



# Wege zum klimapositiven Weinhandel

Dr. Helena Ponstein

28. März 2022 | Netzwerktagung Weinhandel



demeter

# Agenda

- Klimawandel & Wein
- Klimawandel begrenzen: 1,5° Ziel
- Klimaneutral vs. klimapositiv
- Treibhausgas (THG) -Emissionen durch Wein
- Klimaschutzmaßnahmen in der Weinbranche

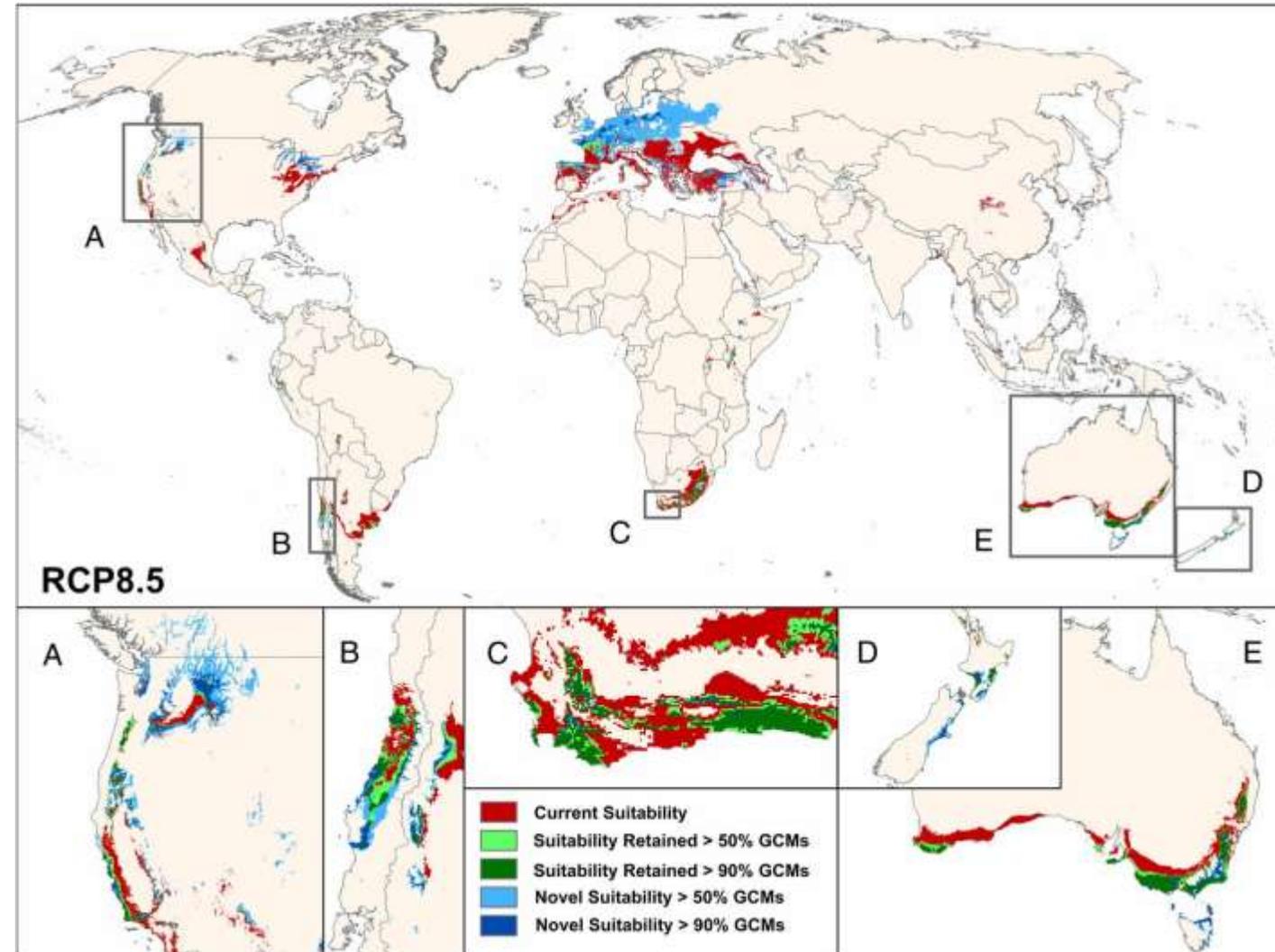




# Klimawandel & Wein

# Klimawandelfolgen für Weinbauregionen

- Massive Veränderungen: Weinbaufläche verringert sich um 25% to 73% in den wichtigsten Weinbauregionen mit mediterranem Klima bis 2050 (RCP 8.5)
- Neue Flächen hin zu den Polen und in höheren Lagen
- Unter dem Strich deutlich weniger Fläche
- Steigende Konkurrenz um Fläche & Wasser mit anderen Ackerfrüchten

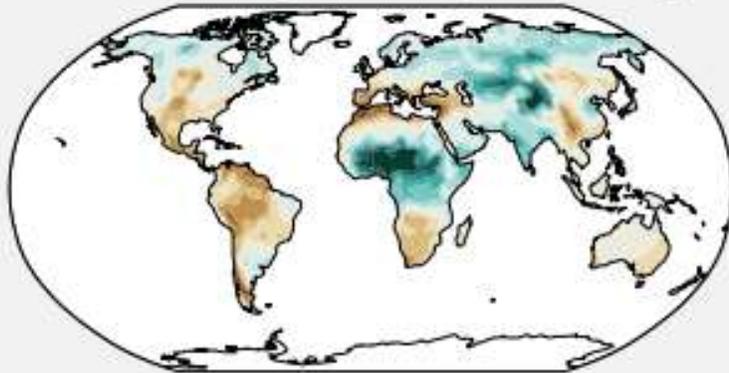


# Kernproblem der Landwirtschaft: Lücke zwischen Wasserbedarf und Wasserverfügbarkeit

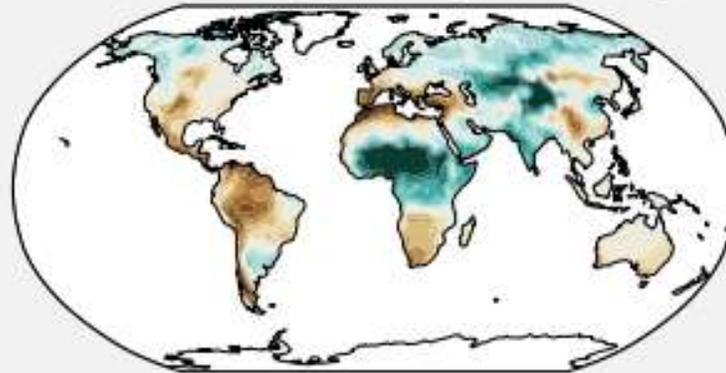
(d) Annual mean total column soil moisture change (standard deviation)

Across warming levels, changes in soil moisture largely follow changes in precipitation but also show some differences due to the influence of evapotranspiration.

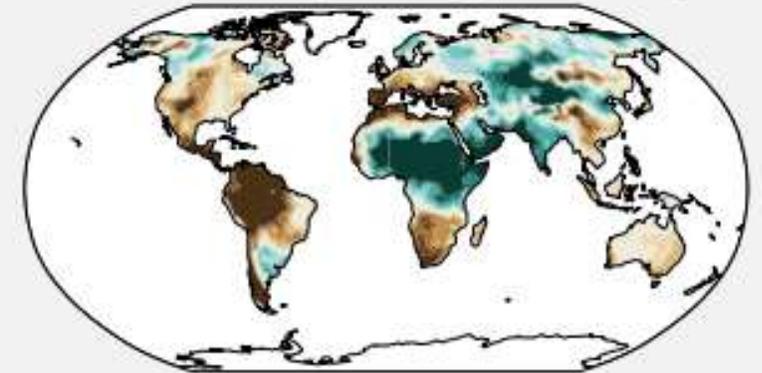
Simulated change at 1.5°C global warming



Simulated change at 2°C global warming



Simulated change at 4°C global warming



Relatively small absolute changes may appear large when expressed in units of standard deviation in dry regions with little interannual variability in baseline conditions.



Quelle: IPCC 2021, AR 6, 17. [https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC\\_AR6\\_WGI\\_SPM\\_final.pdf](https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM_final.pdf)

# NASA & PIK: Klimawandelfolgen treten viel schneller ein



POTSDAM-INSTITUT FÜR  
KLIMAFOLGENFORSCHUNG

INSTITUT PERSONEN THEMEN PRODUKTE AKTUELLES

STARTSEITE › AKTUELLES › NACHRICHTEN

## Neue Studie von NASA und PIK: Bauern weltweit müssen sich schon innerhalb des nächsten Jahrzehnts auf neue Klimarealität einstellen

02.11.2021 - Neue Computersimulationen sagen tiefgreifende Veränderungen in den Anbaubedingungen und Erträgen der wichtigsten Kulturpflanzen schon in den nächsten 10 Jahren voraus, wenn sich die derzeitigen Trends der globalen Erwärmung fortsetzen. In den wichtigsten Kornkammern der Welt kann es viel schneller als bisher erwartet zu gravierenden Veränderungen kommen, so dass sich die Landwirte in aller Welt schon jetzt an die neuen klimatischen Gegebenheiten anpassen müssen. Bis Ende 2100 könnten global die Mais-Erträge um fast ein Viertel zurückgehen, während die Weizenerträge möglicherweise weltweit um etwa 17 % steigen könnten.

