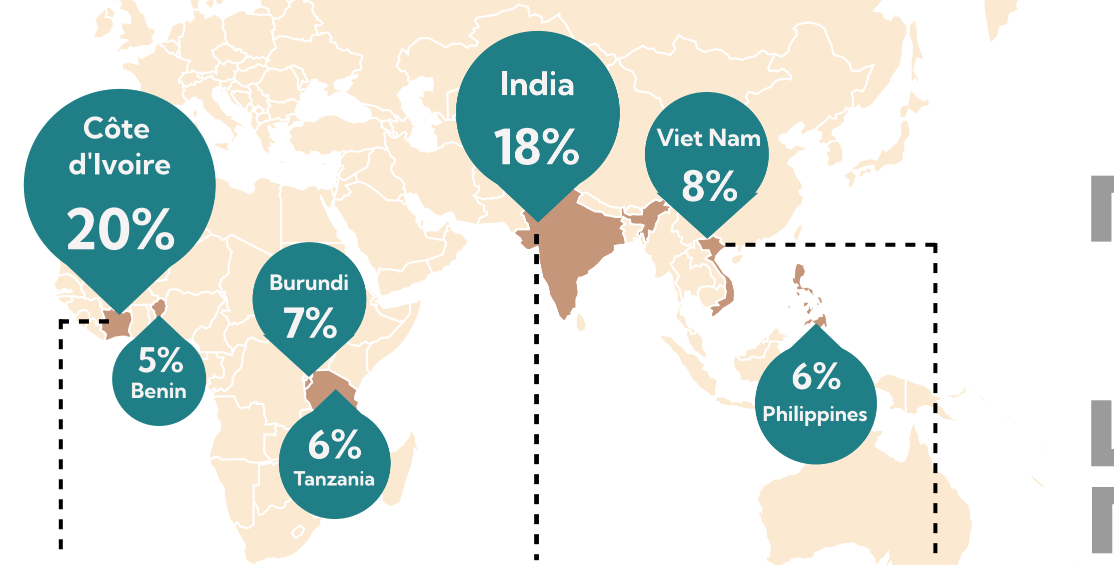
Gender discrimination is also reportedly present, namely among pregnant women and/or those who need to provide childcare. The **poor labour conditions** that are felt across the sector **affect women more stringently than men and contribute to a higher level of vulnerability of this group.**

28% of workers in crop farms are women, most of whom are not born in the US and are part of an ethnic minority.

Cashew

Production & Trade

Global top-7 cashew producers



In 2021, **78% of non-EU imports of cashew to the EU and UK originated from Viet Nam**, 7% from India, 5% from Côte d'Ivoire, and 2% from Brazil.

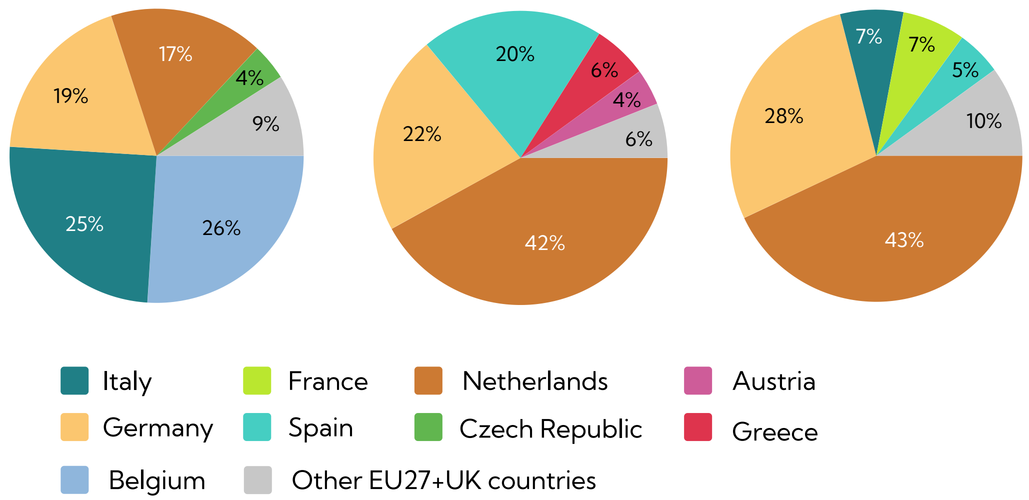
Processing (shelling, peeling, and grading) **is dominated by India and Viet Nam** while the **African continent leads in terms of global cashew production**

Considering the top-7 cashew exporting countries to the EU and the UK in 2021, **85% of cashew originated from processing countries** (Viet Nam and India) and only **11% from producing countries** (Côte d'Ivoire, Brazil, Burkina Faso, Indonesia, and Ghana)

Top 5 EU27 + UK recipients of Côte d'Ivoire exports

Top 5 EU27 + UK recipients of India exports

Top 5 EU27 + UK recipients of Viet Nam exports



In **2020**, the top 7 producing countries **comprised 70% of cashew production worldwide**. Other countries with **3% share or more** in global cashew production are **Mali, Burkina Faso, Guinea-Bissau, Brazil, Indonesia,** and **Mozambique**

The **Netherlands is the largest importer of cashew in the EU**, followed by **Germany and Italy.** Most of the imports of cashew to these three countries originate from Viet Nam (52 tons, 33 tons, and 9 tons, respectively)

Cashew

Environmental Risks

Cashew nuts are among the tree nuts with the largest water use per kilogram.

The water footprint of cashews is not only attributed to **irrigation of the crops**, but also to the **cashew processing methods** (roasting or steaming) used and **washing the processing equipment.** Water stress from cashew production is particularly relevant in dry producer countries such as Mali and Burkina Faso.

14,218 m3/ton

is the average global water footprint of cashew production

Water Footprint

15,204 ha

of forest were at risk in 2018 due to cashew production in Tanzania

There are **significant deforestation risks associated with cashew production**, particularly in Tanzania and Indonesia, which comprise 59% and 27%, respectively, of the deforestation risk embodied in global cashew production. Although these are not relevant countries in terms of EU and UK imports, their **deforestation risk can be indirectly imported via the processing countries** (Viet Nam and India), which import a significant part of the cashews they process from such producing countries.

Land use & Deforestation

Cashew production can lead to **soil and water contamination** in the surrounding areas due to **poor solid and water waste management.**

Some of the **by-products of cashew production and processing**, such as cashew apple and cashew nut shell liquid or CNSL, end up as production residues, which can be environmentally damaging.

Although fertilizer and pesticide use in cashew farms can contribute significantly to acidification and eutrophication, in West African countries, **cashew farms are mostly smallholdings** that **use less chemical inputs** than other producing countries (e.g., Brazil)

90%

of the cashew apples in African cashew producing countries are not utilized and are dumped as solid waste

Contamination

1.56 kg CO2eq

is the carbon footprint per kg of cashews

In cashew supply chain, **greenhouse gas emissions (GHG)** are associated with the **cultivation, processing, and distribution stages**. In cultivation, and namely in countries such as Brazil, there are **significant nitrous oxide emissions** from the commonly used agricultural practices (fertilization and pest management) in cashew farms.

Cashew processing operations across West Africa tend to **rely on fossil fuels and biomass as sources of energy**, which are well-known sources of GHG emissions.

Emissions

Cashew

Social Risks

Labour conditions

In the cashew industry, **precarious employment** – temporary and without formal registration – and **long working hours and low wages based on piece rate** (payment by volume/weight) are common. **Welfare benefits** for workers, such as sick leave, pension, or holidays, are also **inexistent** in most cases. **Safety equipment is usually not provided** by the employer nor is medical treatment for injuries sustained in the workplace.

33 €/month

is the basic salary of workers in cashew processing units in Maharashtra (largest cashew producing state in India). It is 3x lower than the estimated living wage in India's rural areas.

Child Labour

Child labour has been found in cashew production in Viet Nam, Guinea, and Brazil. It has been linked to participation in family work on the farms and to school absenteeism. Although child labour has significantly decreased in cashew production in recent years, **there is still risk** that cashews are cultivated in combination with crops where child labour is still utilized and that some sub-contracted cashew processing units still allow it. The existence of gender differences in cashew-related child labour are not known.

Health & Safety

Physical and environmental hazards

leading to severe pain, eye damage, and respiratory and skin infections, have been reported among cashew processing workers.

Processing cashew nuts has considerable health and safety risks related to **poor ventilation, minimal sanitation, and lack of protective equipment.** During the processing of cashew kernels, the liquid released (CNSL) can cause **skin burns and infections, as well as eyesight damage.** The **lack of safety equipment**, such as gloves or bandages, **and of basic washing facilities** aggravates these issues.

Musculoskeletal problems (e.g., joint ache and arthritis) can also be developed due to repetitive movements, forceful contractions, and sustained positions, and so can **respiratory diseases** such as asthma.

Gender Issues

Female workers, with **low education** and a **lower socio-economic background**, are considered a **useful labor force** in the cashew industry. They **receive lower wages,** tend to **work longer hours** and **have a lower bargaining power** due to their vulnerable socio-economic condition.

Discrimination is highly present in the industry because the different types of work performed by women and men are translated in **higher wages for men.** In Benin and Tanzania, harvesting, collecting, shelling, and peeling raw cashew nuts is **mostly done manually by women** while men engage in more mechanical processing jobs while also having access to land and finance.

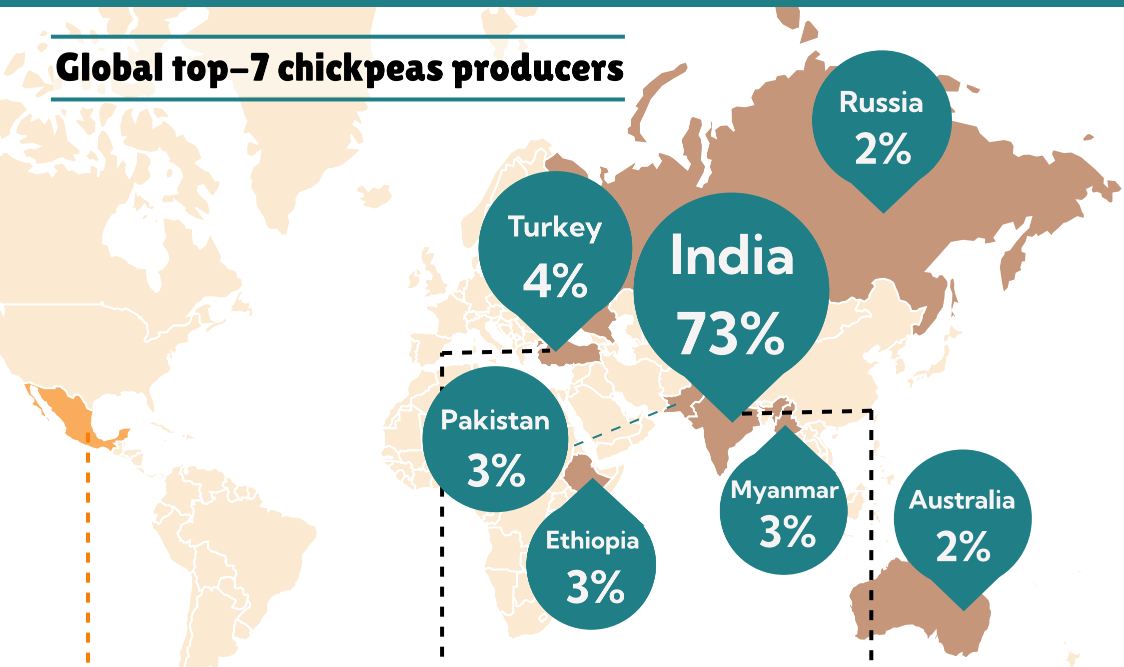
90%

of the workers in the cashew industry in India, in 2020, were women

Chickpeas

Production & Trade

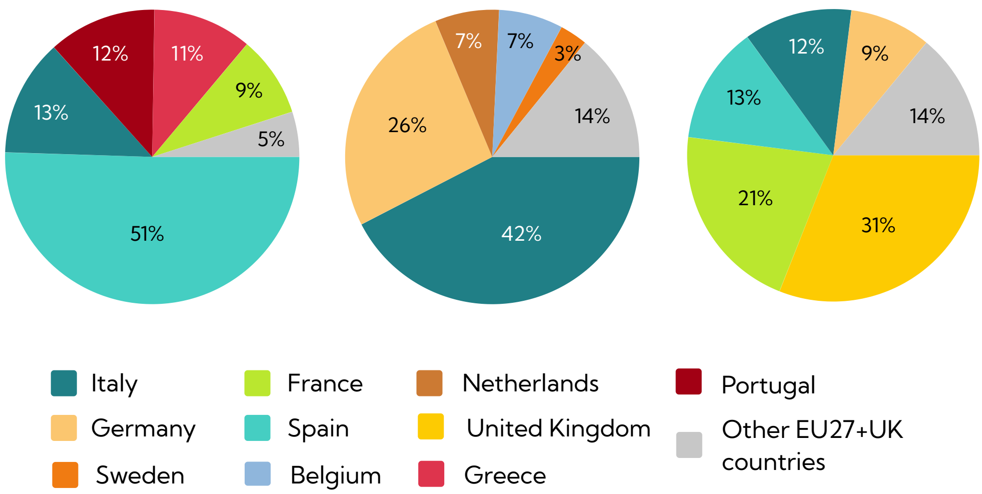
Global top-7 chickpeas producers



Top 5 EU27 + UK recipients of Mexico exports

Top 5 EU27 + UK recipients of Turkey exports

Top 5 EU27 + UK recipients of India exports



In 2021, the EU mainly imported chickpeas from non-EU countries **Mexico** (27%), **Turkey** (23%), **the USA** (21%), and Canada (11%).

While **in 2020 Mexico only produced 1% of the global share of chickpeas production**, the country was the **number one supplier to the EU28 in 2021**. Spain is its major recipient (51%).

Italy is the only country that is a top-5 recipient of chickpeas from Turkey, Mexico, and India in 2021. **The UK was the leading importer of chickpeas from India in 2020.**

In **2020**, the top 7 producing countries **comprised 91 % of chickpeas production worldwide**. Other countries with **more than 1% share** in global chickpeas production are Iran, Canada, the United States, Argentina, Mexico (EU is a key importer), and Sudan.

India is the leading producer of chickpeas, with a 73% share in the global production of chickpeas in 2020. However, it is was only the 8th supplier country of the EU28 market in 2021. While mainly France and Italy re-import chickpeas within Europe, **chickpeas are predominately grown outside Europe**.

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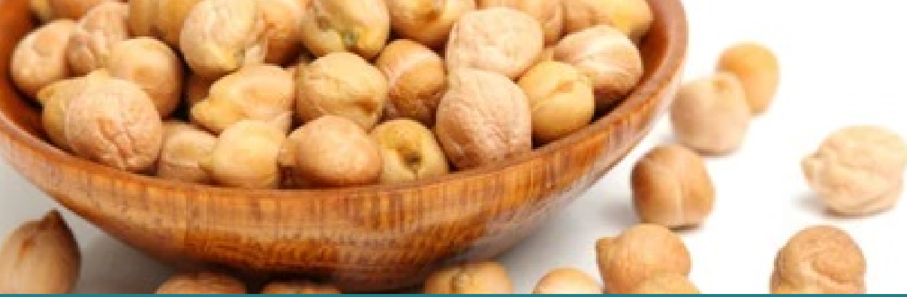


Chickpeas

Environmental Risks

Land use & Deforestation

9,554 ha
of deforestation risk was linked to chickpeas in India

A total of 9,554 ha of **deforestation risk** was associated with chickpeas production in India in 2018. This is relatively low compared to for instance soy-related deforestation in Brazil, which totals 223,365 ha.

Water Footprint

The estimated water footprint of chickpeas, 4,177 cubic metres per ton, is a **moderate global average water footprint**.

