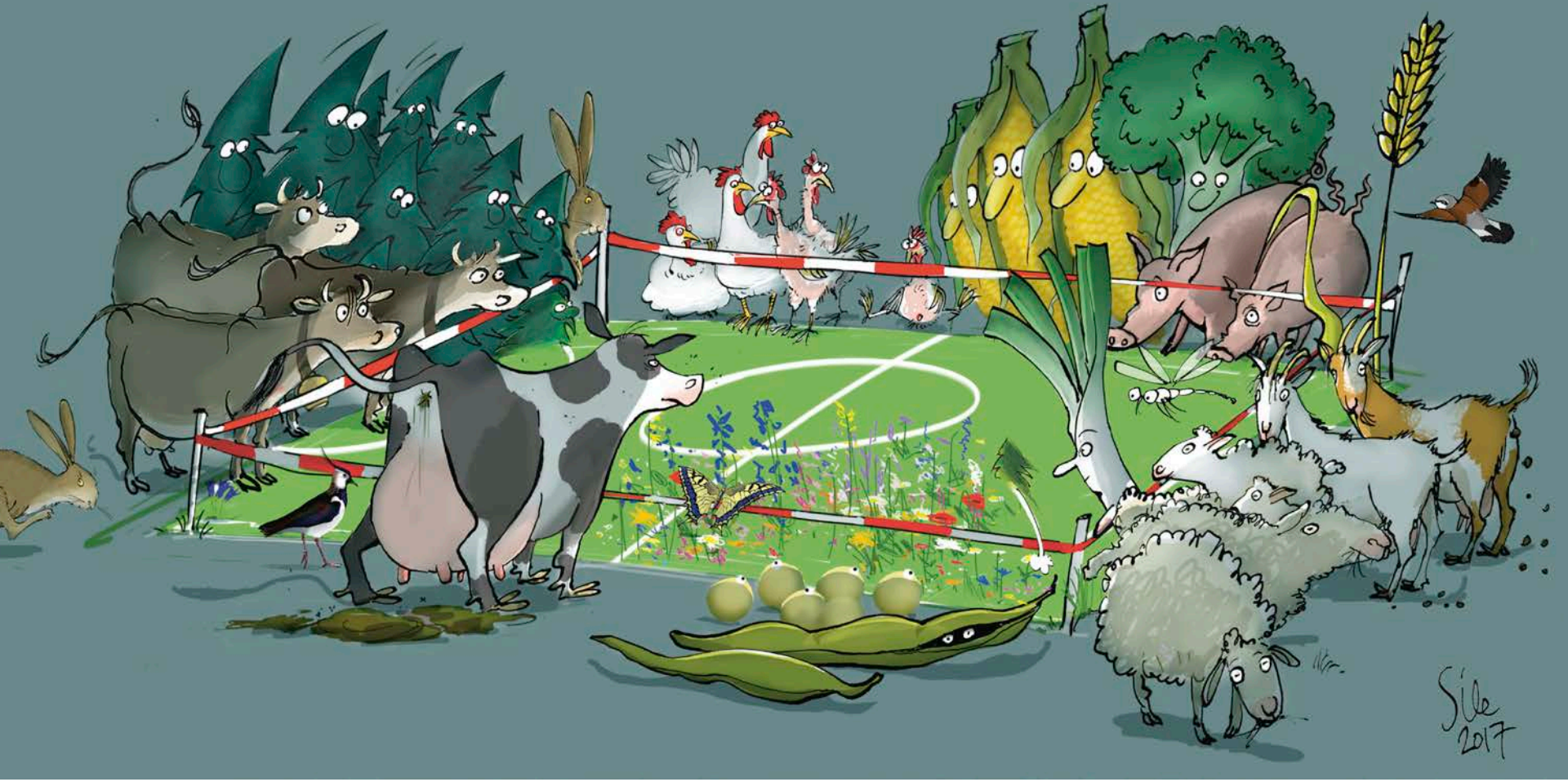
NOVANIMAL

Innovations for a future-oriented consumption and animal production



NOVANIMAL Innovations for a future-oriented consumption and animal production

Priska Baur, reporting results of the NOVANIMAL Team

19th February 2019

FNSNF
Swiss National Science Foundation

Healthy Nutrition and Sustainable Food Production
National Research Programme NRP 69

Content (in green: for discussion)

Part I: Addressing questions of the steering committee

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3. Propositions to reduce animal production and consumption in Switzerland
4. Propositions for future research

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1. Data: from surprising to good to satisfactory
2. Trends and innovations
3. Adapting animal production to local ecosystem boundaries
4. Transdisciplinary field experiment in two university canteens
5. Drivers of innovations
6. Constraints to implementing innovations
7. Solutions to overcome constraints
8. Conclusions
9. Differences between NOVANIMAL and common positions in research

Part I: Addressing questions of the steering committee

Three questions

- Is there a concrete problem in your project's research field that political authorities and/or private actors must address in order to minimise it?
- What are the causes of the problem?
- Based on your results, what should political authorities and/or private actors do specifically, to address the causes of the problem?