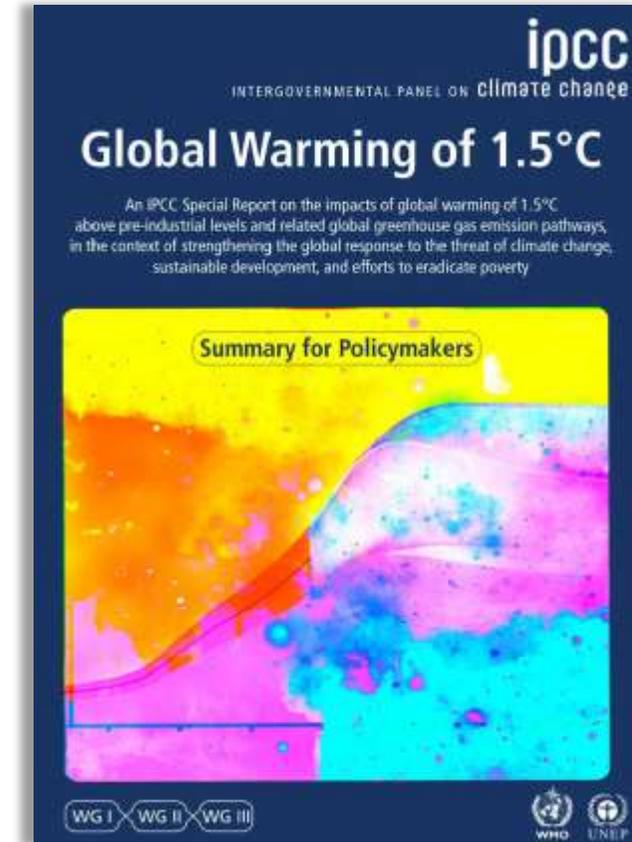
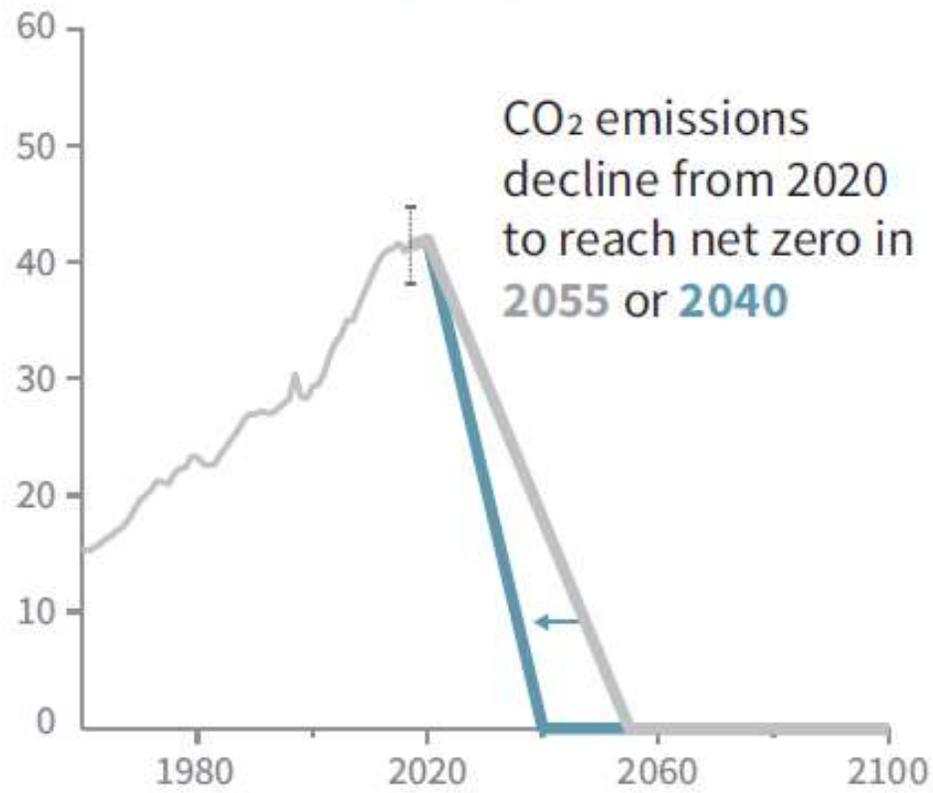
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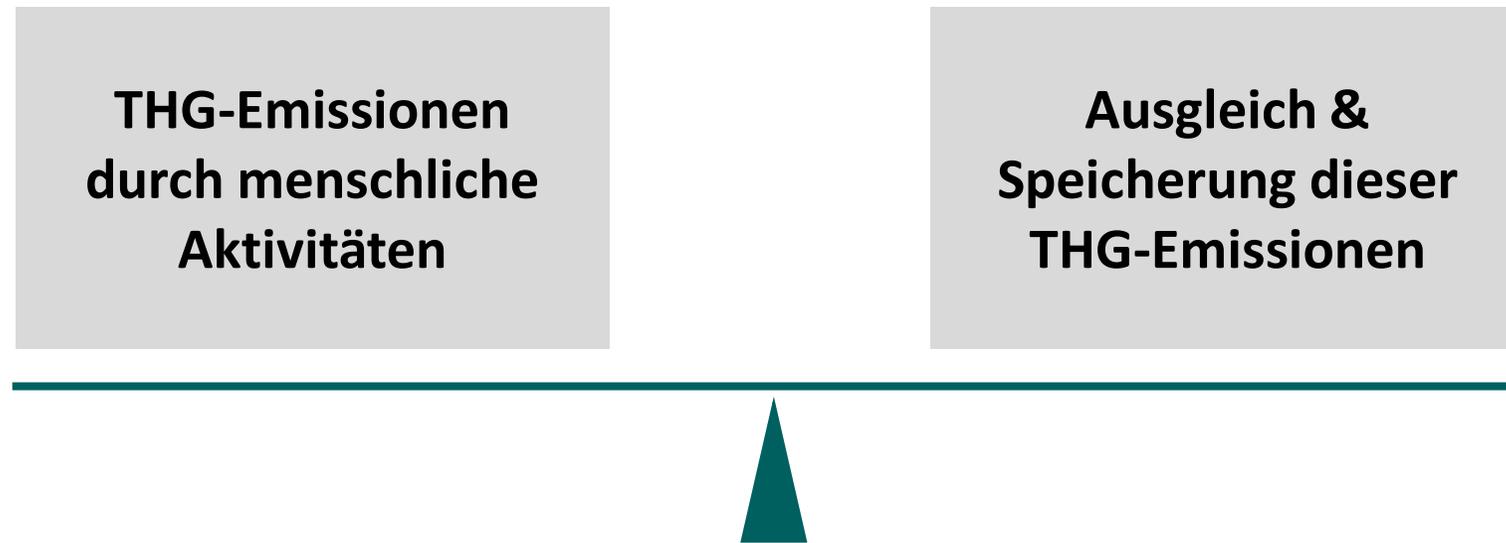
**Erderwärmung auf  
1,5° C begrenzen!**

# Das 1,5 Grad Ziel: Klimaneutrale Welt bis 2040-2055

b) Stylized net global CO<sub>2</sub> emission pathways  
Billion tonnes CO<sub>2</sub> per year (GtCO<sub>2</sub>/yr)



# Klimaneutral vs. klimapositiv<sup>?</sup>



# Klimaneutral



- THG-Emissionen wurden gemessen, reduziert und ausgeglichen
- Menschliche Aktivitäten haben keinen Effekt auf das Klima
- Beinhaltet alle relevanten Treibhausgase, auch Veränderungen der Erdoberfläche, die das Klima beeinflussen (z.B. Albedo, Fähigkeit der Oberfläche, Wärmestrahlung zu reflektieren)
- Keine konkreten Anforderungen an das Ausmaß der Emissionsreduktionen

# Klimapositiv



- THG-Emissionen wurden gemessen, reduziert und ausgeglichen
- Menschliche Aktivitäten haben keinen Effekt auf das Klima
- **Klare Definition der Reduktionsminderung** laut Science Based Targets Initiative:  
1,5 Grad Ziel
  - 42% Reduktion bis 2030
  - Min. 90% Reduktion bis 2050



# Klimaschutz & Wein

## Willkommen bei Klimaneutraler Wein

Tragen Sie zum Klimaschutz bei & werden Sie klimaneutral. Hier werden Klimaschutz und Klimaneutralität wissenschaftlich fundiert erklärt, so dass Praktiker aus der Weinbranche wissen, was es damit auf sich hat und welche Schritte konkret unternommen werden können, um zur Begrenzung der Erderwärmung beizutragen.

[Newsletter abonnieren](#)



# Edler Tropfen

Der Wein von morgen - Film von Conny Schulze und Thomas Mudersbach



Schmeckt der Riesling 2050 noch nach Riesling? Der Klimawandel macht Rebstöcken und Trauben zu schaffen. Winzer suchen nach Wegen, ihren Wein zu retten – und das Klima gleich mit.