4,177 m3/ton
is the water footprint of chickpeas

Contamination

chickpeas
fix nitrogen

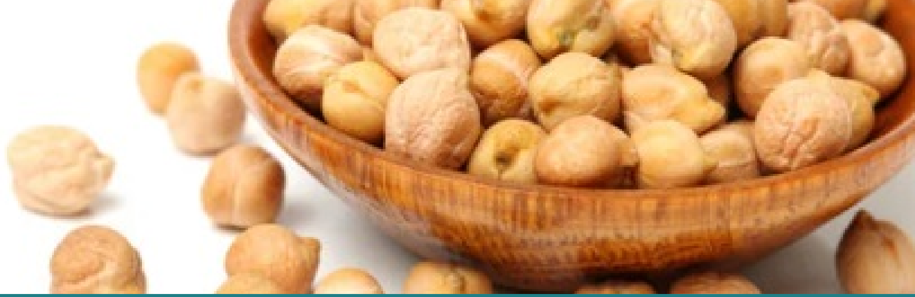
Chickpeas **enrich the soil with nitrogen**, allowing farmers to use less fertilizer.

Emissions

The carbon footprint attributed to the chickpeas crop is **low.**

0.67 kg CO2eq
is the carbon footprint per kg of chickpeas

Chickpeas



Social Risks

Child Labour

While no specific reference is made to chickpeas production, there are indications of **child labour in the vegetable seeds companies in India**, the largest chickpeas producer in the world.

14 million

children are working in India

There are strong indications that India has the highest number of working children in the world, as well as the worst forms of child labor. Turkey, also an EU supplier, **is reportedly linked to child labour in its pulses (legumes) production.**

Also forced labour is common in India, an **estimated 8 million people are forced to work**.

Reputation Risks

250,000 tons

of chickpeas from Russia were destroyed in war in 2022

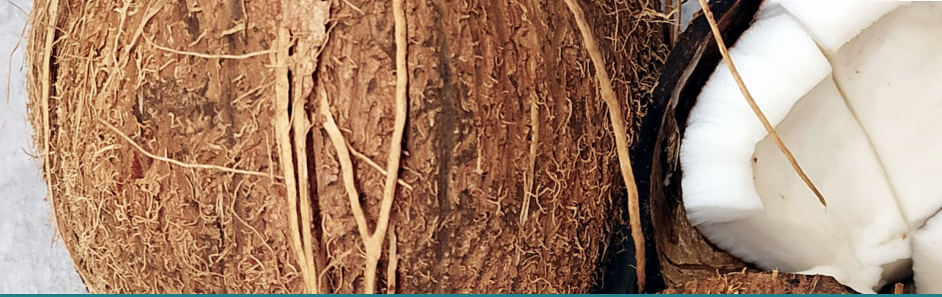
Chickpeas production is affected by the Russia-Ukraine war. Reportedly, Russia exported around 200,000 to 250,000 tons of chickpeas per year. With the star of the war in February 2022, the supply of chickpeas was destroyed.

While global commodity production and trade data did not demonstrate a large role for Ukraine production, it was stated that **Europe would not receive an expected 50,000 tons of chickpeas** because **Ukraine was unable to ensure its chickpea production due to the war.**

Gender Issues

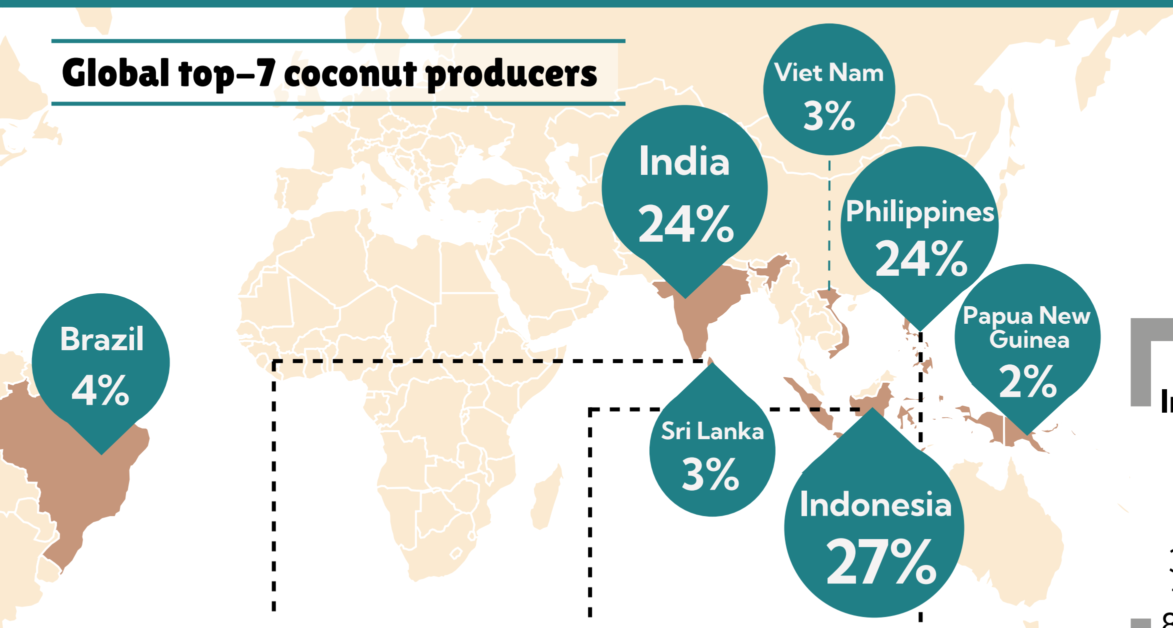
Many of the major production countries of chickpeas have severe gender issues, especially in India. While not specifically linked to chickpeas production, generally, female agricultural workers work under harsh, unequal, and discriminating conditions in many countries, including India. For instance, **women are not allowed to own land, receive lower renumeration, work often long hours without formal contracts or any social or job security, and are more prone to violence and abuse.**

Coconut



Production & Trade

Global top-7 coconut producers



The Philippines and Indonesia are the largest suppliers of coconut products to the EU, respectively representing 47% and 39% of 2021 EU imports for dried coconuts, and 85% and 12% for imports of crude coconut oil

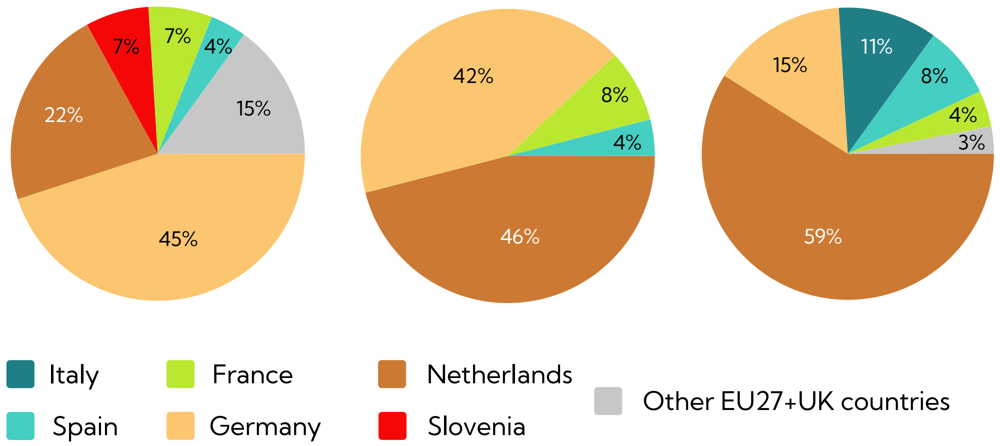
Sri Lanka ranks third as a supplier of dried coconuts and crude coconut oil to the EU in 2021, respectively 9% and 1%

Fresh/inner shell coconuts imported in the EU in 2021 mainly originate from Côte d'Ivoire (51%), **Viet Nam** (35%) and Thailand (7%)

Top 5 EU27 + UK recipients of Sri Lanka exports

Top 5 EU27 + UK recipients of Indonesia exports

Top 5 EU27 + UK recipients of Philippines exports



Note: Relevant coconut products include Desiccated/dried coconuts (HS 080111), Fresh coconuts/inner shell (080112) and Crude coconut oil (HS 15131110).

In **2020**, the top 7 producing countries **comprised 87% of coconuts production worldwide**. Other countries with **more than 1% share** in global coconut production are Mexico, Thailand, and Malaysia.

Coconut is mostly grown in tropical island nations. While Indonesia (27%), India (24%), and the Philippines (24%) were the largest global producers of coconuts in 2020, the **Philippines are the leading exporter** to the EU market.

Coconut

Environmental Risks

18.33 species are threatened by coconut crop per million tons of oil produced

The main biodiversity threats from coconut production relate to its risk of exacerbating extinction rates of unique species.

The number of species threatened by the coconut crop per million tons of oil produced is estimated higher for coconut than for instance for palm oil, olives, and soybeans. It has been a contested issue whether there has been higher biodiversity loss connected to coconut production.

Biodiversity Loss

IUCN lists **66 species**, including vertebrates, plants, arthropods, and mollusks, **for which coconut production is the main threat.**

Coconut production occurs mostly in tropical island countries, where it **has been linked to historical tropical deforestation**, such as in Indonesia and Sri Lanka. Most coconut producing countries were forested in the past, but **in 2015 only an average of 11.2% of their land area was "primary forest"**. In some of these countries, coconut expansion was the main driver of deforestation.

9,159 ha of deforestation risk was calculated for coconuts in Indonesia in 2018

Land use & Deforestation

1.78 kg CO2eq is the carbon footprint per kg of coconuts

Carbon emissions linked to coconut production seem to be currently **moderate,** since most coconut-linked deforestation already occurred in the past.

Emissions

The **water footprint** of coconuts seems **relatively low**, with outdated data (1996-2005) referring to 2,687 m3/ton.

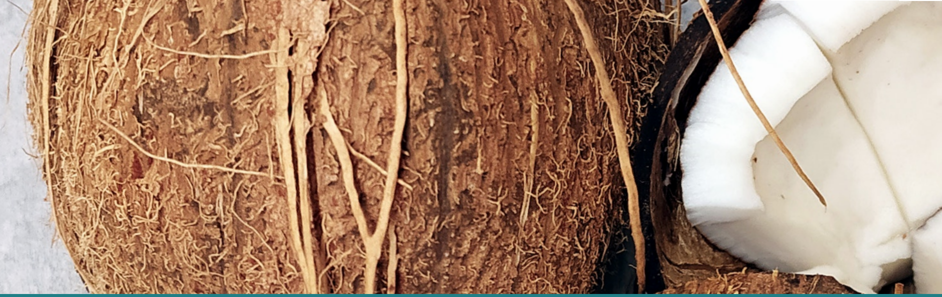
When coconut shells are burned and used for cooking by local smallholder coconut farmers, this may result in **dangerous waste and increases air pollution**.

Farmers are also monocropping in coconut production, leading to depletion of the soil and the need for increased use of **chemical fertilisers**.

2,687 m3/ton is the global average water footprint of coconuts

Water use & Contamination

Coconut



Social Risks

Labour conditions

Coconut farmers in Indonesia and the Philippines are among the poorest of farmers in their countries. They receive low wages and often live **below poverty line**.

60%

of small scale coconut farmers live on or below the poverty line of 20,000 Philippine pesos (about EUR 350) per year

Child Labour

There are indications that **child labour** occurs in the production of coconuts in the Philippines.

Health & Safety

3.4%

of all injuries at the surgical department of a Solomon Islands hospital was linked to coconut palm

Harvesting of coconuts in high trees is a dangerous activity. There are reports of workers on coconut plantations in the Philippines **falling from the trees** at the time of harvest.

Corruption

While corruption is not exclusive to coconut production, there are indications that **corrupt practices** occur in coconut production in the Philippines. This may carry **reputational risks** for coconut and coconut derived products coming from the Philippines.

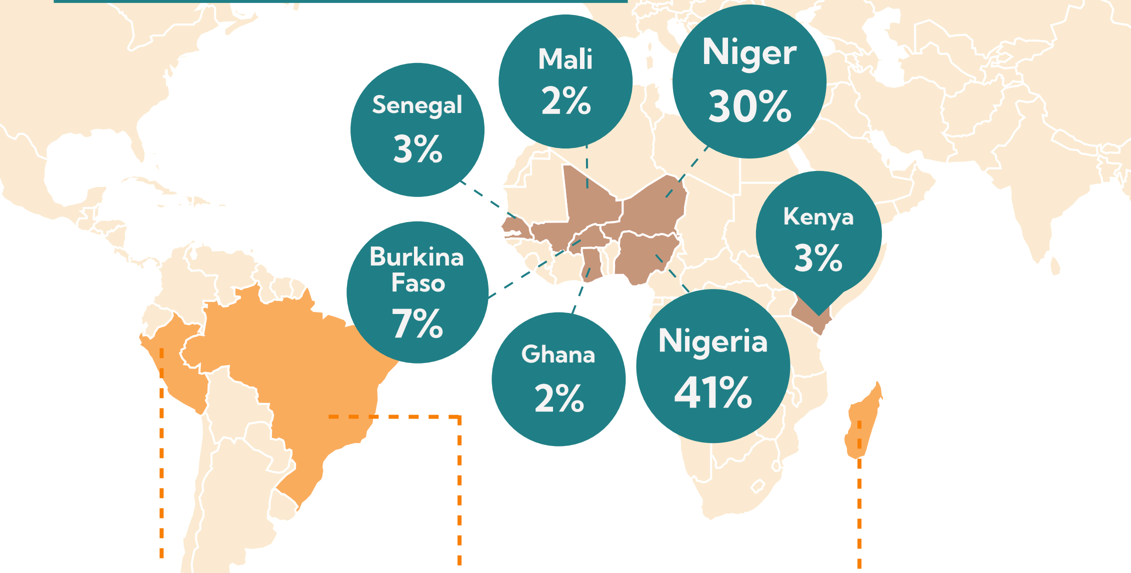
33

is the corruption score of the Philippines on the Corruption Perceptions Index (0=highly corrupt)

Cowpeas

Production & Trade

Global top-7 cowpeas producers

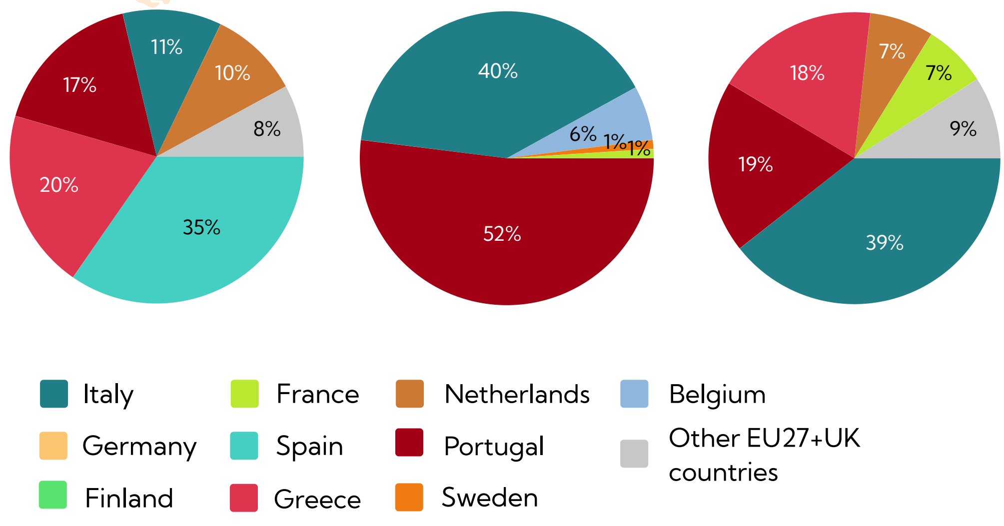


Despite of being the largest producing continent, **the EU barely imports cowpeas from Africa, likely because GM cowpea varieties are used in the largest producing countries** (e.g. Nigeria) and domestic consumption is high

Top 5 EU27 + UK recipients of Peru exports

Top 5 EU27 + UK recipients of Brazil exports

Top 5 EU27 + UK recipients of Madagascar exports



EU 2021 imports of cowpeas largely originate from Peru (48%), **Madagascar** (37%), **and Brazil** (8%). Other suppliers to the EU include Argentina (4%) and Uzbekistan (3%).

In 2021, **Portugal and Italy were the largest EU recipients of cowpeas originating from Peru, Madagascar, and Brazil**. In 2020, the UK ranked fourth as a recipient of Peruvian cowpeas.

In **2020**, the top 7 producing countries **comprised 88 % of cowpeas production worldwide**. Other countries with **more than 2% share** in global cowpeas production are Cameroon, Sudan, and Tanzania.

Cowpeas are largely **produced on the African continent**, where the top 7 producing countries can be found. Major global producers are Nigeria (41%) and Niger (30%).