(Email Marjory Hunt, 29th January 2019)

1. Preliminary note

- **Propositions** (instead of ~~recommendations~~)
- Main addressees: **private sector** ➔ professionals and strategically responsibles in gastronomy, education & professional training chefs, food processing industry, agriculture
- Propositions for political authorities address **research questions and hypotheses** ➔ propositions for future research concern:
  - agricultural market policies
  - consumer's perception of agricultural production in Switzerland
  - agricultural research and education

2. Hypotheses, conclusions and a contradiction

Empirically evident hypotheses ('facts')

- Animal food production and consumption counts for environment and health
- Animal production in Switzerland not compatible with local ecosystem boundaries
- Animal food products consumption of Swiss population not compatible with local ecosystem boundaries, in Switzerland and abroad
- Animal food products consumption of Swiss population arguably higher than from a public health perspective desirable
- Out-of-home consumption counts for about 50% of total animal food products consumption
- Out-of-home consumption will in the future rather increase

Normative conclusions ('politics')

- Animal production in Switzerland should be reduced.
- Animal food products consumption in Switzerland should be reduced.
- Out-of-home catering is a promising location to reduce animal food products consumption and to practice resource-lighter eating habits

Problem: conclusion to reduce animal production contradicts current goals of agricultural policy, that aim at

- maintaining agricultural production on current level (23300 TJ)
- maintaining a high (hypothetical) degree of self-sufficiency, which is for animal food products 100%

3. Propositions to reduce animal production and consumption in Switzerland

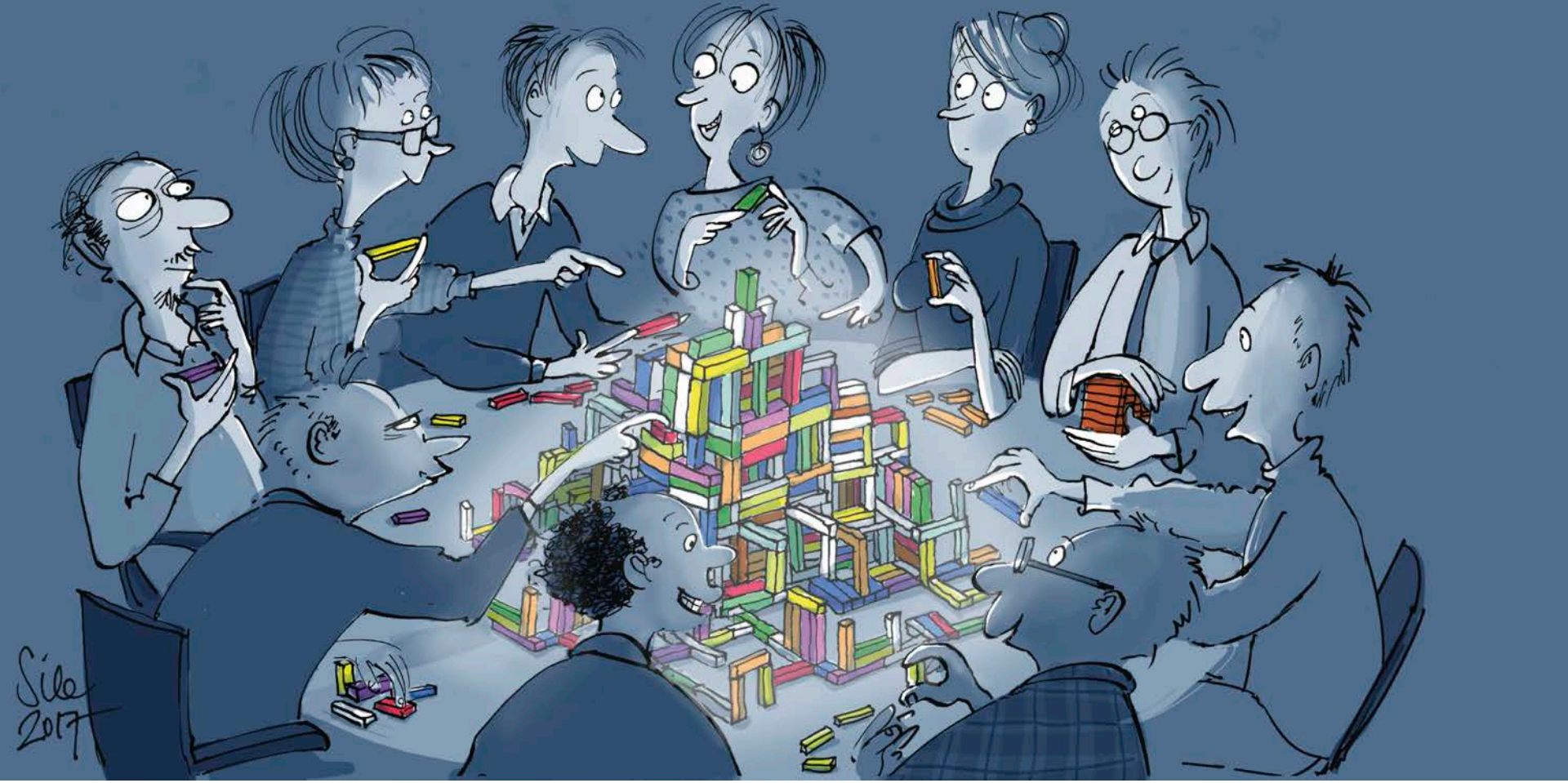
Adapting livestock and production to local ecoystem boundaries