29 min | 17.03.2022 | UT - DGS

Video verfügbar bis 06.03.2024



Mehr von plan b

<https://www.zdf.de/gesellschaft/plan-b/plan-b-edler-tropfen-100.html>

# Forschung: Treibhausgasemissionen durch Wein



## Greenhouse gas emissions and mitigation options for German wine production

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 Net-zero emissions

### ABSTRACT

In the light of a dire need to reduce greenhouse gas emissions (GHG) from food value chains, this paper analyses GHG emissions from wine production based on primary data from 5 wineries, one wine cellar and 9 grape producers in Germany and explores main emission sources based on their contribution to variance. Considering system boundaries from cradle to gate we found a 90% confidence interval for results between 0.753 and 1.069 kg CO<sub>2</sub>e per bottle of wine. Main contributors to variance were bottle weight (31%), electricity usage (18%), heat (11%), yield (-9%), and diesel use in vineyards (9%). Looking at production process phases, 93% of emissions resulted from the production of wine grapes, while 81% was attributable to the winery phase, mainly to the packaging materials (57%). Exploring the mitigation potential of a reduction in bottle weight, reuse of glass bottles, increase in packaging volume and renewable energies, we found that the reuse of glass bottles deserves close attention from wine producers, winemakers, and policy makers who strive for an effective decarbonization of the wine value chain. The mitigation potential of the reuse of an average bottle exceeds the mitigation potential from a reduction in bottle weight by more than threefold. A combination of the replacement of grid electricity by renewable energies, bottle weight reduction and reuse can curb GHG emissions per bottle of wine by 47%.

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### 1. Introduction

Germany's long history of wine production dates back to the Roman era. As the world's tenth largest wine producer with an annual volume of 8.9 million hectolitres from approximately 102,000 hectares of planted vineyards in 2016, Germany is amongst the most important markets in terms of wine consumption. Its consumption volume of 20.5 million hectolitres (hl) the country exceeded only by Italy (22.5 million hl), France (27.0 million hl) and the USA (31.8 million hl) (OIV, 2017). With a market volume of €8.9 billion, wine plays an important economic role (Deutsches Weinwirtschaft, 2017).

A lot of attention has been paid to the environmental impacts of the wine value chain (Chen and North, 2013). A focus on

greenhouse gas emissions (GHG) can be observed in the literature, referred to as a proxy for environmental impacts (Rugani et al., 2013). An estimate of the contributions of wine to global anthropogenic greenhouse gas emissions revealed that this value chain cannot be overlooked, contributing approximately 0.3% of annual global GHG emissions (Rugani et al., 2013; Anisimo et al., 2014) demonstrated the significance of the wine sector on the national level for a country with a high wine consumption per capita, estimating that the annual wine consumption in the UK caused 0.6% of the national GHG emissions. This demonstrates that while the wine industry is highly affected by climate change (Hannah et al., 2012; Garbarrat, 2017), it also is a relevant driver of global warming.

Internationally, wine producers regard the inventory of the greenhouse gas emissions related to their activities, commonly referred to as carbon footprint (CF), as an incremental element of environmental sustainability (Smith, 2013), and a driver for innovation (Nazzari et al., 2017a). The communication of low GHG emissions to customers provided a competitive edge for food items in Germany, as the consumer's willingness to pay was positively associated with lower carbon emissions (Gubina et al., 2016). This

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Ponstein et al., 2019a



## How to increase sustainability in the Finnish wine supply chain? Insights from a country of origin based greenhouse gas emissions analysis

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 Finland

### ABSTRACT

As wine supply chains become increasingly globalized, sustainability issues take on ever greater importance. This is the first study to analyse the environmental sustainability aspect of greenhouse gas (GHG) emissions from a global wine supply chain perspective, covering just over 90% of Finland's wine imports. Lacking substantial domestic production capacity, virtually all wine consumed in Finland is imported. Finland is comparable to its Nordic neighbours, Sweden and Norway, in this respect. The Life Cycle Assessment (LCA) methodology was combined with sensitivity and scenario analyses to investigate GHG emissions implications from prospective policy changes. Our results spotlight differences related to wine production in the eight main wine producing countries for the Finnish market (Australia, Chile, France, Germany, Italy, Spain, South Africa, and the United States), related logistics, and all packaging types for wine used in Finland (glass bottle, bag-in-box, PET bottle, beverage cartons, and pouch). We found an average value of 1.23 kg CO<sub>2</sub>e for 0.75 l wine consumed in Finland, ranging from 0.59 kg CO<sub>2</sub>e for French wine in a bag-in-box packaging to 1.92 kg CO<sub>2</sub>e for Australian wine in a glass bottle. After identifying the main GHG emission hotspots in the wine supply chain, our scenario analyses highlight the effects of reducing glass bottle weight, moving away from glass packaging toward bag-in-box, increasing bulk wine export volumes to Finland, and following the European Commission's Energy 2020 strategy which targets increasing energy efficiency by 30 percent.

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### 1. Introduction

Seeking to improve the sustainability of supply chains, practitioners and scholars of sustainable supply chain management are increasingly using systems approaches, including analysis of greenhouse gas emissions (GHG), environmentally extended input-output analyses, and Life Cycle Assessment (LCA) (Blais and Corbett, 2018; Prazer et al., 2017; Ahl and Searcy, 2013). These approaches, and in particular LCA, have gained in importance due to rising demands for transparency and principle-based

sustainability standards (Ayuso et al., 2016), and the need for a harmonization of sustainability claims, as the EU Commission's Environmental Footprint pilot evidences (European Commission, 2018). LCA is widely used to assess the environmental impacts of a product, organization, or service, focusing on the resources used throughout its lifecycle, i.e. from raw material acquisition to waste management (ISO, 2006a and 2006b; Finnenonen et al., 2009; Hoffweg and I. Castka, 2014). These LCA and related systems approaches can help supply chain members to identify cost saving opportunities through energy efficiency initiatives (Mathiesen et al., 2008; Song et al., 2018) or provide opportunities for restructuring entire supply chains (Sotinen and Jagan, 2018; Linton et al., 2007).

The reduction of the overall agri-food sector's carbon footprint (CF) is seen as one important potential contribution to mitigate such anthropogenic GHG emissions (Vermeiren et al., 2012). The

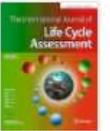
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Ponstein et al., 2019b

28.04.2021 | LCA FOR AGRICULTURE | Ausgabe 7/2021 | OPEN ACCESS

## Exploring sustainability potentials in vineyards through LCA? Evidence from farming practices in South Africa



Zeitschrift: The International Journal of Life Cycle Assessment > Ausgabe 7/2021

Autoren: V. Russo, A. E. Strevler, H.J. Ponstein

[Zum Volltext](#)

[PDF-Version jetzt herunterladen](#)

### Wichtige Hinweise

#### Abstract

##### Purpose

Following the urgency to curb environmental impacts across all sectors globally, this is the first life cycle assessment of different wine grape farming practices suitable for commercial conventional production in South Africa, aiming at better understanding the potentials to reduce adverse effects on the environment and on human health.

##### Methods

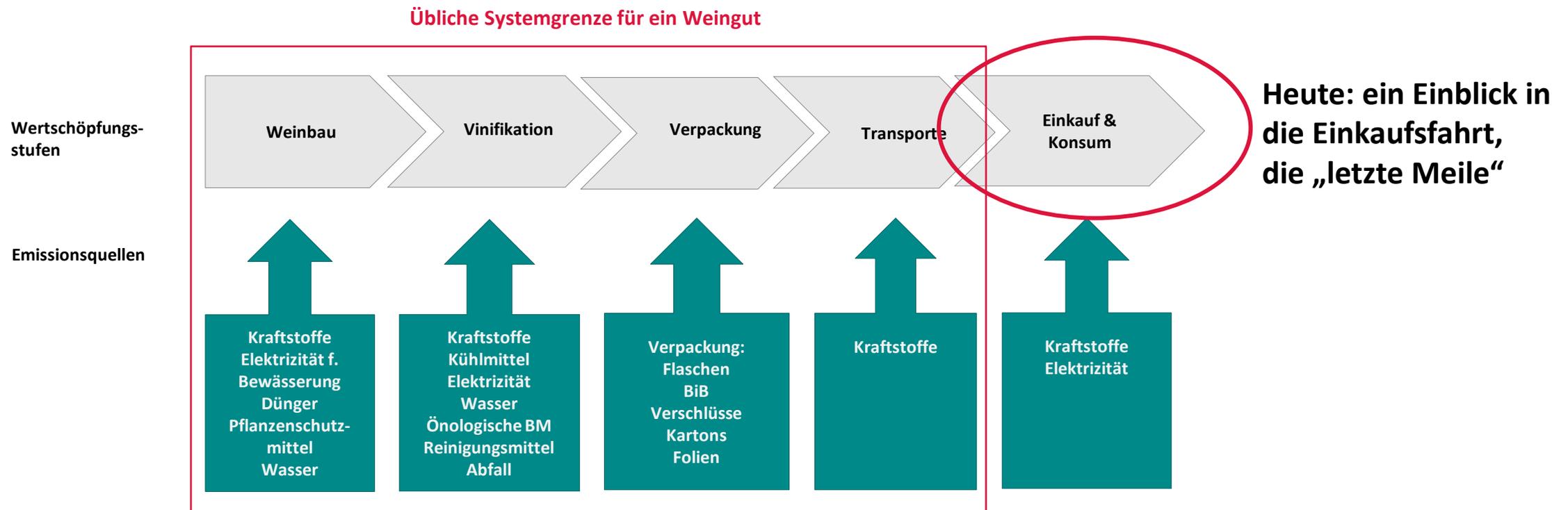
An attributional life cycle assessment was conducted on eight different scenarios that reduce the inputs of herbicides and insecticides compared against a business as usual (BAU) scenario. We assess several impact categories based on ReCiPe, namely global warming potential, terrestrial acidification, freshwater eutrophication, terrestrial toxicity, freshwater toxicity, marine toxicity, human carcinogenic toxicity and human non-carcinogenic toxicity, human health and ecosystems. A water footprint assessment based on the AWARE method accounts for potential impacts within the watershed.