Cowpeas

Environmental Risks

6,906 m3/ton is the water footprint linked to cowpeas production

Water Use

There is **little reported on environmental risks linked to cowpea production.**

However, one negative impact is that cowpeas production has a **relatively high water footprint** compared to other peas and beans, which may be extra relevant in dry environments of some of the major producing countries.

Biodiversity Loss

Cowpeas can provide **biodiversity benefits** when grown in mixed crops systems, especially those that are cross-pollinated. Although cowpea flowers do not need insects for pollination, **they produce large amounts of nectar**, attracting and supporting pollinators such as bees and butterflies.

Cowpeas in Africa are often GM crops. There are indications that when improved GM varieties of cowpea are grown in a community, traditional landrace varieties are not being displaced. This would imply having little effect on agro-biodiversity.

0.48 kg CO2eq is the carbon footprint per kg of cowpeas

Emissions

Cowpea production related **GHG emissions** are **low**.

Contamination

Cowpeas can contribute to nitrogen fixation

When integrated into crop rotation systems, **cowpea has the potential to** promote the buildup of soil organic matter and carbon, and **nitrogen fixation.** This may also support a reduction in fertiliser use.

Cowpeas

Social Risks

Social risks

There is **little to nothing reported on social risks linked to cowpea production.**

No social risks reported

While the majority of cowpeas are grown in Africa, with potential risks of being linked to (post-) conflict affected countries such as Nigeria, the EU hardly imports cowpeas from the continent, therefore **these challenges do not constitute a risk embodied by the cowpea imports that enter the EU market.**

Gender Issues

Cowpea

is seen as a crop for the poor and of women

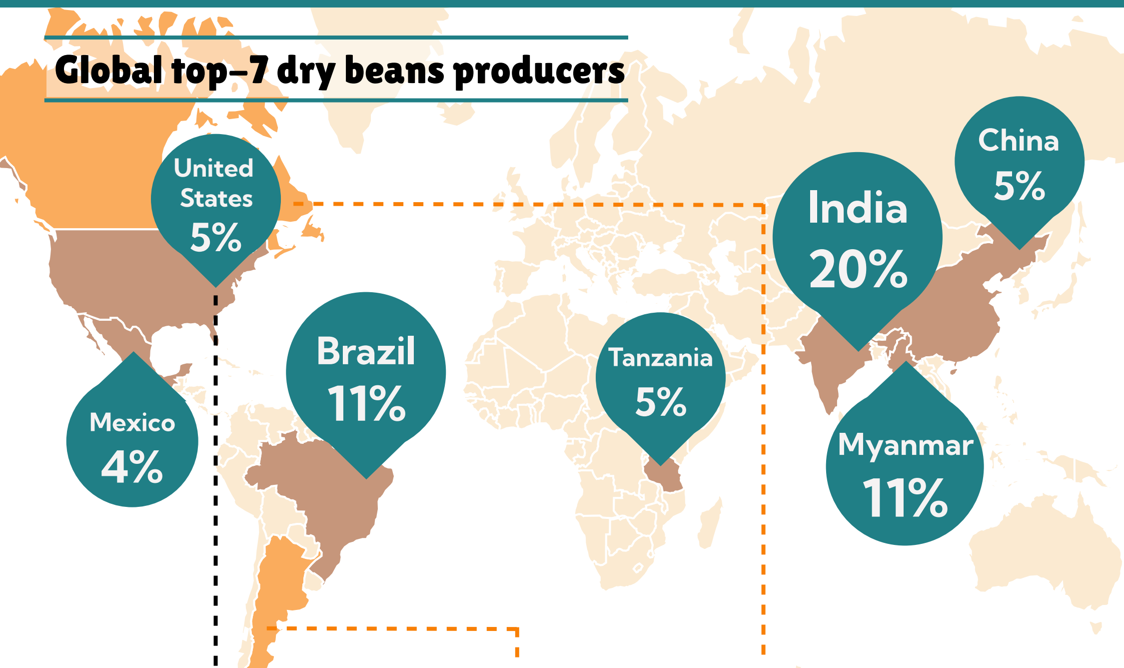
Women are the **primary cultivators of cowpea** in many parts of Africa, reportedly both for the nutrition it offers to their families as well as for the income it generates when they sell it in the local markets or traders.

Nevertheless, the cowpea crop has to deal with a negative image of being seen as a crop for the poor and for women, and therefore lacks sufficient investment.

Dry beans
incl. Kidney beans, white beans

Production & Trade

Global top-7 dry beans producers

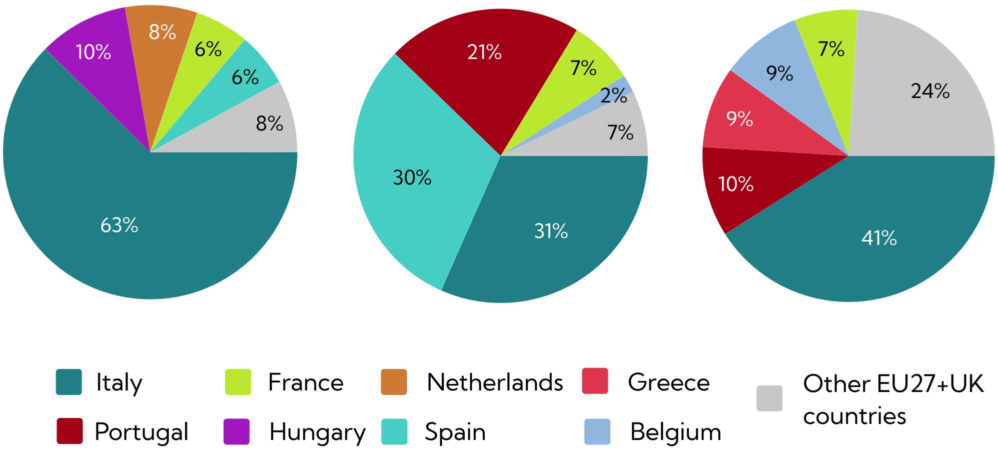


Next to the top-3 suppliers Argentina, Canada, and the United States, **other non-EU suppliers of dry beans to the EU in 2021 include Egypt** (8%), **Ethiopia** (6%), and **China** (6%).

Top 5 EU27 + UK recipients of US exports

Top 5 EU27 + UK recipients of Argentina exports

Top 5 EU27 + UK recipients of Canada exports



Volumes of dry beans from China to the EU have been on the decline, linked to growing domestic demand. China now represents the 6th largest supplier of dry beans to the EU.

France and Italy are the major recipients of dry beans from Argentina, Canada, and the USA, followed by Poland and Belgium. In 2020, the UK ranked fourth as a recipient of Canadian dry beans.

In **2020**, the top 7 producing countries **comprised 60 % of dry beans production worldwide**. Other countries with **more than 2% share** in global dry beans production are Kenya, Argentina, Uganda, Ethiopia, Canada, Burundi, Rwanda, and Cameroon. There are over 50 species of dry beans, of which kidney beans and dried peas are two most traded pulse varieties)

The EU does not produce dry beans and only imports from non-EU countries. **Argentina (33% of non-EU imports), Canada (25%), and the United States (13%)** are major suppliers of dry beans, including (white) kidney beans, to Europe. These countries are known for their good quality and reliability.

Dry beans
incl. kidney beans, white beans

Environmental Risks

241,159 ha

of deforestation risk was linked to dry beans production in Brazil in 2018

Dry beans production was associated with **high deforestation risk** in several producing countries in 2018, mainly in **Brazil, Myanmar, DR Congo, Mozambique, and India**, respectively 241,159 ha, 143,414 ha, 125,796 ha, 118,779 ha, and 93,116 ha. In Brazil, this number is even higher than the deforestation risk attributed to soy production (223,365 ha).

Land use and deforestation

However, the majority of EU dry beans imports in 2021 originated from other non-EU countries. Ranked the 10th supplier of the EU, Brazil provided less than 1% of the total EU imports of dry beans. **In Argentina, felling of trees started with kidney bean crops**, one of the traditional crops, which **occurred until the mid-1990s. This was followed by the soybean boom and soybean-linked deforestation.**

Data comparing water footprints of several plant-based crops estimates a water footprint of 5,053 cubic meters per ton of dry beans produced, which can be considered a **moderate water footprint.**

5,053 m3/ton

is the water footprint of dry beans production

Water Use

Canada

is the preferred supplier of dry beans to the EU

Organic buyers are moving away from Chinese dry bean production, as there is an increasing **concerns about compliance with organic standards**, e.g. linked to pesticide and fertiliser use. Canada is currently seen as the preferred supplier to the EU, e.g. of white pea bean (navy bean).

Contamination

Dry beans, as part of legumes, also have a positive environmental impact, as they are known to **fix nitrogen** in the soil. By fixing their own nitrogen, dry beans are able to increase biodiversity. Dry beans are therefore a suitable rotation crop.

Dry beans

fix nitrogen

Biodiversity Loss

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Dry beans
incl. kidney beans, white beans

Social Risks

Labour Conditions

With over 50 species of dry beans (Phaseolus Vulgaris), and a range of environment and cropping systems in many continents, there are little to no direct reports linked to social impacts of the production of the **overall class of 'dry beans'**.

14 labour rights

risks are identified linked to leguminous vegetables production in China

For beans originating from China (mainly white pea bean, a smaller type of white bean), it is relevant that **labour rights** and conditions are often adverse. MVO risk checker identifies 14 labour right risks in China linked to leguminous vegetables (can include beans). They vary from low income, to long working hours, lack of childcare, to migrant issues and state-sponsored forced labour.

Livelihood Issues

With over 50 species of dry beans (Phaseolus Vulgaris), and a range of environment and cropping systems in many continents, there are little to no direct reports on the existence of livelihood issues linked to the production of the **overall class of 'dry beans'**.

Health & Safety

not for producers. No pervasive health and safety issues were reported for dry beans. However, eating raw or undercooked kidney beans can lead to food poisoning, including symptoms such as nausea, vomiting and diarrhea. **Only a few beans are needed to cause poisoning**.

Food poisoning

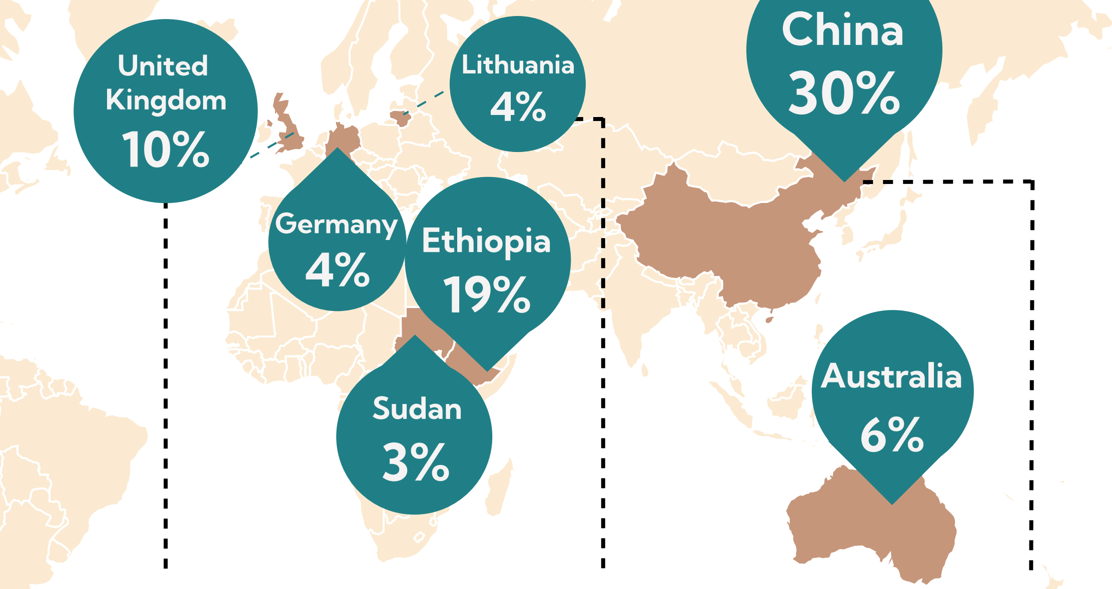
Only eating a few raw kidney beans can lead to food poisoning

Fababeans

Fava beans, broad beans, horse beans, field beans

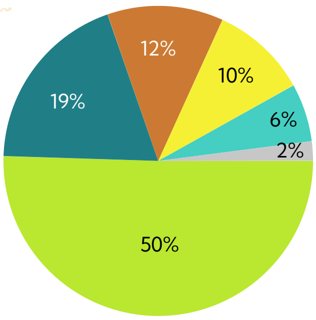
Production & Trade

Global top-7 fababeans producers

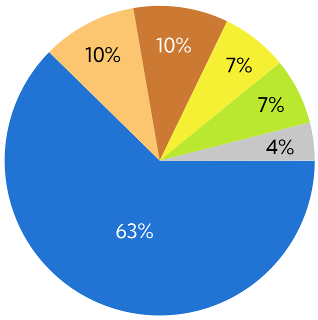


The majority of 2021 fababeans EU imports **originate from within the EU, mainly from the UK** (#3rd largest global producer; 29% of total EU imports), Lithuania (#6; 22%), Latvia (#10; 14%) and Germany (#7; 12%).

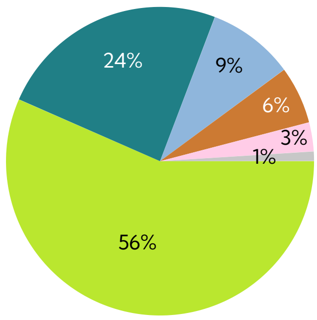
Top 5 EU27 + UK recipients of UK exports



Top 5 EU27 + UK recipients of Lithuania exports



Top 5 EU27 + UK recipients of China exports



From non-EU countries, the majority of EU 2021 faba beans imports **originate from Egypt** (38% of total non-EU imports), Australia (18%), and Ukraine (11%). But in terms of volumes, the EU imports limited volumes from non-EU countries.

Italy | France | Netherlands | Latvia | Belgium
Germany | Spain | Denmark | Bulgaria | Other EU27+UK countries

Apart from being an important European producer of fababeans, **Latvia is also a major recipient of fababeans from Lithuania, which is the second largest supplier to the EU** (22% of total EU imports from EU27 + UK).

Note: EU import code HS 071350 includes broad beans (Vicia faba var. major) and horse beans (Vicia faba var. equine and Vicia faba var. minor). Field beans also fall under the Vicia faba group.

In **2020**, the top 7 producing countries **comprised 76 % of fababeans production worldwide**. Other countries with **more than 2% share** in global fababeans production are France, Italy, Latvia, and Egypt.

Most EU imports of fababeans come from within the EU. While **China** is the largest global producer of fababeans (30%), it only ranks 10th place as a supplying country to the EU. **Ethiopia** is the second largest worldwide producer of fababeans (19%), but EU import data does not show Ethiopia as a supplying country.

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Fababeans

Fava beans, broad beans, horse beans, field beans

Environmental Risks

There are **little to no reports on negative environmental impacts** linked to fababeans production. On the contrary, mainly positive impacts are described.

Water Use

2,018 m3/ton is the water footprint of fababeans production

Data on the global average water footprint of several plant-based crops, points to fababeans production as a **relatively low water footprint**.

Emissions

GHG emissions linked to fababeans production are low. A 2022 study on the environmental impact of fababeans grown in Norway, found a **low climate impact linked to fababeans production.**

0.55-0.57 kg CO2eq is the carbon footprint per kg of dried grain legumes (incl fababeans)

Contamination

Fababean can fix atmospheric nitrogen

The fababean is recognised as a pulse with a high ability to **fix atmospheric nitrogen**, which allows for a reduction in the application of fertilisers.

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Fababeans

Fava beans, broad beans, horse beans, field beans

Social Risks

Labor conditions

While not specifically linked to fababeans production, there are reports on **general adverse labour conditions in the major EU fababeans producer countries**. For instance, **in Lithuania**, national minorities experience difficulties to access labour markets and salary discrimination.

44%

of national minorities in Lithuania experienced discrimination in the labour market or workplace

In the UK, the agricultural sector relies heavily on **seasonal migrant workers**, for which working conditions can be poor (e.g. long working hours, wages can be withheld, denied contracts, violence threats). Migrant workers on fruit and vegetable farms in the United Kingdom often have to **pay illegal fees** to work on these farms.