- Cattle: minus 30-40%; milk: minus 40-50%; beef: minus 30-40%
- Pig: minus 45-60%; pigmeat: minus 50-70%
- Poultry: minus > 80%; eggs: minus 80% eggs; chicken: minus > 90%

Increasing significantly supply of meals with less and no animal products in gastronomy, combined with clever marketing

- Vegetarian and vegan meal offer ↗↗
- Culinaric quality of vegetarian and vegan meals ↗↗↗↗
- If animal food products, then ‚less is more' and 'from nose to tail'↗↗

- Enhancing **competencies, skills and motivations** in gastronomy to prepare and recommend veg-meals and meals with less animal food products but of higher ecological and ethological process quality
  - Professionalisation and specialisation in the kitchen team
  - Better training to prepare attractive vegetarian/vegan meals
  - Better training to prepare meals with less animal products: ‘less is more’ and ‘from nose to tail’
  - Improving knowledge about animal food products consumption and the impacts of production and consumption on the environment, on animals and arguably on health
  - Introducing a new specialised apprenticeship for vegetarian/vegan cuisine
  - Reviewing and revising nutritional guidelines of the SGE/SSN



4. Propositions for future research

The following hypotheses relate to the responsibilities of policy makers for healthy nutrition and sustainable food production in Switzerland. They partly contradict widespread beliefs and preanalytic visions. We suggest that they be investigated in-depth in further independent research projects.

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Hypotheses relating to current agricultural policies (I)

- High meat price levels don't reduce significantly meat consumption, but **encourage consumption of lower-priced processed meat**
- High prices for vegetables & fruit **contribute to low vegetables and fruit consumption** in Switzerland
- Border control for fruit/vegetables increases seasonal vegetables & fruit prices and **doesn't promote seasonal consumption**

Hypotheses relating to current agricultural policies (II)

- Market opening:
  - **decreases domestic animal production** and increases ecological & ethological quality of domestic animal products
  - **doesn't increase total meat & dairy consumption** because megatrends are working in opposite direction
  - **doesn't decrease total ecological and ethological process quality** because of growing importance in export countries
  - **decreases quantity of plant production** but promote greater diversity and ecological product quality
  - **increases total consumption and diversity of plant products**

Hypotheses relating to consumer‘s perception

- Consumer triotism (‘Konsumpatriotismus’) – preference of ‘regional’ – food, **encourages meat and dairy products consumption**, because Swiss agriculture is specialised for dairy and meat production
- Positive image of animal husbandry in Switzerland **encourages meat consumption** because meat can be eaten with a clear conscience (‘psychological rebound effect’).

Hypotheses relating to agricultural and food research and education

- **More independent agricultural and food research** in Switzerland would improve research in consumers and food industries interests
- A modernised **agricultural education** would better prepares farmers to gear production to market demand for products ’made in Switzerland’ (high product quality and high ecologically and ethologically process quality)