##### Results and discussion

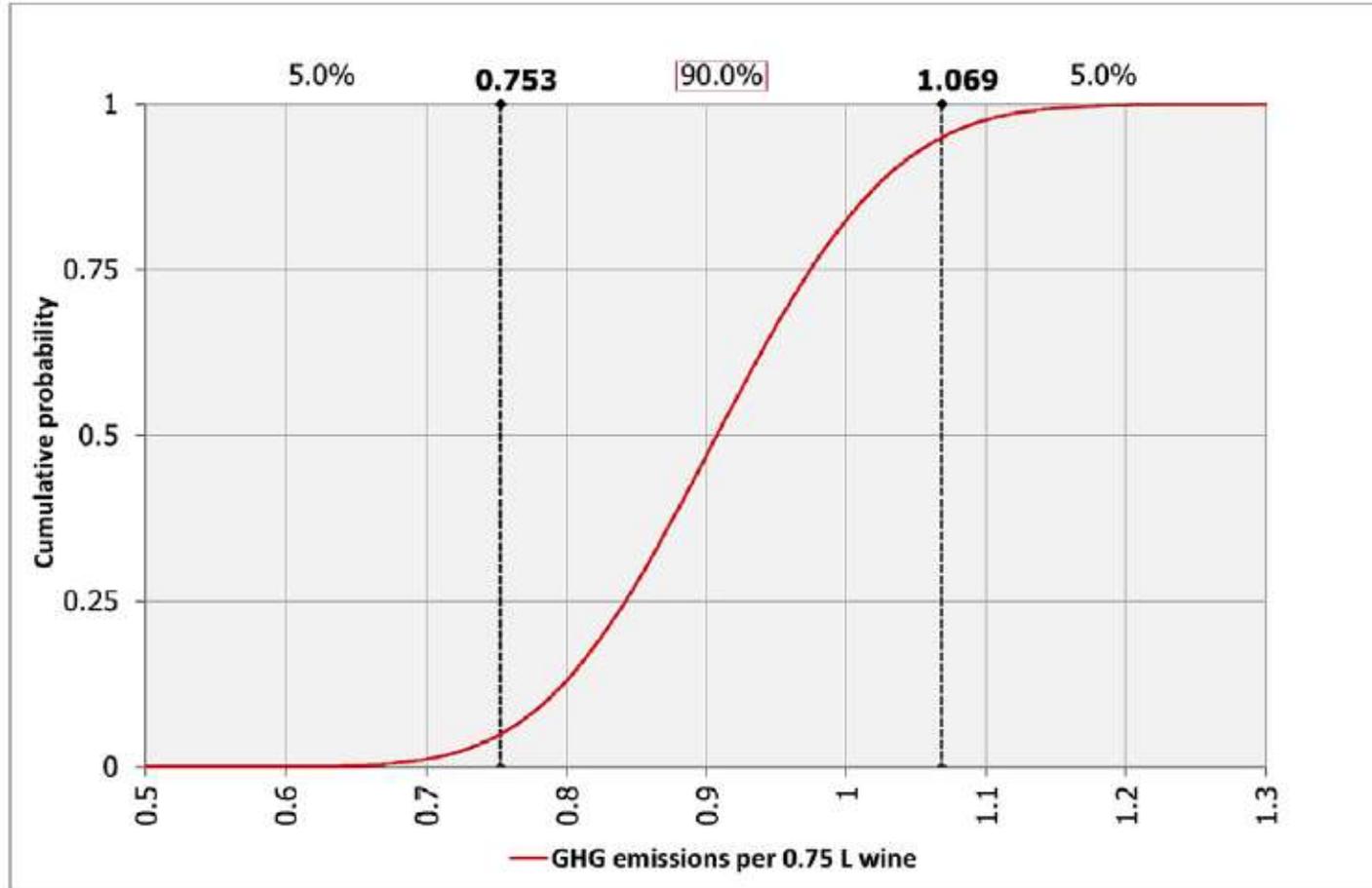
Results show that in our impact assessment, more sustainable farming practices do not always outperform the BAU scenario, which relies on synthetic fertilizer and agrochemicals. As a main trend, most of the impact categories were dominated by energy requirements of wine grape production in an irrigated vineyard, namely the usage of electricity for irrigation pumps and diesel for agricultural machinery. The most favourable scenario across the impact categories provided a low diesel usage, strongly reduced herbicides and the absence of insecticides as it applied cover crops and an integrated pest management. Pesticides and heavy metals contained in agrochemicals are the main contributors to emissions to soil that affected the toxicity categories and impose a risk on human health, which is particularly relevant for the manual labour-intensive South African wine sector. However, we suggest that impacts of agrochemicals on human health and the environment are undervalued in the assessment. The 70% reduction of toxic agrochemicals such as Glyphosate and Paraquat and the 100% reduction of Chlorpyrifos in vineyards hardly affected the model results for human and ecotoxicity. Our concerns are magnified by the fact that manual labour plays a substantial role in South African vineyards. Increasing the exposure of humans to these toxic chemicals at their workplace.

# Systemgrenzen für Wein

Systemgrenzen legen fest, welche Emissionsquellen berücksichtigt werden



# Treibhausgasemissionen durch Wein

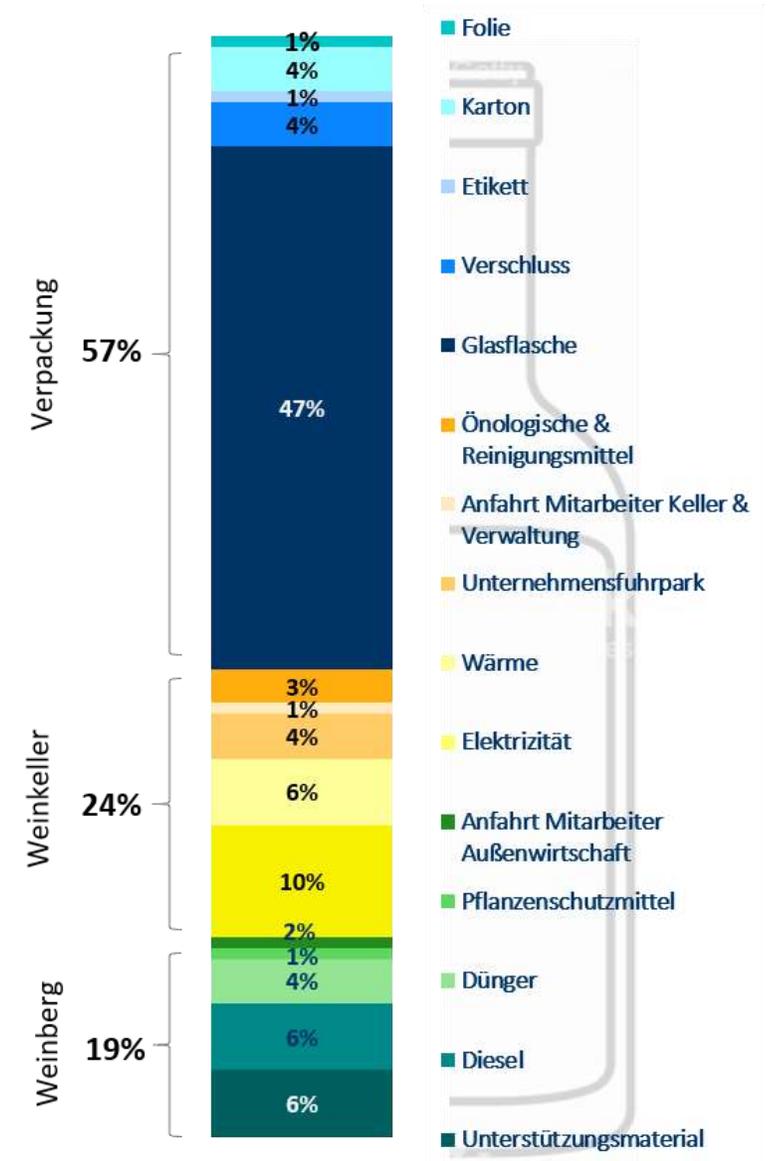


**Fig. 3.** Monte Carlo simulation of GHG emissions per FU.

Ponstein et al., 2019. Greenhouse gas emissions and mitigation options for German wine Production. J. Clean. Prod. 212, 800-809.