Health & Safety

5%

of the world population has a genetic disease (favism) that can be triggered by the intake of large quantities of fresh fababeans

Consuming large amounts of faba beans can be **dangerous for about 400 million people** – mainly in Asia, Africa and the Mediterranean Basin– due to a compound called vicine, which accumulates in the beans, linked to a genetic disease called favism. The disease is caused by a **lack of a particular enzyme and can result in acute anaemia and liver disorders.** Scientists are in the process of finding a way to make faba beans safe for all to eat.

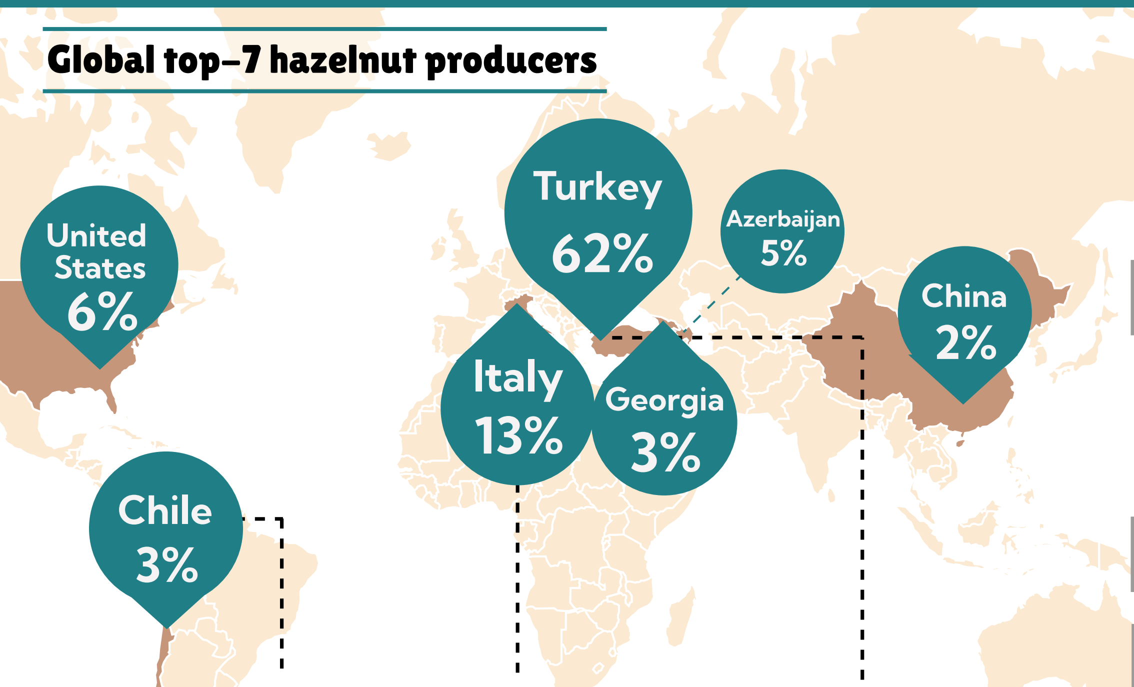
Gender Issues

More than men, women face discrimination on the labour market or workplace in, for instance, Lithuania.

Hazelnuts

Production & Trade

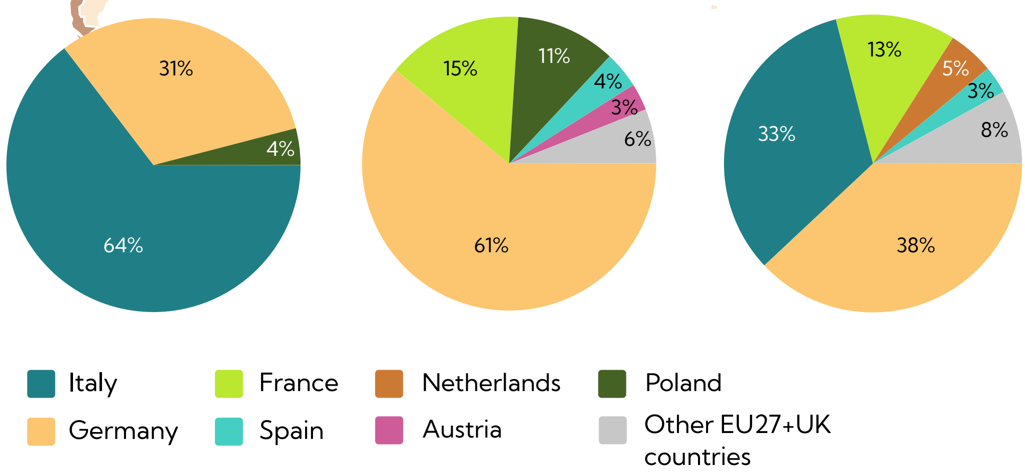
Global top-7 hazelnut producers



All EU27 + UK recipients of Chile exports

Top 5 EU27 + UK recipients of Italy exports

Top 5 EU27 + UK recipients of Turkey exports



In 2021, the EU imported the majority of hazelnuts from Turkey (79%) **and Chile** (9%), that are respectively the first and fifth largest global producers of hazelnuts

Italy is the second largest global producer of hazelnuts (28,471 tonnes), but the country also imports from Turkey and Chile. **Within the EU, Italy is the largest supplier (57%) of hazelnuts to the EU.**

Apart from Turkey and Chile, **the EU also imports hazelnuts from Georgia** (7%) **and Azerbaijan** (5%) (and others such as the USA and Switzerland but volumes are close to 0%)

In **2020**, the top 7 producing countries **comprised 94% of hazelnuts production worldwide**. Iran is the only other country with a production share of slighty over 1%.

In the EU, also **France, Poland, Spain, Croatia, and Romania** produce hazelnuts, but volumes are negligible compared to the top-7 global producers, of which Italy is the second largest world producer. .

Hazelnuts

Environmental Risks

Biodiversity Loss

Hazelnut production in Italy is currently characterized by **monocultures.** In the Viterbo region, **hazelnut trees dominate large parts of the farming area.** In Turkey, hazelnuts are largely produced in the Black Sea Region, where **monoculture of hazelnut trees prevail due to economic reasons.** The expanding area with hazelnut monocultures has affected biodiversity by limiting habitat provision while also causing problems with water, soil, and air. These monocultures have helped spread plant diseases and insects, resulting in the greater use of pesticides and herbicides.

Water Use

10,515 m3/ton

is the water footprint of hazelnuts production

The global average water footprint of hazelnuts production is **high**. This tree crop has been linked to groundwater depletion due to irrigation.

The exhaustion and pollution of several lakes in Italy have been connected to the extensive monoculture of hazelnuts. In Turkey, where hazelnut groves continue expanding, land conversion linked to this has severe effects on nearby water bodies.

Contamination

The use of **chemical fertilizers and pesticides treatments** in hazelnut production in Italy is making the soil increasingly arid, which in turn has led to its erosion in some places. **Large quantities of fertilizers** have been used in the intensive hazelnut cultivation, and they have ended up in Lake Vico in Italy. This has caused the proliferation of so-called "red-algae," which produces carcinogenic chemicals that are harmful to environmental and human health.

30%

of all surface water monitoring sites in Italy detected one or more pesticides above the effect threshold

In Turkey, the u**se of fertilizers, biocides, and lime in hazelnut orchard care** has been connected to chemical hazards for farm workers.

Emissions

1.07 kg CO2eq

is the carbon footprint per kg of hazelnuts

The carbon footprint of hazelnuts is **low.**

Hazelnuts

Social Risks

Labour conditions

In general, the working conditions of farmer workers producing and processing nuts are often bad. They work excessive overtime hours and often do not get enough to eat or drink. **Migrant labour issues are a major concern** in hazelnuts production, particularly in Turkey. Overall, seasonal agricultural workers in Turkey work under adverse conditions (12-hours working days, without formal contracts).

Reportedly, **Syrian refugees** work(ed) without permits on hazelnuts farms, without legal and social protection. There are strong indications that **discrimination of migrant workers** takes place in the production of hazelnuts in Turkey.

Child Labour

Child labour has been found in hazelnuts production in Turkey (the biggest world producer of hazelnuts and one of the main suppliers of the EU27 and the UK). Besides the heavy loads and exhausting working hours, children working in hazelnut production are also more vulnerable to the pesticides and toxic chemicals used.

Livelihood Issues

Hazelnuts production can negatively affect the livelihoods of smallholder farmers. In Italy, the rush to invest in hazelnut plantations is **increasing land prices**, making it harder for small farmers to buy or rent land.

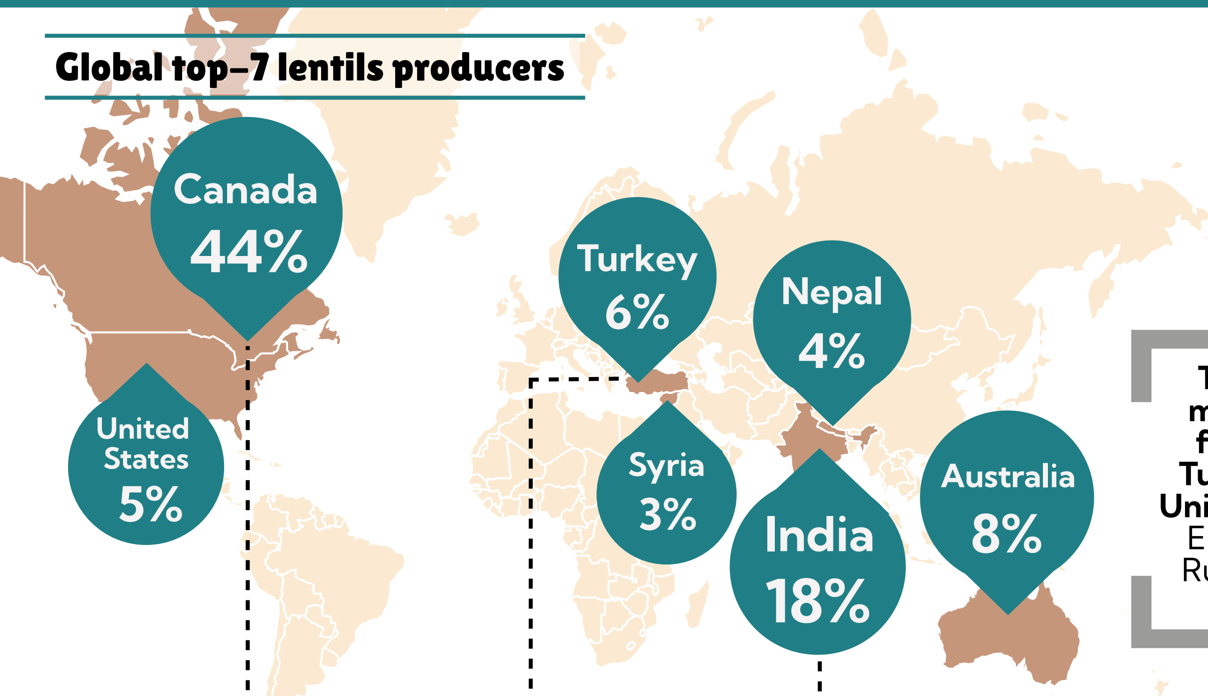
10.9
m2*year
is needed to produce 1 kg of (unsalted) hazelnuts

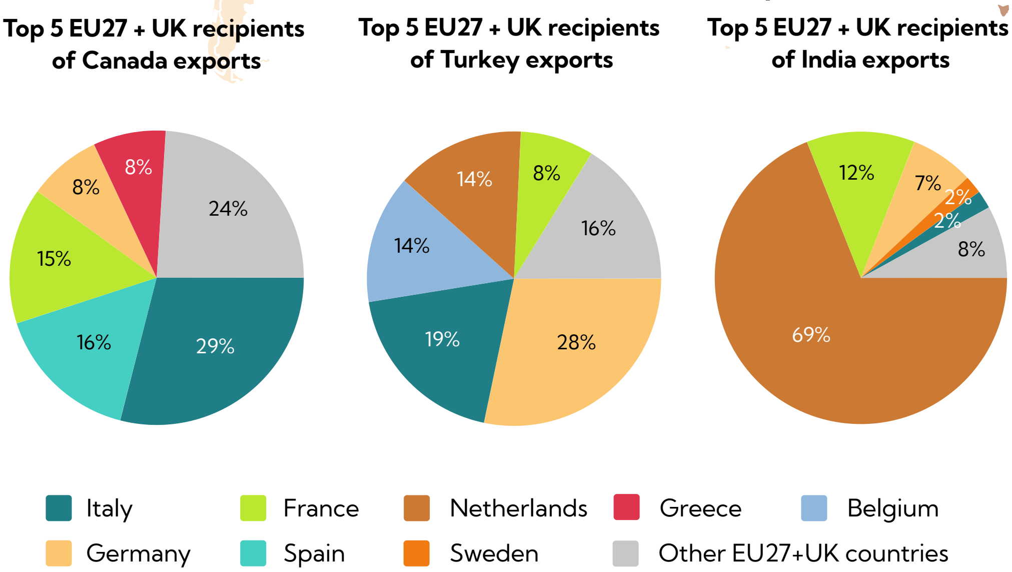
Climate resilient production may be an issue. The majority hazelnuts produced in Turkey are produced in the Black Sea region, where climate change has recently caused heat waves, shifting rain patterns, and severe storms, leading to declines in crop yields and affecting thousands of livelihoods.

Lentils

Production & Trade

Global top-7 lentils producers

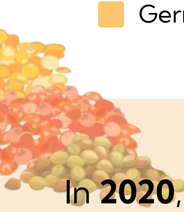




The EU imports the majority of its lentils from Canada (50%), **Turkey** (20%), **and the United States** (20%). The EU also imports from Russia (3%) and China (3%).

According to global production data, **there is no substantial production of lentils within the EU.**

Germany, France, Italy, and the Netherlands are the largest recipients of lentils produced in Canada, India, and Turkey.



In **2020**, the top 7 producing countries **comprised 88% of lentils production worldwide**. Other countries with **more than 2% share** in global lentils production are **Bangladesh, China, Russia, and Ethiopia.**

Canada is the largest global producer (44%) and exporter of lentils. **The province Saskatchewan produces 95% of Canada's lentils.** Despite being the second global producer (18%), India is not present in the top-5 of largest suppliers to the EU, likely due its large domestic market.

Lentils

Environmental Risks

The global average water footprint of lentils production is **moderate to relatively high (compared to other beans and legumes).** Sources on the crop's water footprint vary considerably, also depending on whether the crop is rain-fed or irrigated, for instance from 1,650 litres for the production of 1 kilogram of dry lentils grown in Saskatchewan (Canada), to 5,874 L per 1 kilogram.

5,874
m3/ton
is the water footprint of the lentils production

Water Footprint

However, lentil production in India is largely rain-fed.

985
ha
of deforestation risk in 2018 linked to the production of lentils

There is limited **deforestation risk** associated with lentils production in India. To put this in perspective, the deforestation risk was 985 ha for lentils production in India in 2018, compared to 223,364 ha for soy production in Brazil in that same year.

Land use & Deforestation

Lentils production has a **low impact** in terms of greenhouse gas emissions (GHG) and energy use.

There is a **relatively low environmental impact of Canadian pulses.**

Lentils are reportedly **improving the physical property of soils** trough a process called **nitrogen fixation,** allowing for crop rotation and limited use of fertilisers.

1.03
kg CO2eq
is the carbon footprint per kg of lentils

Emissions

Lentils

Social Risks

Labour conditions

Overall, **labour conditions and the possible existence of child labour** in lentil production **require due diligence to be carried**. Seasonal agricultural workers in Turkey work under inadequate conditions (overtime, no formal contracts, no job and social security). Seasonal workers are incorrectly compensated for their work.

Pulses (legumes) production in Turkey have been associated with child labour in 2020.

Land Appropriation

Saskatchewan, in Canada, is one of the country's leading provinces in terms of agri-food production and exports. Lentils were the 2nd most exported output of the region in 2020. However, **agricultural production in Saskatchewan has been linked to the sell out of public land** and the transformation of native grasslands into farmland. This has **directly affected the First Nations and created hurdles to the exercise of the Treaty and inherent Indigenous Rights.**

To date, **over one million acres of grassland have been sold**, much of which were First Nations' farmlands or hunting areas. These have often been leased to non-aboriginal farming operations that turn them into cultivated croplands with detrimental environmental and social impacts.