Part II: Overview of selected NOVANIMAL results and conclusions

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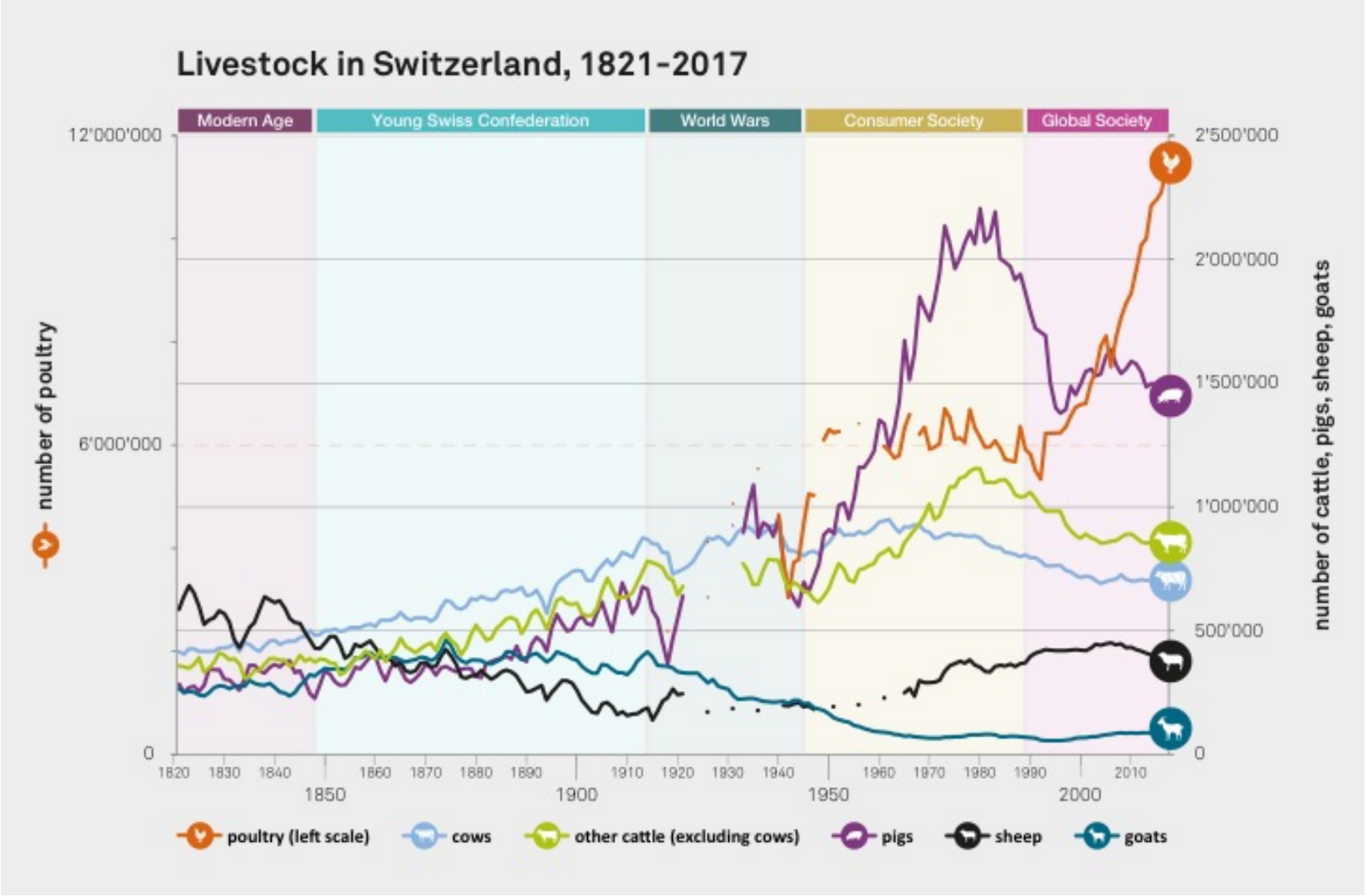
1 Data: from surprising to good to unsatisfactory

1. Surprising: Historical development of livestock in Switzerland 1821-2017
2. Good production data, unsatisfactory consumption data
3. Relatively good, but partly contradictory environmental data
4. Unsatisfactory animal husbandry & animal protection data
5. Health risks of meat and dairy consumption