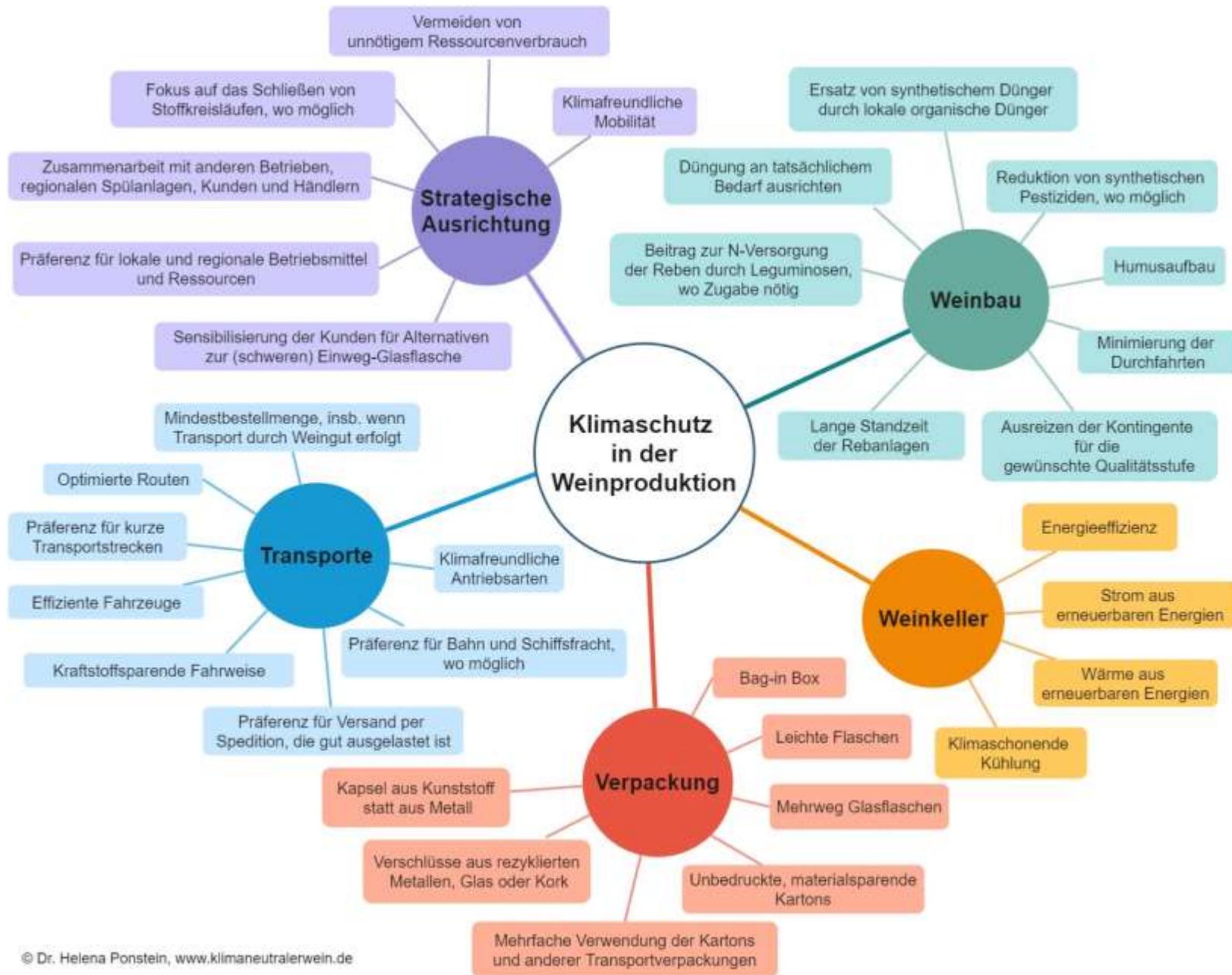
15/11/2021

Dr. Helena Ponstein



Quelle: Ponstein, 2019, modifiziert.

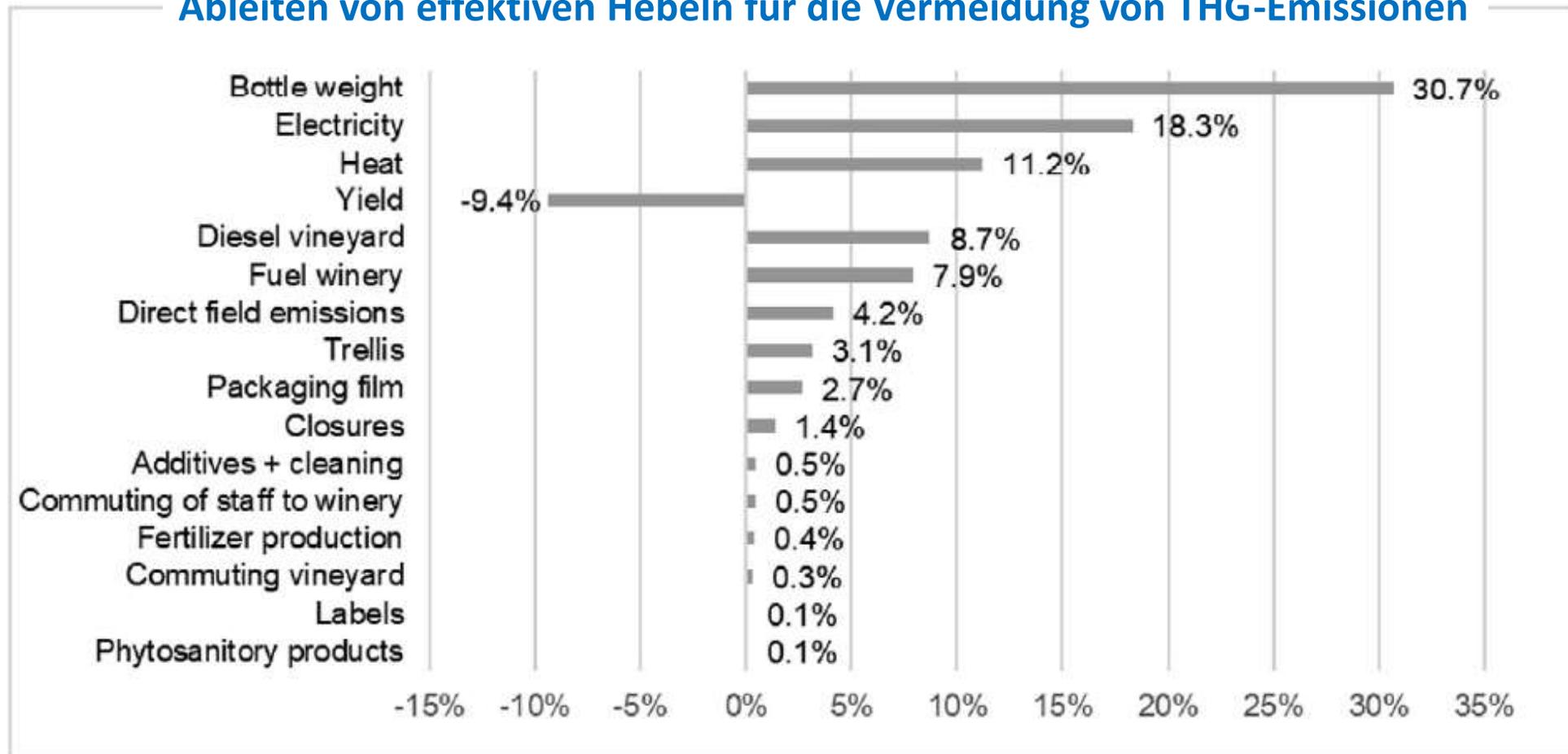
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# Contribution to variance

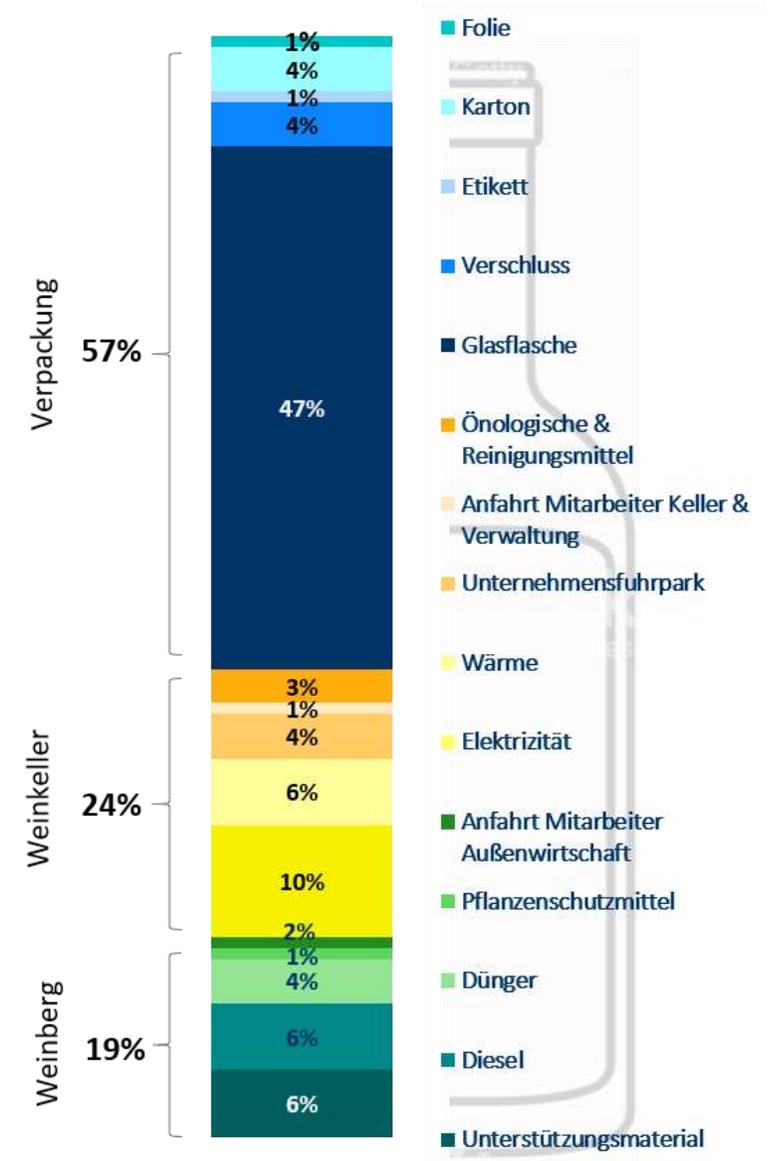
## Ableiten von effektiven Hebeln für die Vermeidung von THG-Emissionen