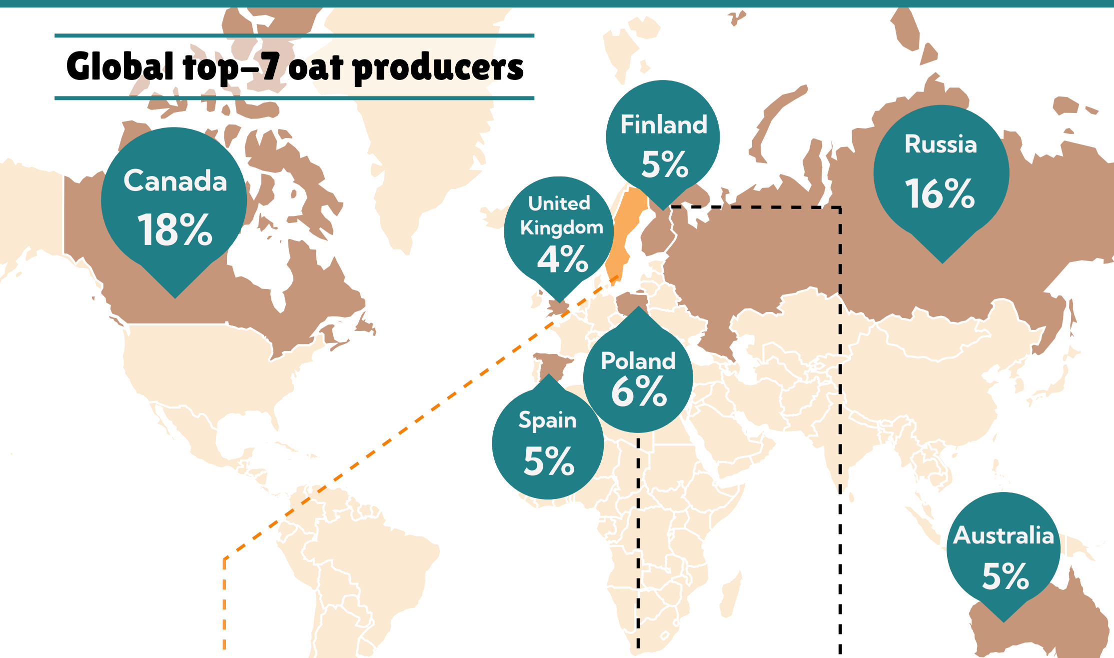
Gender Issues

Due diligence is required on gender aspects. While no specific gender risks related to lentils production have been identified, the risk is that, especially in lentil producing countries such as India, female agricultural workers work under harsh, unequal, and discriminating conditions. For instance, women are not allowed to own land, receive lower remuneration, work often long hours without formal contracts or any social or job security, and are more prone to violence and abuse.

Oats

Production & Trade

Global top-7 oat producers



Europe, Russia, and North America are the most important areas in terms of oat production. In 2020, **79% of the oats produced globally originated from these regions.**

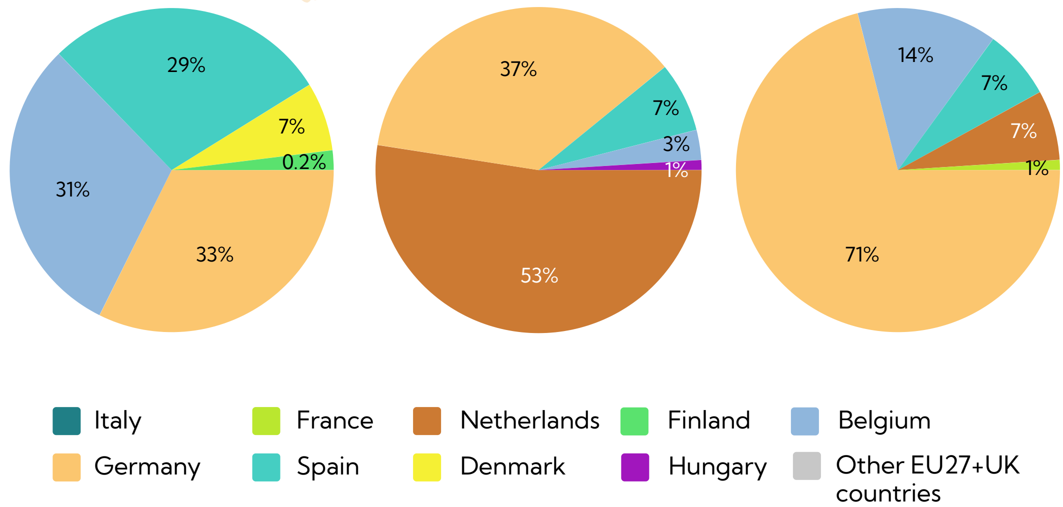
Oats are one of the largest cereal crops in Europe, together with wheat, barley, and maize. About **50% of the oats produced are used as feed for livestock** while **less than 10% is used for food products**.

In 2021, the EU imported **more than 9 thousand tons of raw oats from non-EU countries**, the top 3 being Ukraine (35%), Uruguay (28%), and Russia (16%).

Top 5 EU27 + UK recipients of Sweden exports

Top 5 EU27 + UK recipients of Poland exports

Top 5 EU27 + UK recipients of Finland exports



In **2020**, the top 7 producing countries **comprised 60% of oat production worldwide**. Other countries with **3% share or more** in global oats production are the **United States, Brazil, Sweden, and Germany.**

The EU is a large producer of oats. Imports of raw oats (HS 1004) originate mainly internally, from **northern European countries such as Finland, Poland, and Sweden**. Germany, however, is also among the top-10 EU suppliers of oats.

Oats

Environmental Risks

Contamination

Oats have a relatively low demand for nitrogen and low susceptibility to diseases. Because of this, oats have a relatively low need for additional inputs (e.g., fertilisers and pesticides). Nonetheless, **oats that are not certified organic, may contain, among others, glyphosate,** which is often used as a desiccant to dry the crops before harvesting.

Glyphosate

may be found on non-certified organic oats.

Emissions

0.70

kg CO2eq

is the carbon footprint per kg of oats

The carbon footprint of raw oats is **low**. For oatmeal, this average increases to around 1.13 kg CO2eq per kg of oatmeal.

In the EU, the carbon footprint has been found to be **slightly lower than this estimation – 0.55 kg CO2eq per kg of oats produced.** The biggest contribution to the carbon footprint of oats produced in the EU come from **nitrogen fertiliser production and use**, and from the **energy consumed in field work.**

As for oat protein concentrate, the largest contribution to the carbon footprint comes from the energy consumed in the processing stage.

Land Use & Deforestation

The EU average in terms of land use for oat cultivation is 2.8 m2/kg. However, this estimate varies depending on the country of production and it can range from 2.0 m2 to 5.5 m2 per kg of oats. In the case of oat protein concentrate, this average also increases to 3.2 m2 per kg of concentrate. The land use requirement of both raw oats and oat protein concentrate are very low, placing below pulses and any animal protein product.

3.2

m2

is the average amount of land necessary to produce 1 kg of oat protein concentrate in the EU.

Oats

Social Risks

Labour Conditions

No specific labour issues have been systematically reported in oat farms and industry. However, there is still a risk because in the agriculture sector workers often face exploitation and tough working conditions.

Reputational Risks

A significant share of the raw oats supplied to the EU are produced in countries linked to the 2022 Russia-Ukraine crisis. Like in the case of other similar commodities and products, **sourcing from these countries may involve reputation risks for vega(n) producers.**

Land Appropriation

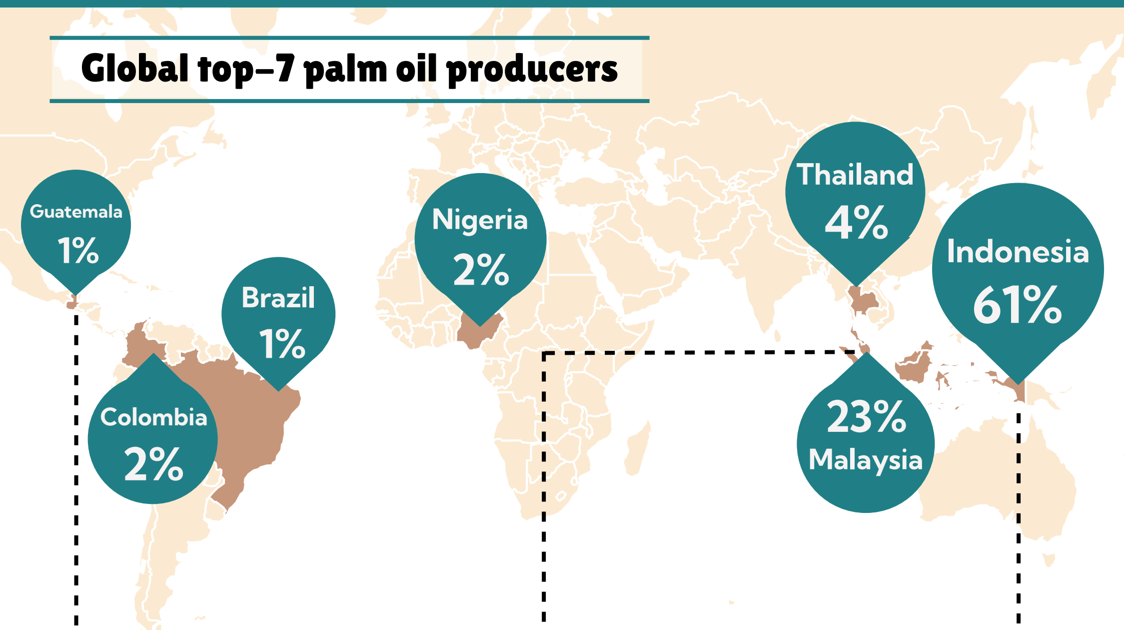
Saskatchewan, in Canada, is one of the country's leading provinces in terms of agri-food production and exports. Oats were the 4th main exported output of the region in 2020. However, **agricultural production in Saskatchewan has been linked to the sell out of public land** and the transformation of native grasslands into farmland. This has **directly affected the First Nations and created hurdles to the exercise of the Treaty and inherent Indigenous Rights.**

To date, **over one million acres of grassland have been sold**, much of which were First Nations' farmlands or hunting areas. These have often been leased to non-aboriginal farming operations that turn them into cultivated croplands with detrimental environmental and social impacts.

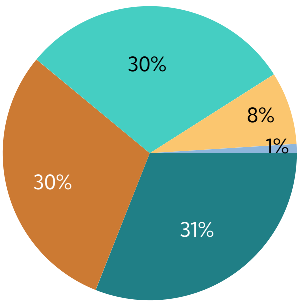
Palm Oil

Production & Trade

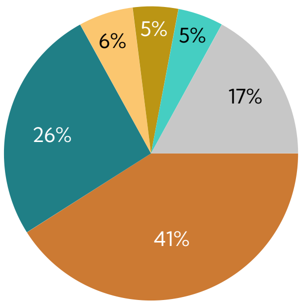
Global top-7 palm oil producers



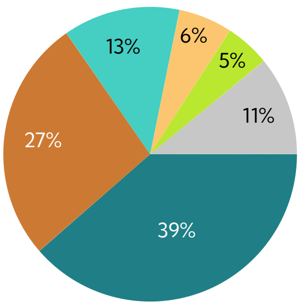
Top 5 EU recipients of Guatemala exports



Top 5 EU recipients of Malaysian exports



Top 5 EU recipients of Indonesia exports



Belgium · France · Netherlands · Spain
Germany · Italy · Ireland · Other EU27+UK countries

The majority of EU imported volumes of palm oilcake and refined palm kernel or babassu oil are from Indonesia and Malaysia. In 2021, for oilcake, 95% originated from Indonesia and 3% from Malaysia; for refined palm kernel oil 53 % came from Indonesia, and 45% from Malaysia.

Crude palm kernel or babassu oil **largely originates from Malaysia** (54%), **Papua New Guinea** (11%), **Honduras** (10%), **and Colombia** (8%).

EU imported palm nuts and kernels originate mostly from Côte d'Ivoire (48%), Thailand (8%), and Cameroon (5%), but **these numbers are close to 0% in terms of volume and value**

Note: Relevant palm oil products imported in the EU include, next to palm oil (HS 1511), crude palm kernel or babassu oil (151321), palm oilcake (230660), refined palm kernel and babassu oil(151329) and palm nuts and kernels (120710). The trade data presented relates exclusively to palm oil.

In **2020**, the top 7 producing countries **comprised 94% of palm oil production worldwide**, of which Indonesia and Malaysia cover 84%. Palm oil is the most imported palm nut derivative in the EU and one-third of all the imports are used in the food industry.

Indonesia and Malaysia are the largest suppliers of palm oil to the EU. The EU received respectively 44.6% and 25.2% of its palm oil import volumes in 2021 from these two producer countries, followed by Guatemala (8.8%), Papua New Guinea (6.6%), Honduras (5.4%), and Colombia (4.1%).

Palm oil

Environmental Risks

Palm oil production is one of the best known commodity drivers for **forest loss and peatland destruction**. While historically deforestation rates were very high, particularly in Southeast Asia, **recent research suggests that deforestation continued to decline in the Indonesia, Malaysia, and Papua New Guinea**. However, Papua New Guinea is currently considered the latest frontier for palm oil linked deforestation.

11,500 ha
of forests were lost in the first half of 2021 in Indonesia, Malaysia and Papua New Guinea linked to palm oil production

Land use & deforestation

In the light of environmental and social sustainability concerns in relation to palm oil from Southeast Asia, several **Latin American countries see an opportunity to open export markets** as they present palm oil from the region as a more sustainable option.

While oil palm in Latin America indeed mostly expands on non-forested land, conversion and deforestation still occurs. Some of the leading exporters require particular due diligence: Colombia, Guatemala, and Honduras.

2.32 kg CO2eq
is the carbon footprint per kg of palm oil

Considering the direct link between oil palm plantation and peatland expansion and conversion, **GHG emissions linked to palm oil production have been (historically) significant**, mainly in Southeast Asia. Just for the production of the crop, without considering deforestion-linked emissions, the carbon footprint of palm oil is **low to moderate** (0.80 kg CO2eq per kg of palm nut; 2.32 kg CO2eq per kg of palm oil).

Emissions

Environmental sustainability concerns are prominent in the Latin American and African palm oil sector and require continued due diligence, **especially for regions and ecosystems that report considerable loss of vegetation and biodiversity**: Petén province in Guatemala, Amazon Rainforest, the Chocó-Darién moist forest, the tropical Maya Forest, and the Colombian savanna, the Nigeria State forest and the Congo Bassin.

Biodiversity Loss

4,971 m3/ton
is the water footprint of refined palm oil

Oil palm expansion is linked with the contamination of rivers and water sources used by local and indigenous communities. Reported issues include pollution, decline in surface water quality, soil erosion, drained peatlands, and loss of access to clean drinking water. Moreover, because of oil palm expansion and its influence on (water) ecosystem services, protection against landslides, provision of regular water supply, water catchments, and riparian buffers are affected.

Water Use

Palm oil

Social Risks

Land appropriation

Oil palm expansion is frequently linked with the dispute for land and the recognition of the rights of indigenous and (in Latin America) afro-descendant communities. Particularly on the African continent, oil palm expansion is linked to land-grabbing, violence and intimidation.

Labour conditions

204,135 ha

of the Indonesian oil palm area is affected by agrarian conflict

Breaches of labor rights in the palm oil industry are widespread. Plantation companies largely set too high targets for workers harvesting fruit bunches, so harvesters can only achieve them with the help of family members, often the workers' wives.

The lack of decent wages and food sovereignty are also migration factors.

Gender Issues

The extent of exploitation and discrimination of women within the palm oil industry is hard to deny. The seizure of land by oil palm corporations are affecting women's ability to produce food and access land. In Indonesia, the majority of local workers are women, who transformed from food producers into food buyers and cheap labour for the plantation companies. **As casual workers, women lack job and social security, they are not paid the minimum wage nor do they have social protection.** Abuse and violence against women are frequently reported in oil palm plantations worldwide.