After WW II: ‚take-off' of pig stock and then poultry



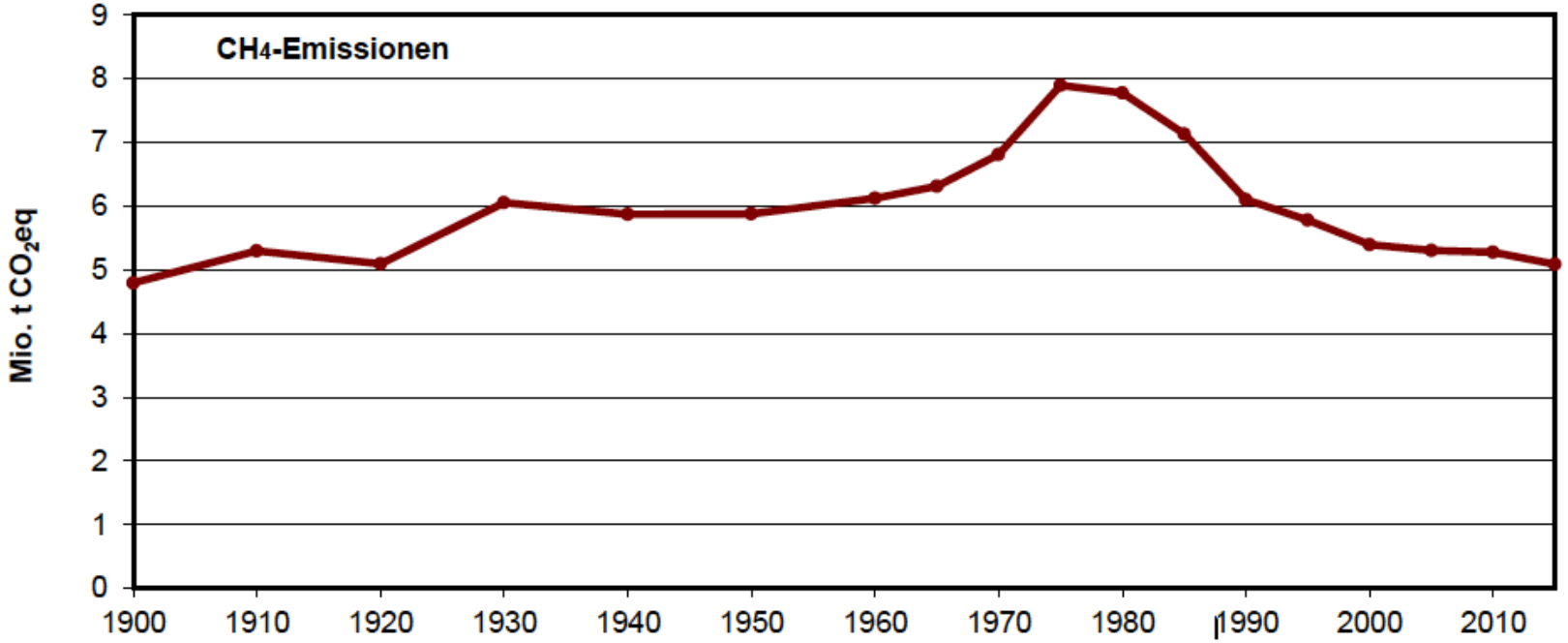
Data: OFS, Historical Statistics (Schluep et al., 2019)
Graphic: Lorenz Rieger, ZHAW

Swiss methane emissions the same as 100 years ago

1910: 5.3 million tons CO_2-eq, 2015: 5.08 million tons CO_2-eq

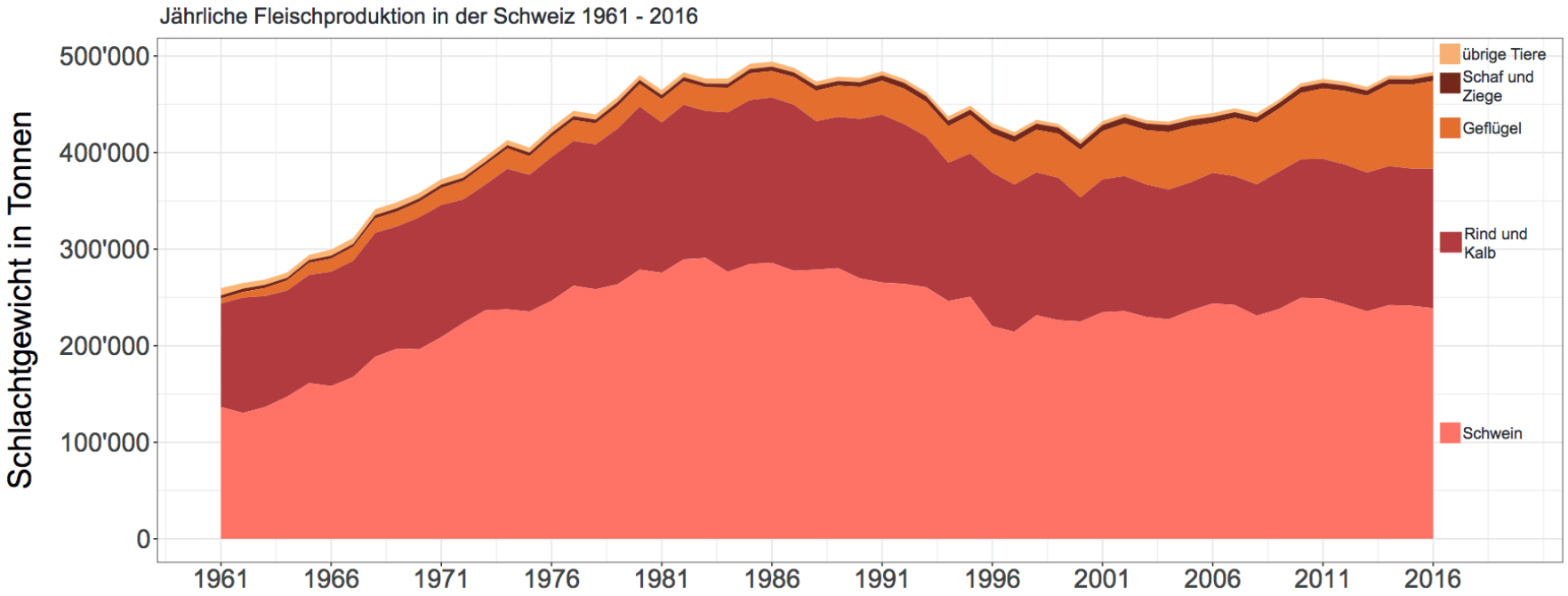
Total cattle: 1914: 1.65 million, 2015: 1.55