**Fig. 4.** Contribution to variance of GHG emission sources.

# Effektive Klimaschutzmaßnahmen

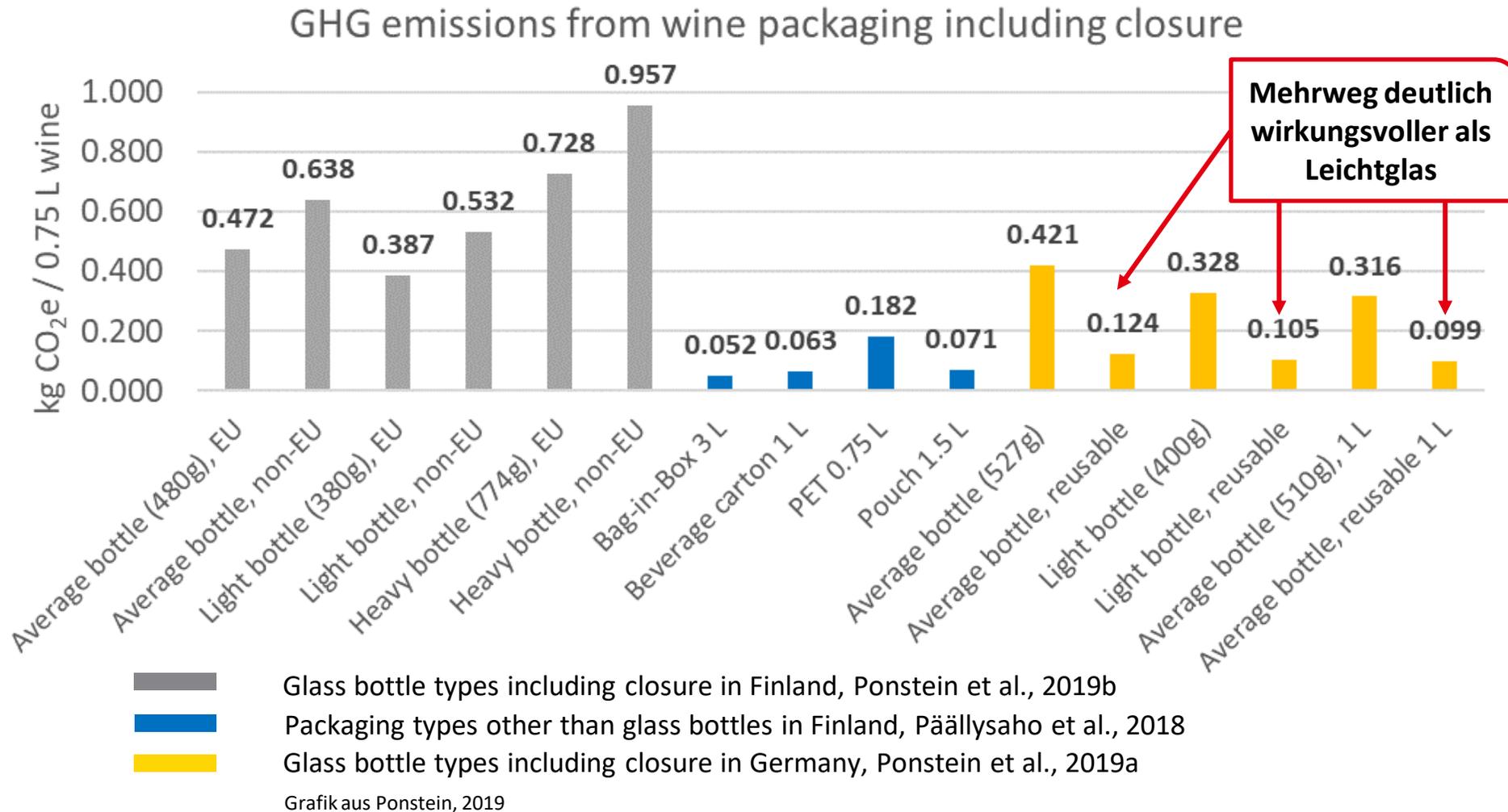
1. Verpackung
2. Dekarbonisierung der Energieträger (Diesel, Benzin, Gas, Öl & Elektrizität)
3. Ressourceneffizienz im Weinbau
4. Ressourceneffiziente Auslieferung





# Klimaschutzmaßnahme Nr. 1: Verpackung

# Klimaschutzmaßnahme Nr. 1: Verpackung



# Klimaschutzmaßnahme Nr. 2: Dekarbonisierung der Energieträger in der Weinproduktion



# Klimaschutz im Weinberg

1. Kontingente Ausfüllen
2. Lange Standzeiten der Rebflächen
3. Dieserverbrauch reduzieren
4. Lokale organische Düngung & nur bei Bedarf
5. Aufbau von Dauerhumus

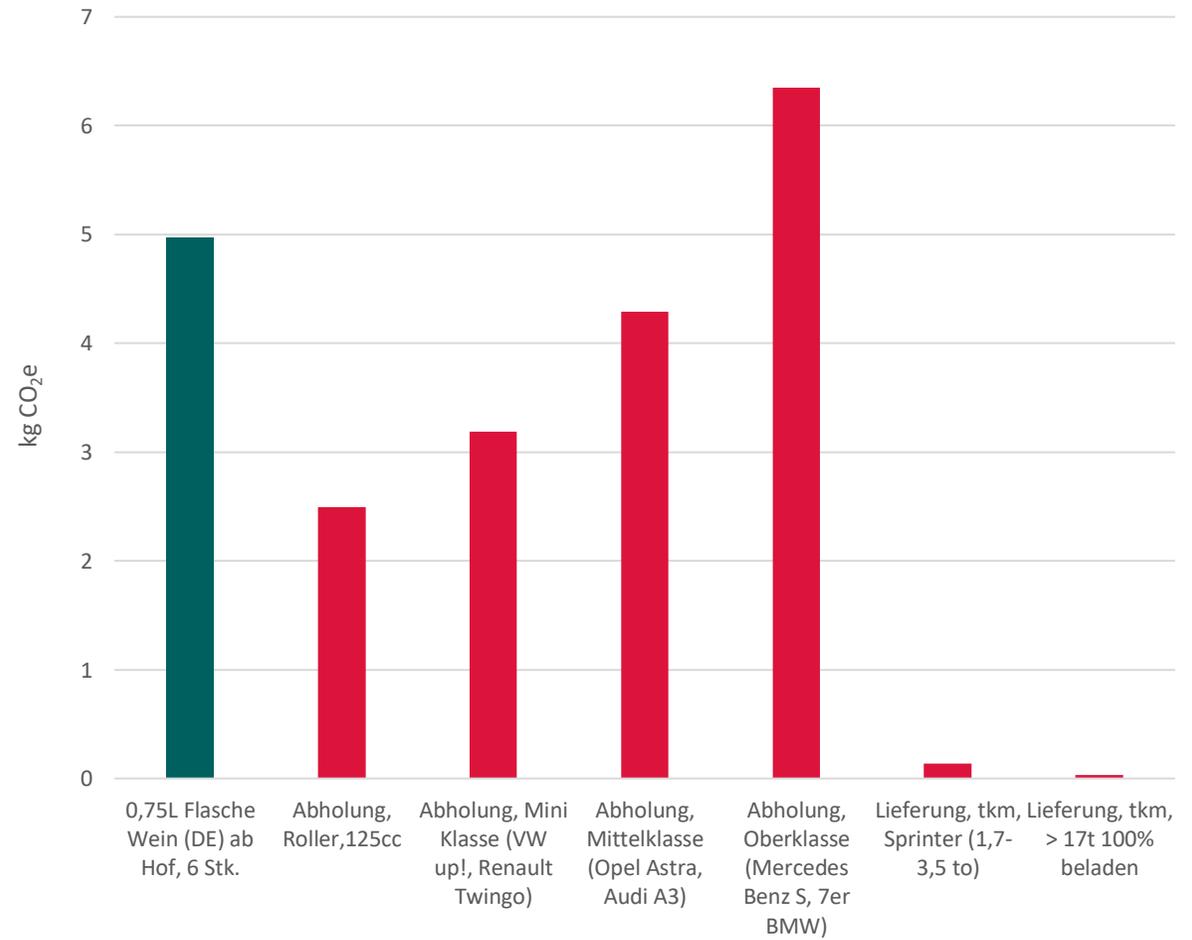
# Klimaschutz in der Auslieferung (Einkaufsfahrt)



# Einkaufsfahrt

- Die Einkaufsfahrt des Endkunden wird üblicherweise aus der Perspektive des Produzenten vernachlässigt.
- Große Unsicherheiten und Ungenauigkeiten: Verkehrsmittel, Strecken, weitere Stationen auf der Fahrt.
- Die Einkaufsfahrt kann viel höhere THG-Emissionen verursachen als die Erzeugung des eingekauften Weins.
- **Dos**
  - Gut ausgelastete Spedition
  - Kombinierte Fahrten
  - ÖPNV
- **Don'ts**
  - Längere Fahrten „nur“ für den Einkauf mit PKW
  - Fahrzeuge mit hohem Energieverbrauch