70%

of Indonesia's oil palm plantation workers are casual labourers with little social, legal, and labour rights; the majority of them is female

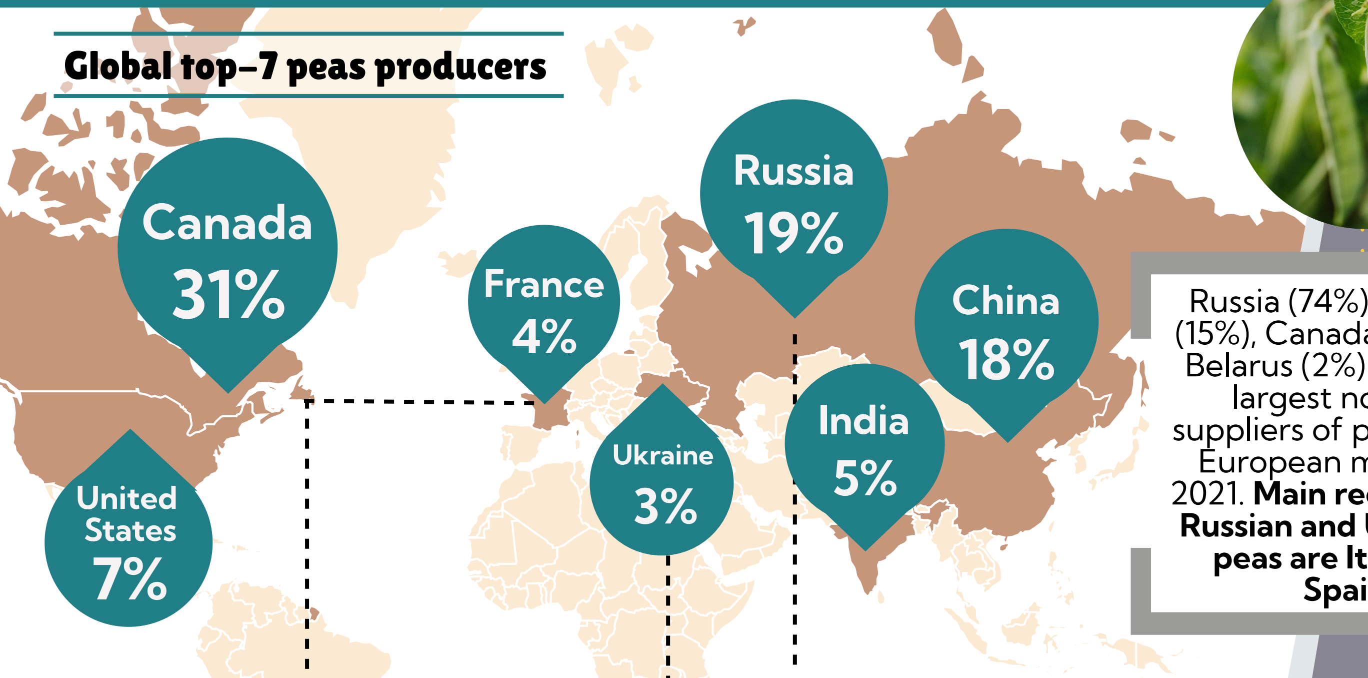
Health & Safety

The intensified use of pesticides in the palm oil sector has **increased the vulnerability of workers to acute poisoning and chronic health effects.** Since many casual workers are female, they are most exposed. This is of particular concern given the demonstrated link between exposure to pesticides and women's reproductive problems such as birth defects, infertility, spontaneous abortion and still births.

Peas

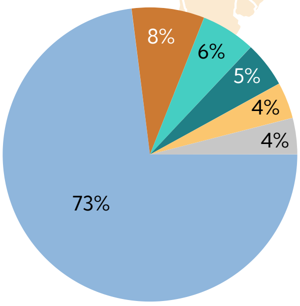
Production & Trade

Global top-7 peas producers

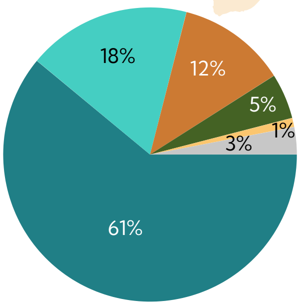


Russia (74%), Ukraine (15%), Canada (5%) and Belarus (2%) were the largest non-EU suppliers of peas to the European market in 2021. **Main recipients of Russian and Ukrainian peas are Italy and Spain**.

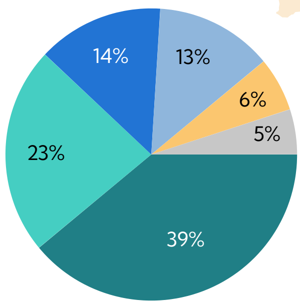
Top 5 EU27 + UK recipients of France exports



Top 5 EU27 + UK recipients of Ukraine exports



Top 5 EU27 + UK recipients of Russia exports



Italy
Netherlands
Germany
Latvia
Spain
Belgium
Poland
Other EU27+UK countries

The EU28 also imports frozen peas (HS 071021), mainly from Serbia and China, respectively 5,414 MT and 2,305 MT in 2021 (low volumes compared to dry peas)

The majority of peas (and soy) protein concentrates and textured protein substances to the EU originate from **Serbia, the United States, and China.**

In **2020**, the top 7 producing countries **comprised 80 % of peas production worldwide**. Other countries with **more than 2% share** in global peas production are Ethiopia and Germany. **Canada and Russia** are the largest global producers of peas, respectively having a 31% and 19% share in global production, followed by China (10%).

Within Europe, **France is the largest European producer** of peas (4% of global production). Also Germany, Spain, and Lithuania are EU producers with more than 1% of global peas production.

The EU also imports **protein concentrates and textured protein substances** (HS 21061020), that are processed for instance from peas and soy, and which are relevant for its use in vega(n) products

Peas

Environmental Risks

Overall, **little environmental sustainability risks** are reported linked to peas production.

Water Use

1,979 m3/ton

is the average water footprint of peas

An old study with data from 1996-2005 refers to **1,979 m3/ton as the global average water footprint of peas.**

Compared to data from the same study on other plant-based products (e.g. coconut is 2,687 m3/ton; cowpeas is 6,906; chickpeas 4,177, cashew 14,218; almonds 16,095) this is a **low water footprint**.

Emissions

Carbon emissions linked to peas production are **low**. Peas have the ability to fix nitrogen, improving soil health.

0.58 kg CO2eq

is the carbon footprint per kg of peas

Peas

Social Risks

Overall, **little social sustainability risks** are reported linked to peas production.

Reputation Risk

Relevant is that peas supplied to the EU are largely produced in countries linked to the 2022 **Russia-Ukraine crisis**, such as Russia, Ukraine, and Belarus.

Sourcing from these countries may involve **reputation risks** for vega(n) producers.

74%

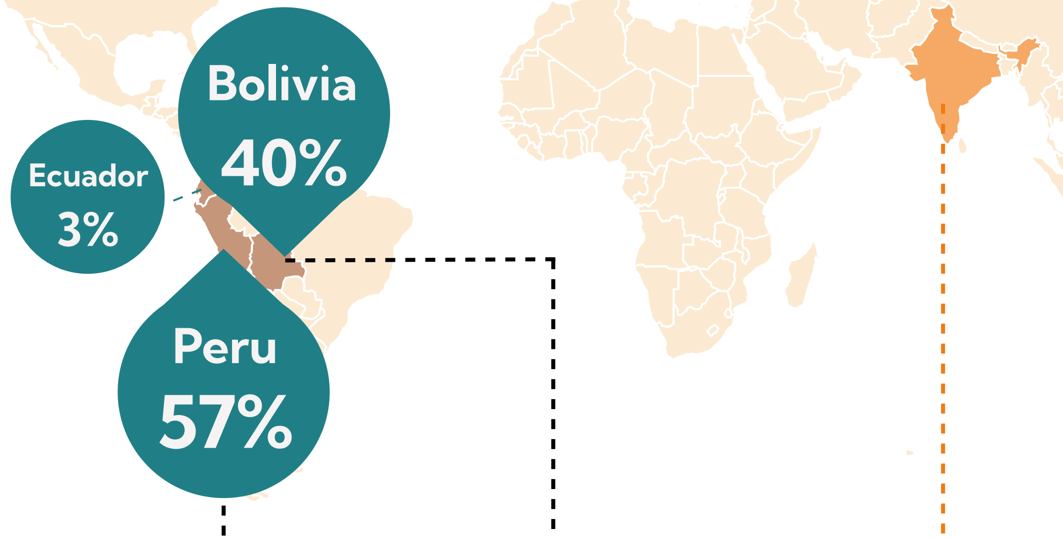
of 2021 EU peas imports originate from Russia

Labour Rights

Textured protein substances, for instance made from peas, imported in the EU in 2021, originate from Serbia (45%), the United States (28%) and China (22%). While there is no specific reporting on labour conditions linked to peas production, **labour conditions in Chinese processing facilities are often not meeting international standards**, conventions, and rights.

Quinoa

Global top-3 quinoa producers



Next to Peru and Bolivia, the EU also imports 1% of quinoa in 2021 from India, a country non-listed as a producer of quinoa in FAO 2020 global production data.

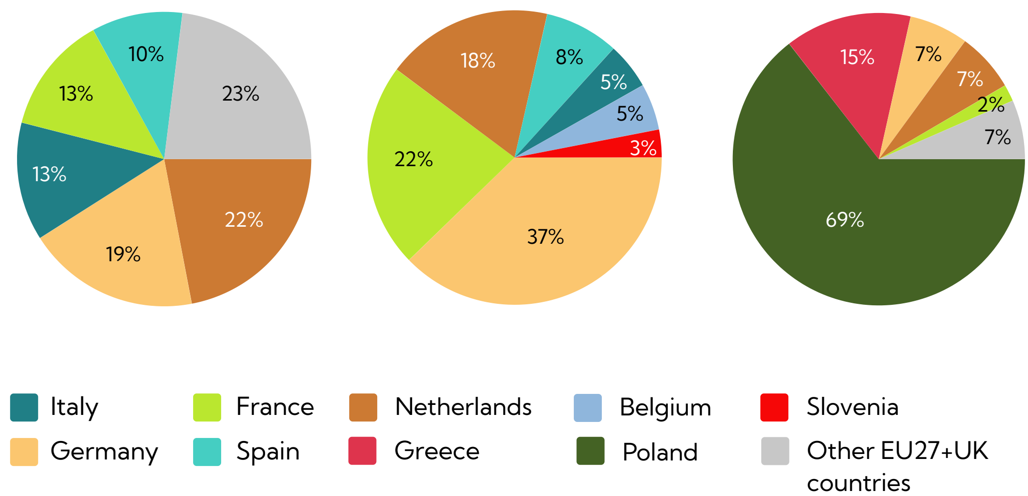
The remainder (all <0.5%) originates from Ecuador, Zambia, Turkey, and Canada. **Apart from Ecuador, none of the countries are listed as global quinoa producers in FAO 2020 data.**

Germany (26%), the Netherlands (20%), and France (17%) were the top importers of Peruvian and Bolivian quinoa in 2021. In 2020, the UK ranked fifth as a recipient of Bolivian quinoa.

Top 5 EU27 + UK recipients of Peru exports

Top 5 EU27 + UK recipients of Bolivia exports

Top 5 EU27 + UK recipients of India exports



In **2020**, global production data of quinoa highlights only three producing countries, **Peru (57% share in global production), Bolivia (40%), and Ecuador (3%)**.

In 2021, the EU imported 22,931 tons of quinoa, mainly from **Peru (60%) and Bolivia (37%)**.

Quinoa

Environmental Risks

120 varieties

exist of quinoa. But farmers continued growing only about 20 varieties to serve global demand for light-coloured, large grains

Biodiversity Loss

The **'quinoa boom' since 2009 caused un unprecedented grow in demand** (export volumes grew 18 times, prices rose 600%), leading to **loss of (agro-)biodiversity** as farmers turned to monocropping and abandoned traditional and sustainable farming practices.

Monocropping single-variety quinoa and mechanisation on the land has made the crop and environment more prone to **plant diseases, land degradation, desertification, erosion, and poor quality soil**.

Water use

The water footprint of the quinoa crop is **relatively low**. However, the introduction of industrial farming methods in the Andean region reportedly caused **wasteful consumption of water**, energy and gas. Wastewater polluted nearby bodies of water.

3,306 m3/ton

is the water footprint of quinoa

Land use & deforestation

124% & 440%

is the increase in area occupied for quinoa in respectively Peru & Bolivia in the past four decades

There is relatively **little associated deforestation risk** linked to quinoa production. In 2018, 1,261 ha of deforestation risk was reported in Peru, and a minor 137 ha in Bolivia.

However, the quinoa boom and its linked expansion of production area had negative effects on **Peruvian farmlands** and the environment, as described above.

Emissions

The carbon footprint of quinoa production can be considered **low**.

0.96 kg CO_2eq

is the carbon footprint per kg of quinoa

Quinoa

Social Risks

Land Appropriation

The introduction of large-scale production methods (e.g. use of tractors to clear land) caused **community ownership conflicts**, since most of the land in Andean communities is traditionally held in common.

Community Conflicts are linked to expansion of quinoa farmland area

This was seen as a form of land appropriation. Also the expansion of quinoa farmlands created **tension with llama farmers**, who search for grazing land for their llamas.

Livelihood Issues

2014-15 were years with a huge drop in demand and price of quinoa, causing adverse effects on farmers' livelihoods

While the economic quality of life of quinoa producers had improved during the boom, there are also significant risks to their livelihoods.

First, many farmers are **fully reliant on the crop**, resulting in farmers' vulnerability and loss of livelihoods when demand drops.

Second, Andean (smallholder) farmers suffer from **unbalanced competition** from large-scale farmers (with technology, capital and credit to increase yields and monopolise the market) and from developed countries (e.g. USA begins to cultivate and sell their own quinoa).

Gender Issues

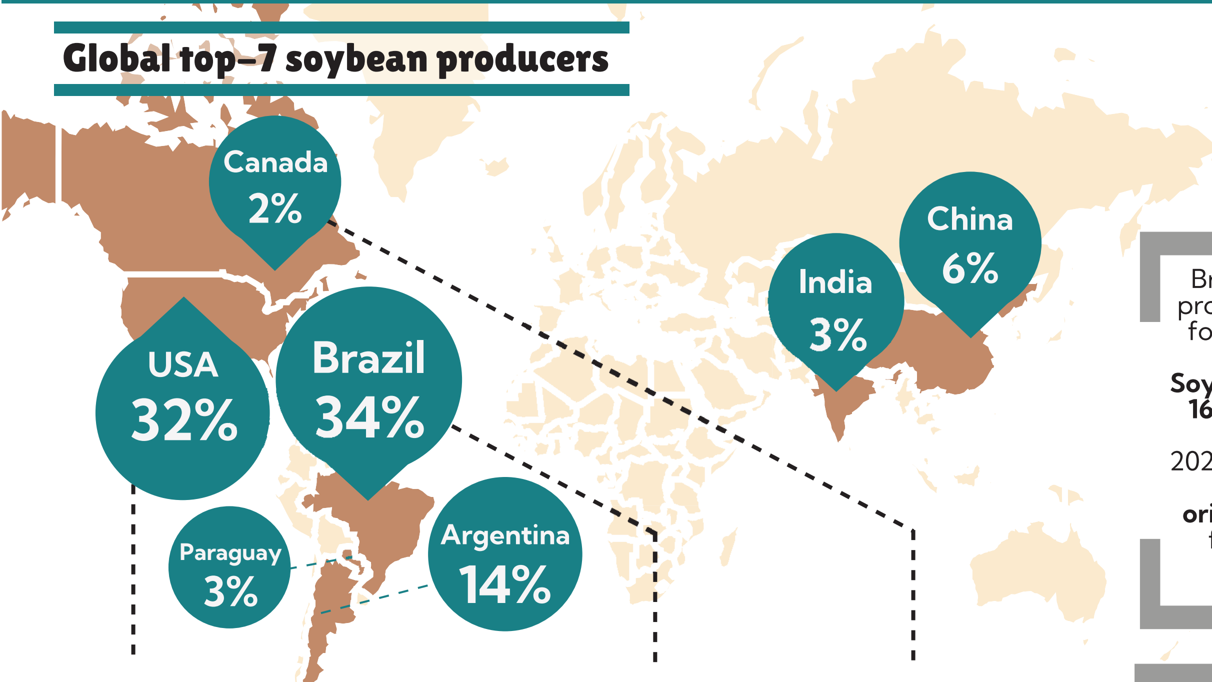
On the positive side, **the quinoa boom has been an income boost to female farmers** who had hardly any alternative income sources.