Total methane emissions in Switzerland, CO_2-eq, 1900 - 2015



Source: FOEN (2017; pp 57)

Swiss meat production growing again



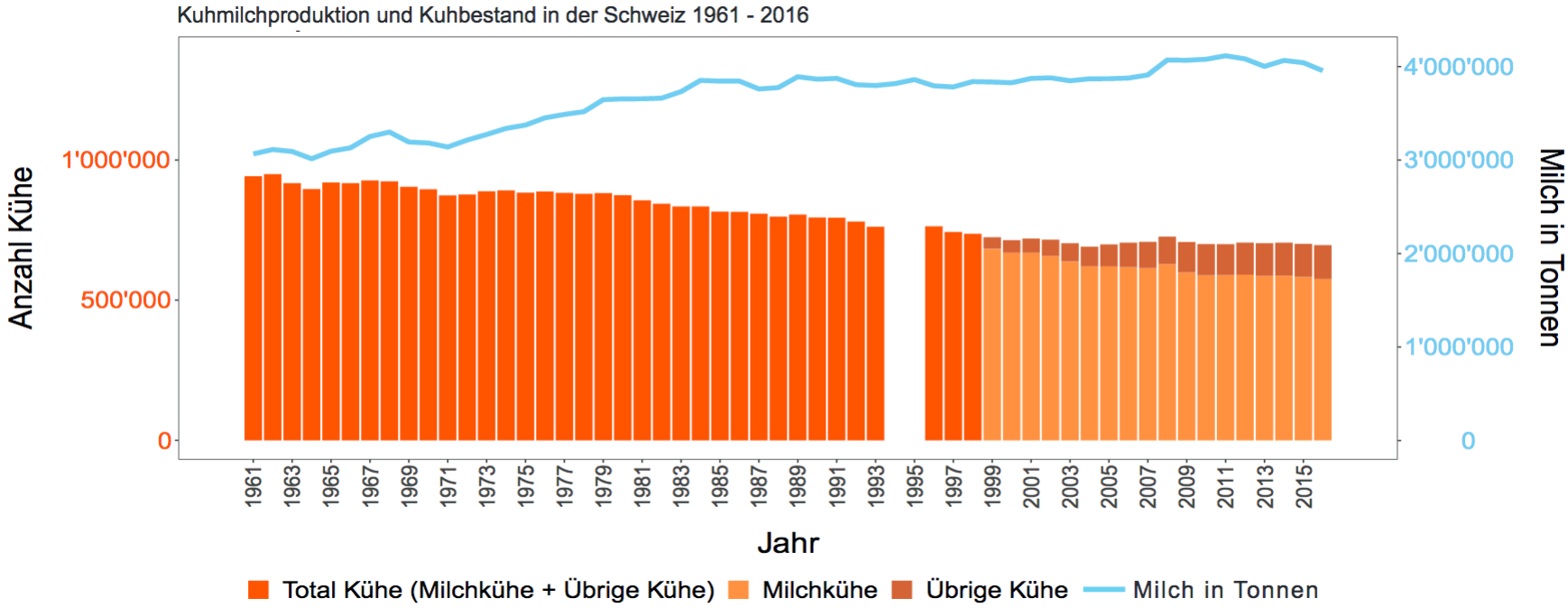
Data: FAO (2018)

How much meat is ‘consumed’ in Switzerland on average per capita and year?