THG-Emissionen durch die letzte Etappe des Transports bis zum Endkunden  
(Paket ca. 7,8 kg, 6 Flaschen, 30 km)



Transport-Emissionen: Eigene Berechnung. Emissionsfaktoren: DEFRA, 2021  
0,75 L Flasche Wein: Ponstein et al., 2019a

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**How to increase sustainability in the Finnish wine supply chain? Insights from a country of origin based greenhouse gas emissions analysis**

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**1. Introduction**

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**ABSTRACT**

As wine supply chains become increasingly globalized, sustainability issues take on ever greater importance. This is the first study to analyze the environmental sustainability aspect of greenhouse gas (GHG) emissions from a global wine supply chain perspective, covering just over 50% of Finland's wine imports. Lacking substantial domestic production capacity, virtually all wine consumed in Finland is imported. Finland is comparable to its Nordic neighbours, Sweden and Norway, in this respect. The Life Cycle Assessment (LCA) methodology was combined with sensitivity and scenario analyses to investigate GHG emissions implications from prospective policy changes. Our results spotlight differences related to wine production in the eight main wine producing countries for the Finnish market (Australia, Chile, France, Germany, Italy, Spain, South Africa, and the United States), related logistics, and all packaging types for wine used in Finland (glass bottles, bag-in-box, PET bottles, brown-glass cartons, and plastic). We found an average value of 1.23 kg CO<sub>2</sub>e for 0.75 L wine consumed in Finland, ranging from 0.59 kg CO<sub>2</sub>e for French wine in a bag-in-box packaging to 3.02 kg CO<sub>2</sub>e for Australian wine in a glass bottle. After identifying the main GHG emission hotspots in the wine supply chain, our scenario analyses highlight the effects of reducing glass bottle weights, moving away from glass packaging toward bag-in-box, increasing bulk wine export volumes to Finland, and following the European Commission's Energy 2020 strategy which targets increasing energy efficiency by 20 percent.

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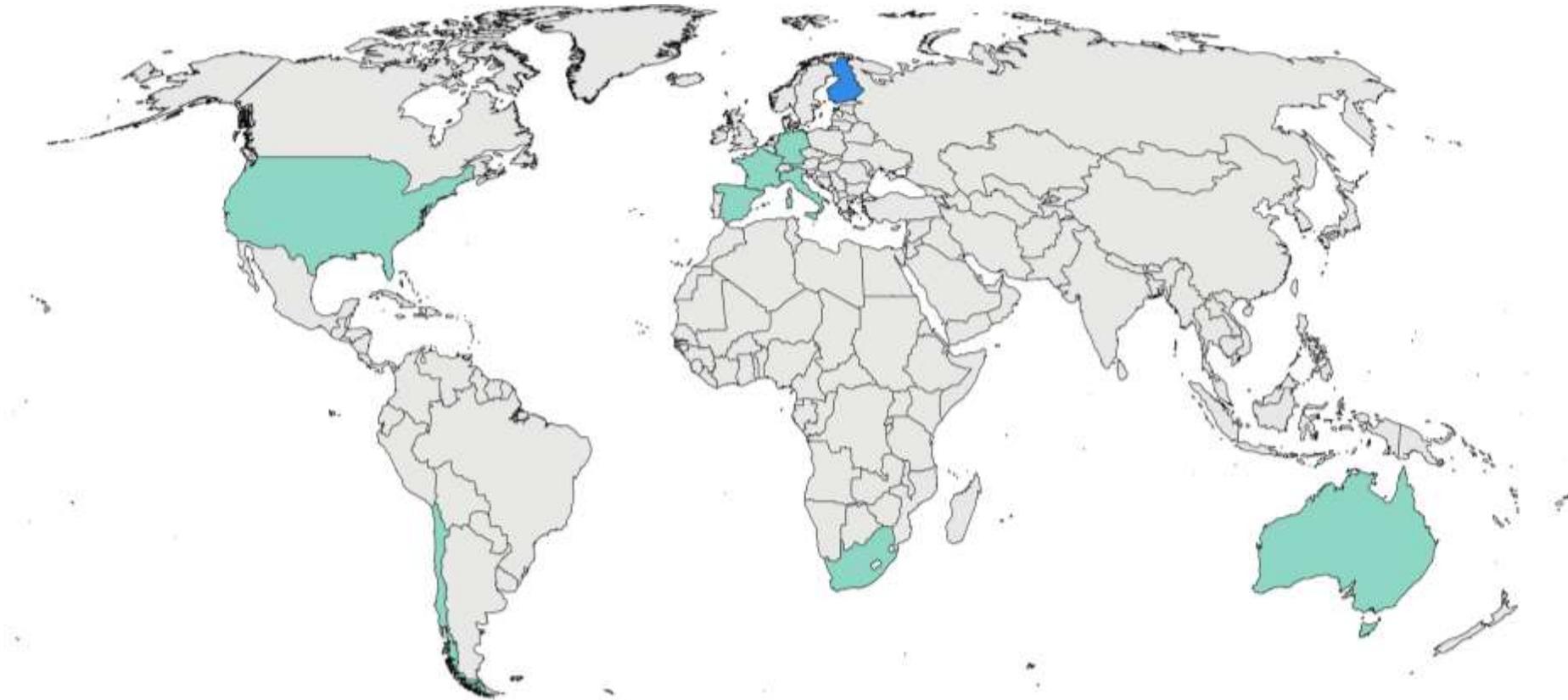
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# Vermeidung von THG-Emissionen in globalen Wertschöpfungsketten von Wein