40% of quinoa farmers in Peru are women

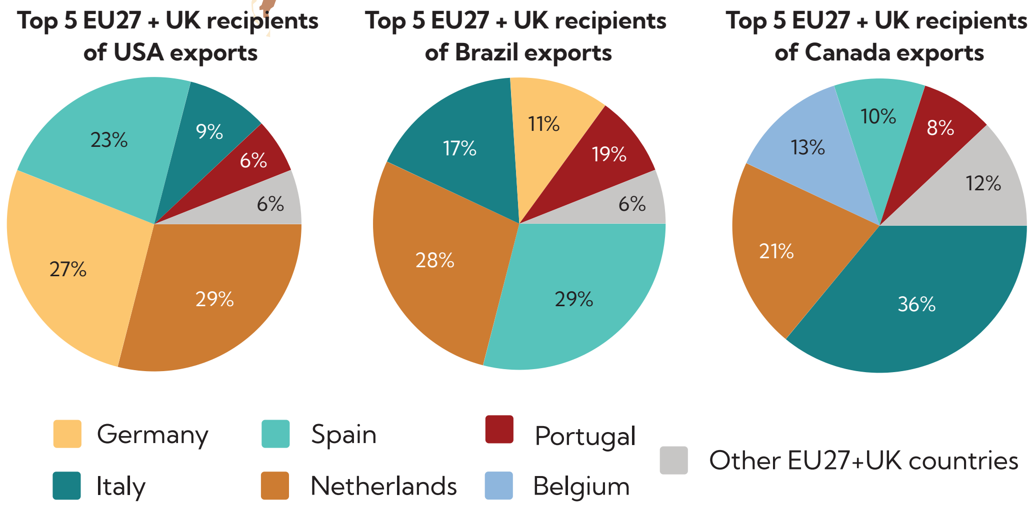
Soy

Production & Trade

Global top-7 soybean producers



Brazil is the world's largest producer of soybeans (34%), followed by the USA (32%) and Argentina (14%). **Soybeans** (HS 1201) represent **16.6%** of EU imports of soy products by value. In 2021, **57% of the EU imported volumes of soybeans originated from Brazil**, 30% from the USA, 8% from Canada, and 3% from Ukraine.



Soybean cake (HS 2304) represents 78.5% of EU imports of soy products by value. Among forest-risk countries 47.8% of the EU imported volumes of soybean cake in 2020 originated from Brazil, 37.9% from Argentina, 3% from Paraguay, and 0.9% from Nigeria.

Soybean oil (HS 1507) represents 4.7% of EU imports of soy products by value. Among forest-risk countries, 7.7% of the EU imported volumes of soybean oil in 2020 originated from Paraguay and 0.4% from Argentina.

Note: Next to soybeans (HS 1201), other relevant soy products under scope of the EU Deforestation Regulation are soybean flour and meal (HS 120810), soybean oil (HS 1507) and soy oilcake (HS 2304). Also isolates soy protein (35040091) and textured protein substances (HS 21061020) are relevant.

In **2020**, the top 7 producing countries of soybeans **comprised 94% of soybeans production worldwide**. Other countries with **1% share or more (but less than 2%)** in global soybeans production are Russia, Bolivia, Ukraine, and Uruguay. **In the EU, Italy, France, and Austria are soy producers (< 1 %).**

The EU also imports protein concentrates and textured protein substances, **largely from China and the US** (respectively 49% and 13% of non-EU imports). These are processed for instance from **soy and peas**, and are relevant for their use in vega(n) products. China is the largest importer of Brazilian soybeans. **Major EU recipients of Chinese protein concentrates** are the Netherlands (25%), Germany (22%), Spain (14%), Romania (13%) and Italy (8%).

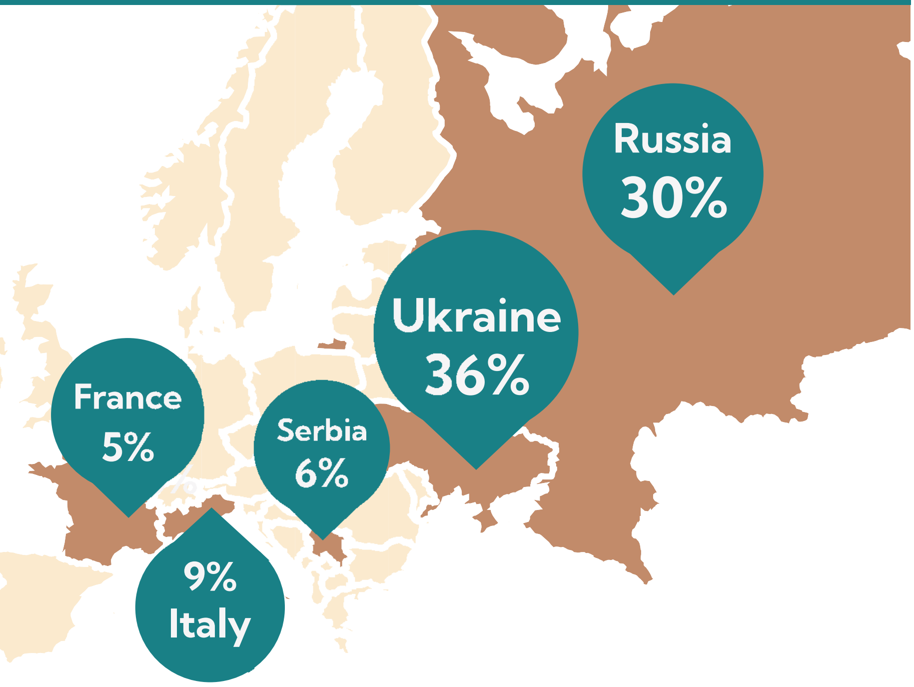
IUCN NL (2022/2023). Sustainable plant-based worldwide. Guide for value chain management in the protein transition.

Soy

Soy: non GM supply relevant for the vegan sector

The world's major soy producers are in North and South America. However, **non-GM soy production on the European continent is on the rise** (combined about 10 million tonnes; 11 % of global non-GM soy acreage.) This is among others stimulated by EU (members) protein self sufficiency policies.

Europe is the third largest non GM soy producer after China and India. In official soy trade data, no difference is made between non GM/ GM or between soy suitable for animal/human consumption, which makes it hard to get exact figures of non GM trade for the vegan sector.



Top-5 soybean European producers

In 2021, the top 5 European producing countries of soybeans **comprised 86% of soybean production in Europe** (including the European part of Russia). Other producing countries with 2% share or more in European soy production include Romania, Austria, Croatia, Hungary, and Slovakia.

Currently, **6-7 % of global soy is used for direct human consumption**, merely based on **non GM soy**. Soy production in Europe, Asia and Africa (except South Africa) is mostly non GM.

Foremost suppliers for European soy food and plant-based markets are: Europe (domestic production), Brazil, India, USA, Canada, and China. Main European markets for **non GM soy** (feed and food) are: **Germany, Scandinavia, France, Italy. Austria, Switzerland and Serbia** (in declining order).

Yields in Europe, including organic yields, are promising, mainly in **Italy, Serbia, Austria, Croatia**. In Europe, soy if often explicitly used as **nitrogen fixer and rotation crop**.

Soy

Environmental Risks

Land use & deforestation

Soy expansion is a major direct driver of forest loss and conversion in several key global ecosystems, particularly in Brazil's Amazon and the Cerrado (the world's most biodiverse savanna. **Estimates point to 28.3% of Cerrado's total deforestation in 2020 being linked to soy expansion.** Only 3% of the Cerrado native vegetation is under legal protection, compared with 46% of the Amazon.

734,01 ha

of Brazil's Cerrado vegetation was cleared in 2020, an increase of 13.2% compared to 2019

Particularly relevant for vega(n) products that are based on **soy protein concentrates originating from China is that these processed protein substances may ultimately originate from deforestation-risk soybean production in Latin America.**

Emissions

2.30 kg CO2eq

is the carbon footprint per kg of soy oil

While GHG emissions are particularly high linked to soy production and linked conversion in Latin America, several **vega(n) producers have indicated they largely source soy products from Europe (e.g. France) and China** that are less directly linked to deforestation and GHG emissions.

Overall, the **carbon footprint of soybeans is low** (0.60 kg CO2eq per kg of soybeans) **to moderate** (2.30 kg CO2eq per kg of soy oil), but this excludes deforestation-linked emissions.

Vega(n) products such as soy drink, tofu, and vegetarian burgers have relatively low estimated emissions varying from 0.8-5.9 kg CO2 eq (RIVM). Nevertheless, since China is the largest importer of Brazilian soybeans, **processed soy products originating from China, often used in European vega(n) products, may not be free from imported deforestation risk.**

Biodiversity Loss

Stretching over 200 million hectares , the size of Germany, France, England, Italy, and Spain combined, the Cerrado is a wooded grassland that provides critical ecosystem services to the world. It **protects biodiversity, stabilizes regional climate, and regulates watersheds** that provide 40% of Brazil's fresh water. It contains 5% of all biodiversity in the planet, with 1,600 animal species and 12,000 plant species—of which nearly half are found exclusively in the Cerrado. Its deep root systems act as a critical carbon sink, estimated to store 13.7 billion tons of carbon underground. **Conversion of the Cerrado and Amazon vegetation directly results in critical biodiversity loss.**

On the other hand, the soy crop can fix nitrogen, and can therefore be used as a rotation crop.

Soy

Environmental Risks

Water Footprint

The global average water footprint of soybean is **2.145 m3 per ton, which is relatively low**. However, RIVM data indicates that in the period 1996-2005, global soybean production contributed **5% to the total water footprint** of crop production in the world. Moreover, soy production is linked to reduction of Brazil's freshwater resources.

2.145 m3/ton

Is the global average water footprint of soybean production

US News reports that "**from 1991 to 2020, 15% of surface water in Brazil was lost** as a result of deforestation, the construction of large hydropower plants as well as dams and reservoirs for irrigation of crops". The impacts for local communities is significant.

Social Risks

Land appropriation

Soy expansion in Latin America is frequently linked to human rights violations, particularly to land grabbing and displacement of local and indigenous communities, and the absence of prior consultation with local communities. Many company-community land conflicts are linked to soy production in Brazil, where armed security staff guard soy farms from which the land was previously owned by local and indigenous communities without formal land entitlements. Loss of natural habitat may endanger local livelihoods and food security of local communities.

Labor conditions

Deforestation from soy production decreases food supplies for indigenous communities, as well as **local wages, and employment for local farmers as a result of increased mechanisation**. Particularly labour conditions in China linked to the production of protein concentrates and textured protein substances require close monitoring.

Health & Safety

Genetically modified (GM) soy makes up for **90 percent** of the Brazilian total of soy production. The production of GM crops has **polluted water resources**, thus affecting the livelihoods and health of local communities. Moreover, local and indigenous communities in Brazil face **toxic exposures from aerial and ground pesticide spraying** over soy plantations near their homes, schools and workplaces. This causes health problems, such as sweating, elevated heart rate, vomiting, as well as nausea, headache and dizziness.

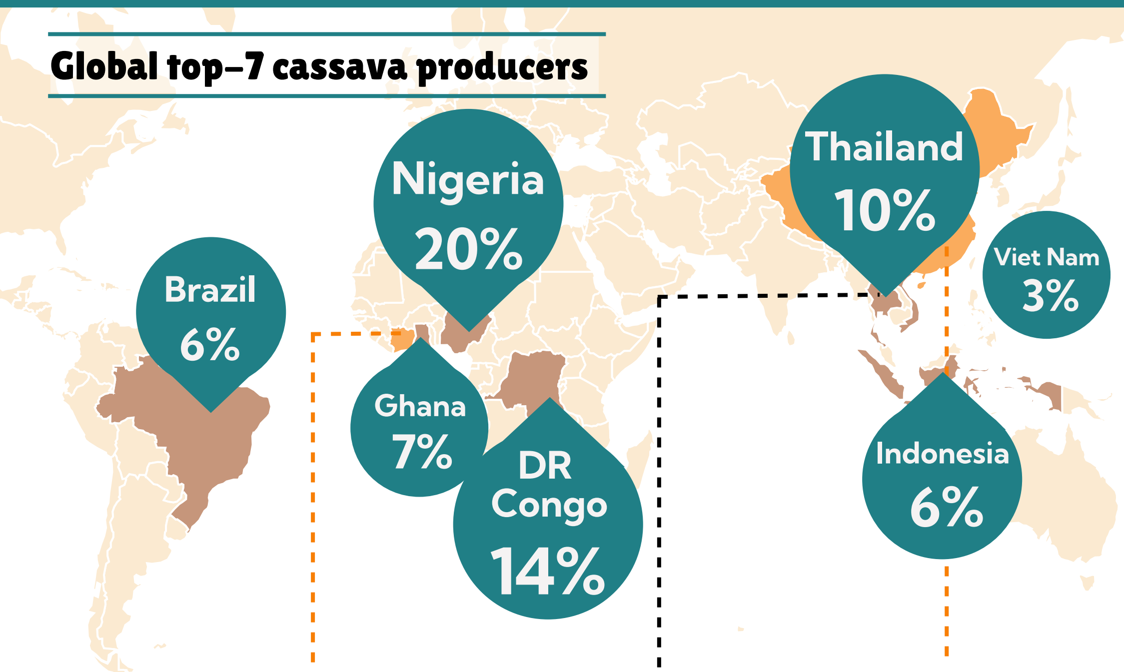
90%

of soy produced in Brazil is genetically modified

Tapioca

Production & Trade

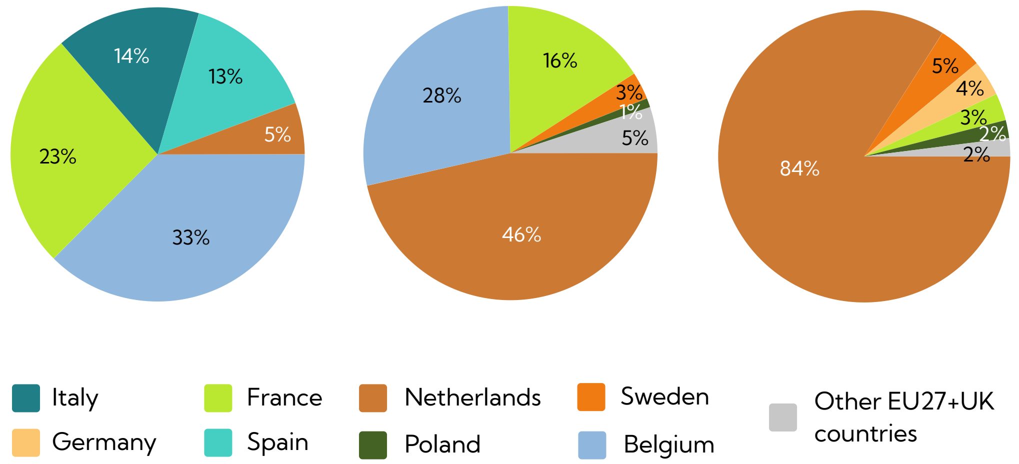
Global top-7 cassava producers



The EU does not produce cassava/tapioca, and therefore only imports from (mainly) tropical countries.

The EU predominately imports tapioca from Thailand (37%), **Côte d'Ivoire** (21%), **China** (18%), **and Taiwan** (13%), This is followed by Brazil (4%) and Indonesia (2%).

In 2021, the Netherlands and France were among the top-5 recipients of tapioca originating from Thailand, Côte d'Ivoire, China, and Brazil. In 2020, the UK ranked #5th as a recipient of tapioca from China, and #3rd from Brazil.



Tapioca is a starch extracted from the storage roots of the **cassava plant, therefore for its origin, the production of cassava is relevant** . In **2020**, the top 7 producing countries **comprised 66 % of cassava production worldwide**. Other countries with **more than 2% share** in global cassava production are **Angola, Cambodia, Tanzania, Côte d'Ivoire, Malawi, Mozambique, India, China and Cameroon.**

In 2020, **Nigeria** (20% share of global production), the **DRC (14%), and Thailand (10%)** were the largest global producers.

Tapioca

Environmental Risks

Hydrogen cyanide is liberated during tapioca processing

Contamination

Cassava processing is generally considered to contribute significantly **to environmental pollution**. There are indications that the growth of the tapioca starch industry (e.g. in Thailand) has resulted in "**heavy water pollution**" as it generates large amount of solid waste and wastewater with high organic content.