A. ☐ 40,5 kg B. ☐ 51,4 kg C. ☐ 57,1 kg D. ☐ 72,3 kg E. ☐ 80,3 kg

Source: Baur & von Rickenbach (2018)
https://novanimal.ch/wp-content/uploads/2018/10/Faktenblatt_Fleisch-1.pdf

Fewer cows producing more milk



Production data: FAO (2018)
Livestock data: 1961-1993 Historical statistics (2012); 1996-2016 OFAG (2016)

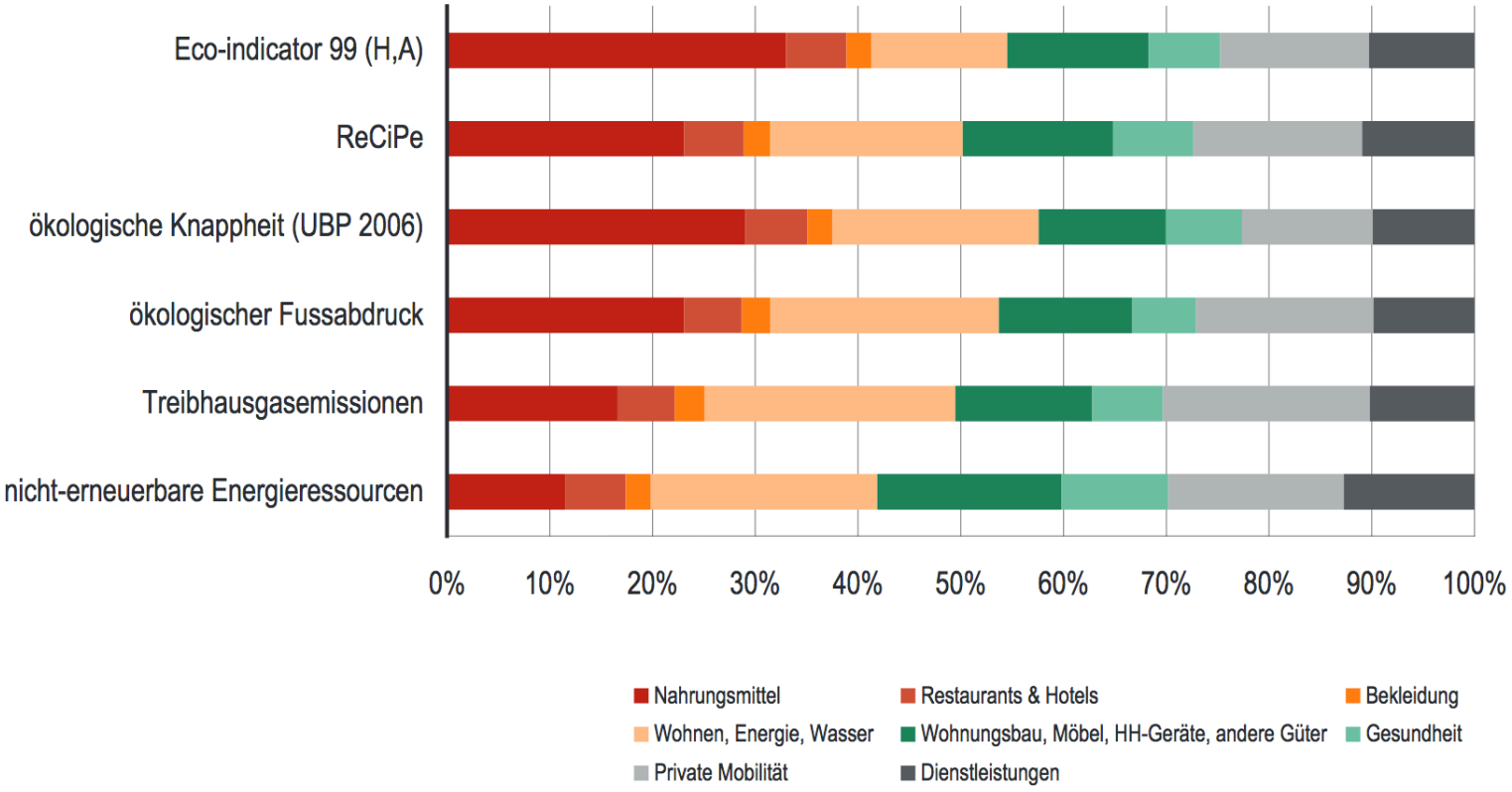
How much milk and dairy products are ‘consumed’ in Switzerland on average per capita and year?