# Klimaschutz in globalen Wertschöpfungsketten von Wein



■ Top 8 countries of origin for wine consumed in Finland

Grafik: Ponstein et al., 2019b, modifiziert

# Importe und Treibhausgasemissionen von Wein in Finnland

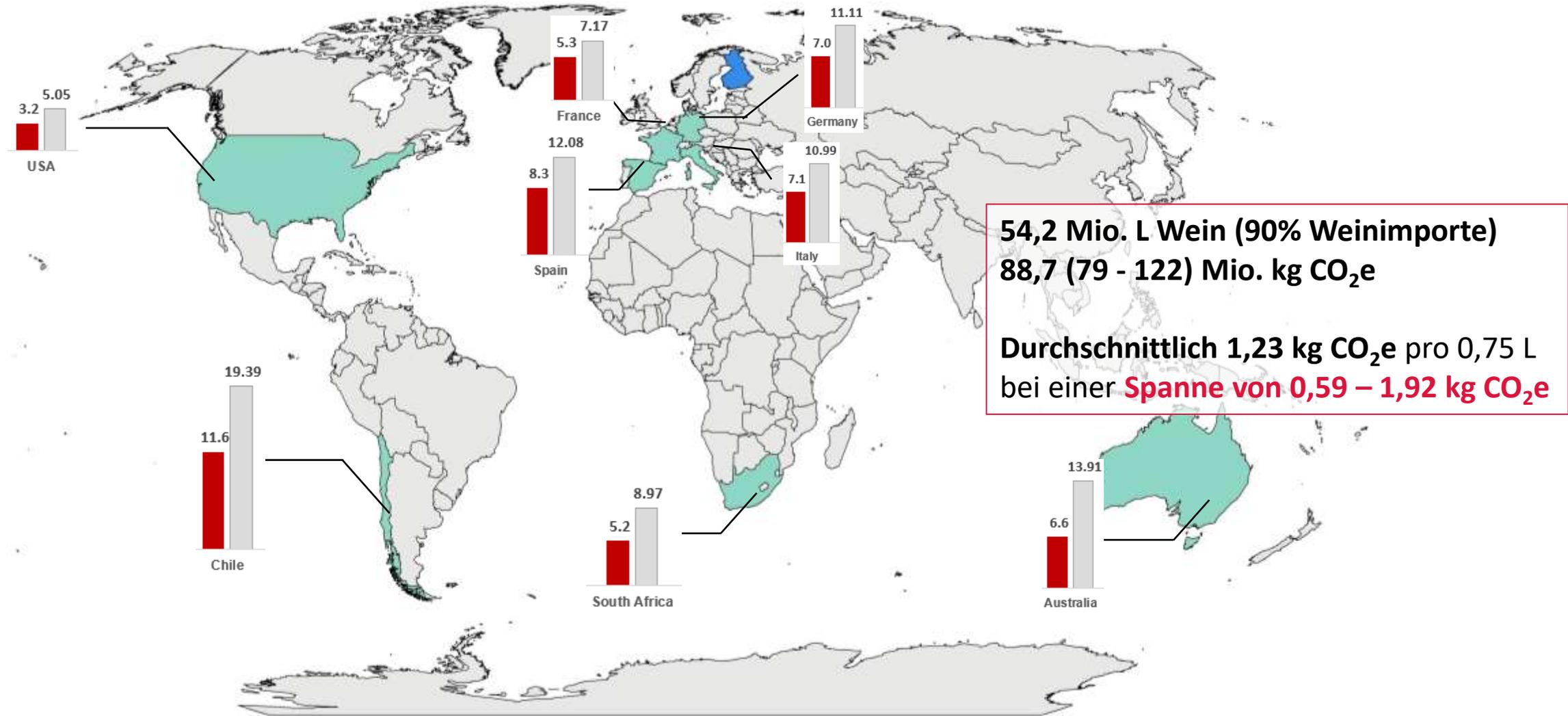
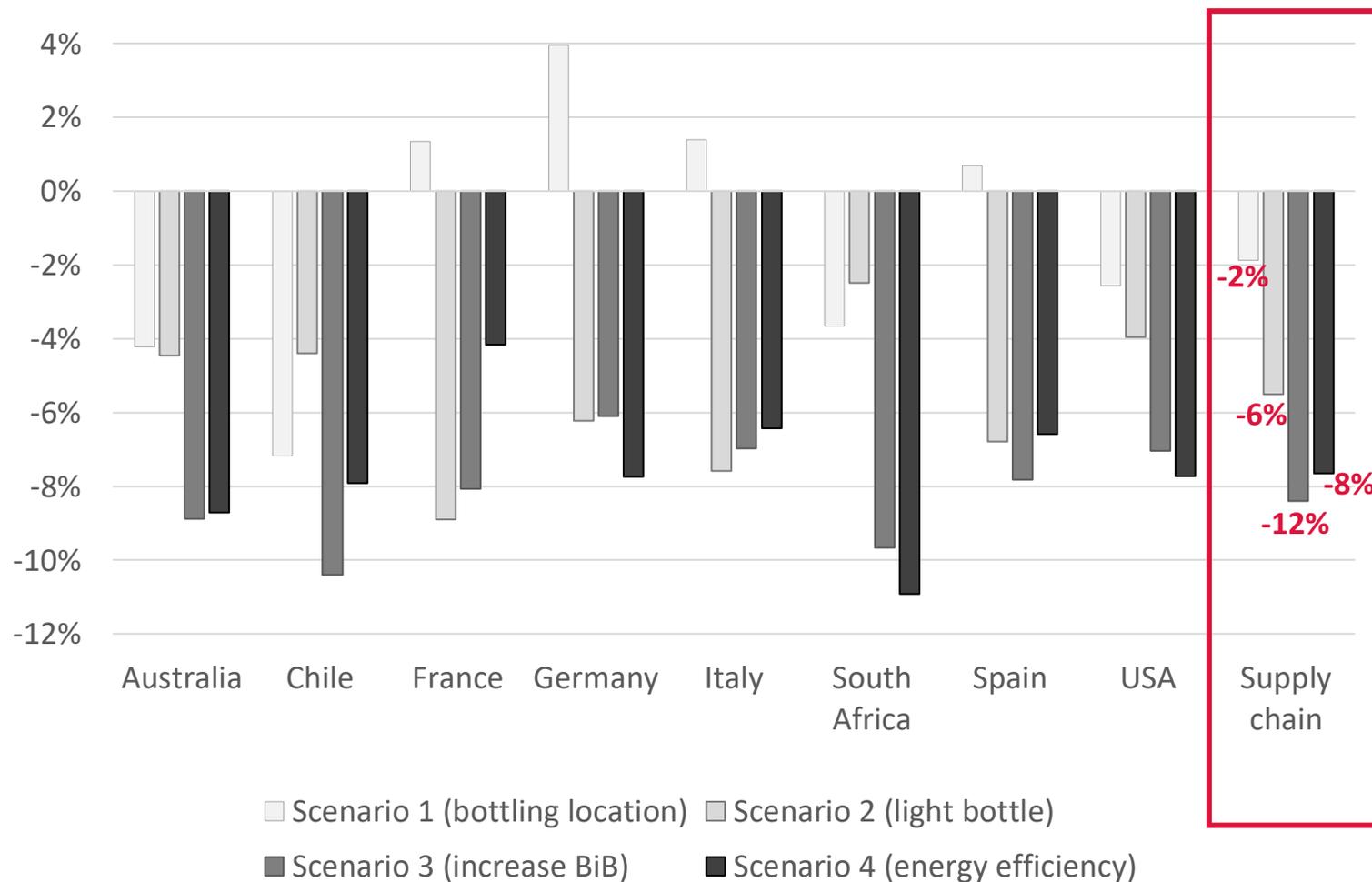


Fig. 4. Finnish wine imports and GHG emissions per country of origin (Source: Own).

# Szenarioanalyse: THG-Reduktion



Szenario 1: Abfüllung nur in Finnland (-2%)

Szenario 2: Gewicht der  $\emptyset$  Glasflasche von 0,480 kg auf 0,380 kg (-6%)

Szenario 3: Anteil von Bag-in-Box (BiB) von 29% auf 59% erhöht (-12%)

Szenario 4: Energieeffizienz in Wertschöpfungskette um 20% gesteigert (-8%)

=> Priorisierung der Mitigationsmaßnahmen auf Ebene der Herkunftsländer sinnvoll

# Wie kann der klimapositive Weinhandel realisiert werden?



# Emissionsreduktion im Weinhandel

- Ebene der **Weinproduzenten**
  - Sehr leichte Glasflaschen, Mehrweg-Glasflaschen, BIB
  - Erneuerbare Energien
- Ebene der **Herkunftsländer**
  - Australien und Südafrika haben extrem hohe THG-Emissionen durch die Stromproduktion – das schlägt sich in den Produkten nieder
  - Produkte aus Frankreich haben tendenziell geringe THG-Emissionen
- Ebene der **Transporte** zu Ihrem Weinhandel
  - Kurze Transportwege (Regionalität, europäische Nachbarn)
  - Seefracht
  - Spedition
- Ebene **Kundenkontakt**
  - Auch hochwertige Weine dürfen in sehr leichten Flaschen und Mehrweg-Flaschen daherkommen!
  - Regionalität



# Fazit klimaneutraler Weinhandel

1. Dringender Handlungsbedarf – die Weinbranche ist vom Klimawandel extrem stark betroffen
2. Dekarbonisierung ist auch für die Weinbranche essentiell
3. Ohne die fundamentale Veränderung der Verpackung kann die Weinbranche nicht klimafreundlich werden
4. Mehrweg-Glasflaschen sind die größte einzelne Klimaschutzmaßnahme in der Produktion
5. Effiziente Transporte zum Endkunden sind ausschlaggebend – Versand per Spedition ist oft die umweltfreundlichere/klimafreundlichere Variante
6. Weinbau ist weniger wichtig – hier ist der größte Einflussfaktor die Erntemenge
7. Kommunikationsbedarf: Bei hoher Qualität wird oft die schwere Glasflasche erwartet. Das muss sich ändern -> Punkte 3.& 4.
8. Klimaneutrale Weine werden immer über den Ausgleich von verbleibenden THG-Emissionen durch Emissionshandel generiert



# Ausblick

Die Weinbranche ist zu einem Maß an Zusammenarbeit aller Akteure aufgefordert, die es in der Form noch nicht gegeben hat.

Die großen Herausforderungen **systemisch & unternehmerisch** angehen:

1. Vision => **Klare Ziele**
2. Niemand kann sie alleine lösen => **Zusammenarbeit & Wertschätzung**
3. Sie sind nicht von heute auf morgen gelöst => **Fokus & Beharrlichkeit**
4. Teilweise ist der „beste Weg“ zum Ziel heute nicht bekannt => **Radikale Bereitschaft zu Lernen**
5. Akzeptieren, dass sich viele Unsicherheiten und Ambiguitäten auch in Zukunft nicht beherrschen lassen => **Mut & Widerstandskraft**



Vielen Dank für Ihre Aufmerksamkeit!

Weitere Informationen, meine wissenschaftlichen Publikationen und sonstige schriftlichen Beiträge finden Sie auf meiner Internetseite zum Thema:  
[www.klimaneutralerwein.de](http://www.klimaneutralerwein.de).

The screenshot displays the website 'Klimaneutraler Wein' with a navigation menu at the top: HOME, ÜBER MICH, RESSOURCEN, KONTAKT, NEWSLETTER. The main header features a green background with the word 'Ressourcen' in white. Below this, the 'Aktuelle Themen' section contains three cards: 1. 'Nachhaltigkeit und Biodiversität im deutschen Weinbau - Handout' (26.06.2021 | DWI Pressereise) with a document icon. 2. 'Strategische Ausrichtung für effektiven Klimaschutz - Klimaschutz in der Weinwirtschaft, Teil 2' (12.06.2021 | DAS DEUTSCHE WEINMAGAZIN) with an open book icon. 3. 'Ökochecker: Umweltsünde Wein! Wie geht nachhaltiger Genuss?' (17.12.2020 | SWR Fernsehen) with a video camera icon. A purple button 'Newsletter abonnieren' is centered below. The 'In Kürze' section features three cards: 1. 'Plan B: Klimaschutz in der Weinbranche' (Q4 2021 | ZDF) with a video camera icon. 2. 'Impulsvortrag - Bund Deutscher Oenologen' (15.11.2021 | BDO-Tagung) with a person and screen icon. 3. 'Impulsvortrag - Ecovin "Feierabend Schluck"' (10.02.2022 | Ecovin) with a person and screen icon. A purple button 'Als Sprecherin für Ihr Event buchen' is centered below. At the bottom, a 'Themenübersicht' section has a grid of buttons: 'Lesenswert', 'FAQ - häufige Fragen', 'TV & Video', 'Radio & Podcast', 'Veröffentlichungen', and 'Vorträge & Events'.