Cassava/tapioca processing effluents cause acidification and hydrogen cyanide, the latter being **toxic to household animals, fisheries and other organisms.** In contrast, the application of fertilisers on cassava crops is usually low.

Water Footprint

While there are reports of cassava processing causing **depletion of water resources,** the water footprint of tapioca of cassava is **relatively low**, with 2,818 cubic meters per ton.

2,818 m3/ton is the water footprint of tapioca

Land use & Deforestation

7,750 ha deforestation risk in Brazil in 2018 is linked to cassava production

There is (limited) deforestation linked to cassava production. In 2018, there was an estimated 7,909 ha of associated **deforestation risk** in Cambodia, 7,750 ha in Brazil, 5,454 ha in the DRC, and 5,182 ha in Tanzania. Brazil is ranked the fifth supplier of tapioca to the EU27 and the UK.

However, production of cassava on slopes generally causes **erosion.**

Emissions

Emissions from tapioca production occur at the cassava plant cultivation stage, transportation, and in its processing stage in a starch factory. Estimates for the carbon footprint for tapioca starch production in Thailand, 0.320 kg CO2eq per kg of tapioca starch, point to a **low carbon footprint**.

0.320 kg CO2eq is the carbon footprint per kg of tapioca starch

Tapioca

Social Risks

Labour conditions

Tapioca (starch) is typically produced in countries were **labour conditions are adverse**. In Thailand, migrant workers are excluded from elements of basic labor law. Seasonal workers have bad salaries, working hours and facilities. Also in China, the risks to workers' rights are very high. In Côte d'Ivoire, informal labour accounts for nearly 60% of all paid jobs.

72 hours

working week is common practice for many workers in China

Child Labour

88.6 million

children are employed in child labour in Sub-Saharan Africa

Most of the cassava-tapioca farms are family owned. It is typical that **the entire family helps out at the farm, including children**. A study on factory workers in a tapioca starch facility in Thailand revealed that "some of the farmers were worried about their children's ability to balance between helping at the farm and attending school."

Gender Issues

Weed control for the cassava crop puts a big burden on the lives of farmers, **especially of women and children**. In West-Africa, the crop is traditionally grown by women, who have issues with gaining **control of the land they need.**

Health & Safety

A study on workers in a tapioca processing facility revealed that 40% of the factory workers worry about their safety, mainly linked to **working machinery and chemical safety**.

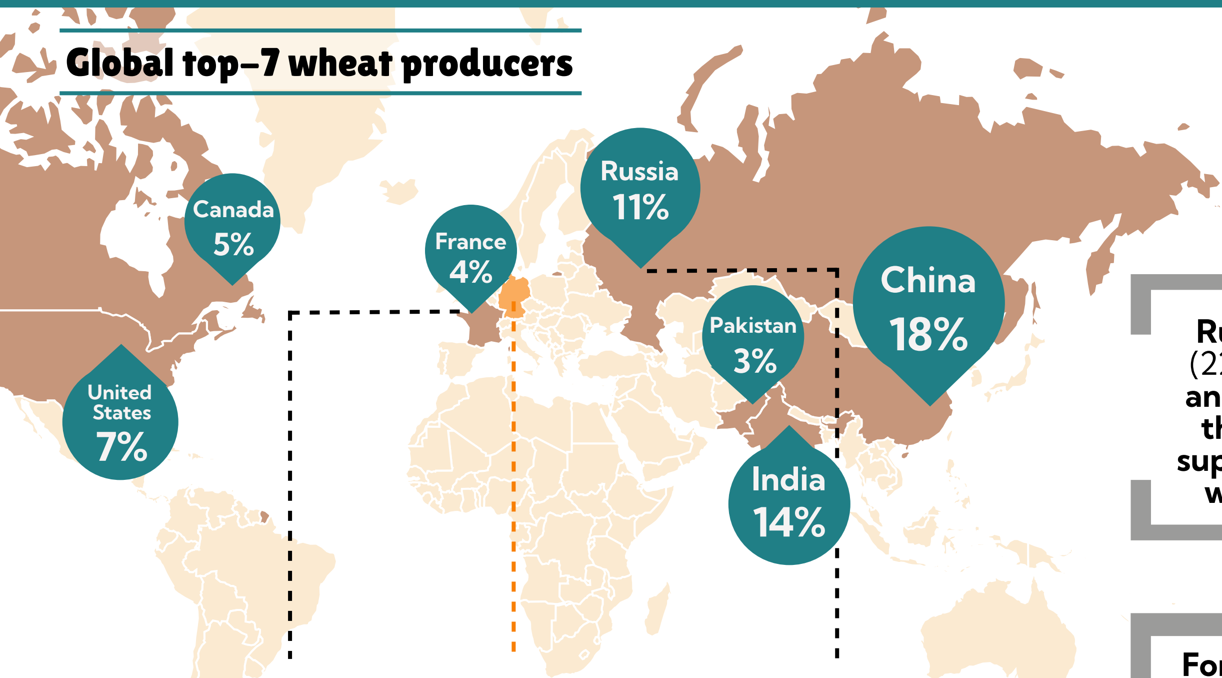
40%

of factory workers have concerns about their safety in a tapioca starch facility in Thailand

Wheat

Production & Trade

Global top-7 wheat producers



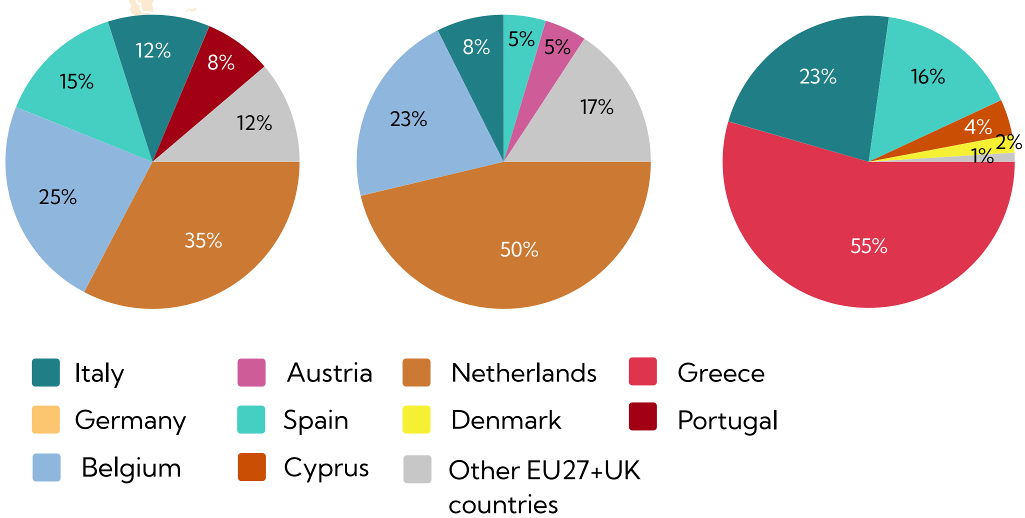
Russia (23%), Serbia (22%), Ukraine (16%), and Canada (13%) are the largest non-EU suppliers of (common) wheat to the EU28.

For wheat starch, the largest non-EU suppliers to the EU28 are Serbia (90%), China (4%), and Turkey (3%). But in terms of volumes, the EU (mainly Austria) is the major supplier of starch to the EU28 .

Top 5 EU27 + UK recipients of France exports

Top 5 EU27 + UK recipients of Germany exports

Top 5 EU27 + UK recipients of Russia exports



Italy and Spain are the largest recipient countries of wheat from France, Germany, and Russia. Greece is the largest recipient of Russian common wheat.

In **2020**, the top 7 producing countries **comprised 62% of wheat production worldwide**. Other countries with at least **3% share** in global wheat production are **Ukraine, Germany, Turkey and Argentina.**

Europe is also a major producer of wheat, with **France, Germany, and Czech Republic** being the top-3 European suppliers to the EU. Next to 'common wheat' (HS 101199). 'Wheat starch' (HS 110811) is a relevant product used in vega(n) products.

Wheat

Environmental Risks

Severe air pollution has been linked to post-harvest burning of wheat residues in the North China plain.

Contamination

Intensive wheat production has significant impacts on the levels of air, soil, and water pollution. Pesticides and fertilizers have been identified as the main sources of agricultural soil pollution.

In China, the excessive use of agrochemicals has largely lead to water contamination – more than 40% of China's rivers are highly polluted and about 80% of its lakes suffer from eutrophication. Agricultural production is the second largest source of ammonia nitrogen and the main responsible for water contamination in China. In fact, **nitrate leaching** (nitrate removal from the soil through drainage water) **is prevalent in several cropping systems, among which wheat-maize rotations.**

Water Use

Although the **water footprint of wheat is relatively low**, in many of the areas where it is cultivated, there is **substantial reliance on water supplied through irrigation**. A large part of wheat global production takes place in regions where there is high water stress, such as in China, India, and the U.S. The irrigation demands of wheat production in such water strained areas leads to **decreased river flows and groundwater depletion**, contributing not only to water scarcity, but also reduced harvests and loss of income for farmers.

1.827 m3/ton is the water footprint of wheat

Land Use & Deforestation

From both the top-7 wheat producers and EU wheat suppliers, **only India's wheat production has been linked to deforestation risk - 1501,12 hectares in 2018** (17% of the total deforestation risk associated with global wheat production in the same year). **Soil exhaustion is also a side effect of intensive wheat production**, leading to lower yields. Phosphorus shortage, one of the main indicators of soil degradation and nutrient depletion, has been connected to the harvesting/cultivating of crops such as wheat.

Emissions

0.67 kg CO2eq is the carbon footprint per kg of wheat

The carbon footprint per kg of wheat is low. However, a significant share of greenhouse gas (GHG) **emissions associated with wheat production**, especially in more intensified, high-yielding systems, **originates from the use of fuel, fertilizers and pesticides**. In China, agricultural activities account for 17% of the total GHG emissions, of which nitrogenous fertilizer overuse is one of its most important sources.

Wheat

Social Risks

Labour conditions

Although wheat production has not been found a major driver of working condition concerns, **there are strong indications of forced labor in Pakistan's wheat production**.

In India, occurrences of precarious work conditions in the production of this crop have also been reported.

50 days/year is the average amount of working time per year available for a seasonal worker in India.

The wheat-paddy crop cycle, which is labor-intensive, **has led to Punjab's dependence on cheap, migrant labour**. A large part of this workforce is made of casual, seasonal workers who only find work in agriculture up to 50 days/year and tend to **live below the social minimum.** In addition, in most cases, they receive poor wages and have long working hours while few social security measures apply to them.

Livelihood Issues

In many parts of the world, wheat is grown by smallholders whose productivity is typically less than that of larger plantations. In addition, **smallholders often face significant challenges accessing markets and may lack technical and financial support to improve their practices**, making them more sustainable, while also being **more vulnerable to climate change, adverse weather events, and market fluctuations**, all of which can endanger their economic stability and food security.

Gender Issues

Many immigrant women and girls work on crop producing farms in the USA where they reportedly face a high risk of sexual violence and harassment. Because most workers in the agricultural industry work in a shadow economy that is excluded from major labor law protections while also fearing deportation and reprisals from employers, these issues tend to be underreported.

Reputational Risks

Relevant is that common wheat supplied to the EU is largely produced in countries linked to the 2022 Russia-Ukraine crisis. **Sourcing from these countries may involve reputation risks for vega(n) producers.**

Methodology

Production and trade data

For origin of production and trade flows, AidEnvironment has used FAO 2020 global production data and EU trade statistics 2021. For each commodity, we selected the top-7 global producers. For the demonstration of trade flows for each commodity from both non-EU and EU countries into the EU market and the UK, we identified, based on Harmonised System (HS) trading codes*, key commodities and ingredients used in vega(n) products. For this, we have used the customs-based Nomenclatuur, the EU Deforestation Regulation Annex; and Trade Map. Moreover, we consulted two experts in the field of commodity trade recommended by IUCN NL.

For each commodity, AidEnvironment selected the top-5 non-EU and the top-5 EU suppliers to the EU (plus UK) market in the year 2021. Based on production and trading volumes, the top-3 supplying countries of each commodity to the Union were selected. This implies that we did not include as top-3 suppliers those European countries that do supply to the EU but that do not produce the commodity, considering that these are likely cases of re-imports. For each of the top-3 supplying countries, we have prepared pie charts with the top-5 recipient countries based on trading volumes. Occasionally, we selected supplying countries with lower trading volumes, but that were relevant to include due to specific sustainability findings, for instance, that such countries were particularly linked to considerable deforestation or human rights violations. Since UK trade data was not always recorded in the 2021 EU trade statistics, we have checked whether the UK was part of the top-5 recipients for each commodity in the trading year 2020. In the cases wherein the UK was part of this group of countries, we mentioned this in text on the factsheet.

Environmental and social risks

The environmental and social risks included in each factsheet were ranked from most to least prevalent, based on the literature research findings. Therefore, it can happen that, for instance, land use & deforestation is depicted as an environmental risk in the soy and palm oil factsheets, but not in the hazelnuts or almonds factsheets since deforestation is not a significant issue in the production and/or processing of these commodities. Conversely, child labour is found in hazelnuts production in Turkey, while it is not commonly associated with soybean production. In sum, each factsheet only presents potential risks linked to the commodity in question, in the order of high to low prevalence of the risk.

Environmental risks

For the environmental risk comparison sheet, we have compared 'hard' data on environmental risks for three variables – 'carbon footprint', 'water footprint' and 'deforestation risk' –, which were based on three key studies: Petersson et al. (2021) for carbon footprints; Mekonnen and Hoekstra (2010) for water footprints, and Pendrill et al., 2022 for deforestation risk. More information on how each study was used can be found on the website. Where possible, we have included insights on loss of native vegetation that are not classified as forest. Moreover, since the deforestation risk data is only valid until 2018, we have included recent updates on deforestation trends where possible.

To rank the environmental risk indicators, AidEnvironment has defined its own ranking scales and thresholds, based on 1) the average carbon and water footprints, and deforestation risk of the sample of 16 commodities; and 2) the ability to distinguish between relatively lower and higher values within the sample of 16 commodities. These ranking thresholds are to some extent arbitrary and subjective (e.g., what is considered relevant deforestation?). Thus, while it may be argued that the carbon footprints of the 16 commodities analysed can be considered low when compared to those of animal products, we have proposed a ranking that distinguishes between 'low' and 'relatively low' carbon footprints, to allow for comparison with other plant-based products within the sample of 16 commodities. Finally, we have added (if available) the footprints for a few animal protein products to give better insight into relative sizes and risks of the different types of products. The traffic light system used (from green to red) aims at making the comparison between products more intelligible and the risk areas easier to identify.

For the environmental risk categories 'Biodiversity Loss' and Contamination', there were no comparable hard data/indicators available. For instance, there is little to no comparable updated statistical data on pesticide use for the different crops produced globally. Therefore, exclamation marks (!) were used to highlight the fact that these aspects should be considered attention areas for vega(n) producers' due diligence. This is generally the case when the risk associated with these areas was ranked high (in first or second place) in the corresponding commodity factsheet

Social risks

Apart from specific research per commodity on labour conditions, child labour, land appropriation, gender issues, health and safety of workers, livelihoods and other relevant issues, general sources that were always consulted are the MVO Risk Checker and the Align tool. Not all commodities were covered under the MVO risk checker (e.g. quinoa). Whenever available, scientific sources were the preferred consultation resources.

Since comparing and ranking social risks in all commodities in the sample would be too subjective, we opted for a more context-based approach, highlighting the specific production countries that display high social risks associated with the commodity. In general, we included the countries that were linked to high attention areas in our factsheets (taking the first or second place in the risks ranked from most to least prevalent). If the social risk was common to the commodity in general and not specific to a producer country, we dubbed 'global' in the comparison table.

Important to note is that not being flagged as an attention area, does not mean the social risks are absent. It entails simply that such issues were not pervasive and therefore did not become apparent in the overall research. Many social risks are also very delicate, rather invisible, and difficult to measure objectively. Moreover, not all commodity risks and impacts are equally and/or systematically studied and reported.

*Note: this is a shortened version of the approach and methods section. For a detailed overview, including tables **with relevant HS codes per commodity** and an extensive **list of sources** used for each commodity, please visit the website.