A. ☐ 77.7 kg B. ☐ 115.3 kg C. ☐ 246.6 kg D. ☐ 319 kg

Source: Baur, Egeler, & von Rickenbach (2018)
https://novanimal.ch/wp-content/uploads/2018/10/Faktenblatt_Milchprodukte-1.pdf

Nutrition causes between 15 and 30 percent of environmental pollution.

Contribution of different areas of consumption to total environmental impact – comparison of six methods



Source: Jungbluth et al. (2011)

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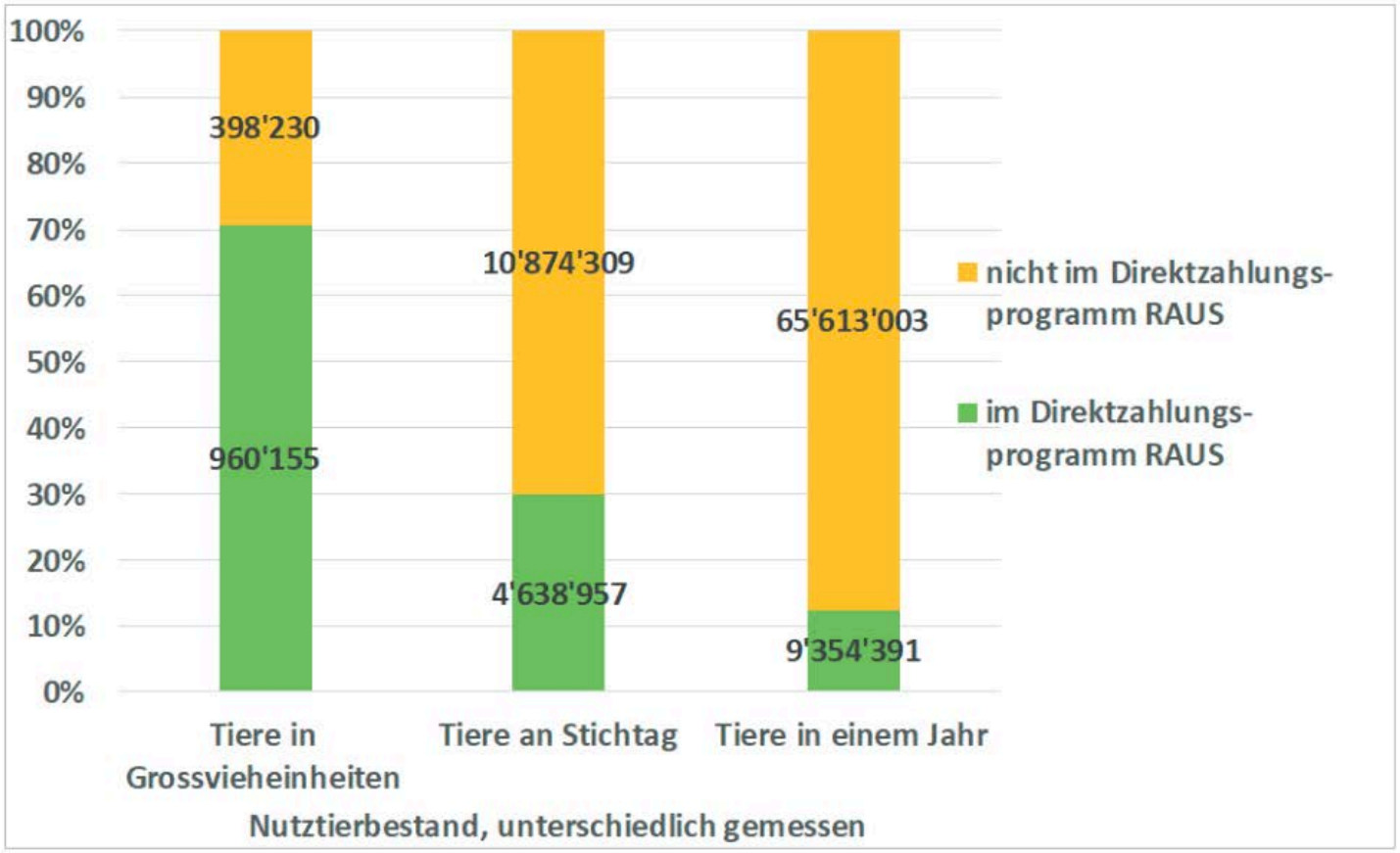
According to advertising, 75% of farm animals are kept in the direct payment program ‘regular stay outdoor’ RAUS; according to our calculations, it is 70%, 30% or 12% of farm animals in Switzerland

Share of livestock in the RAUS direct payment programme (2015)



Data: Proviande (livestock) and OFAG (animals in RAUS)
Calculations: Baur (2017)

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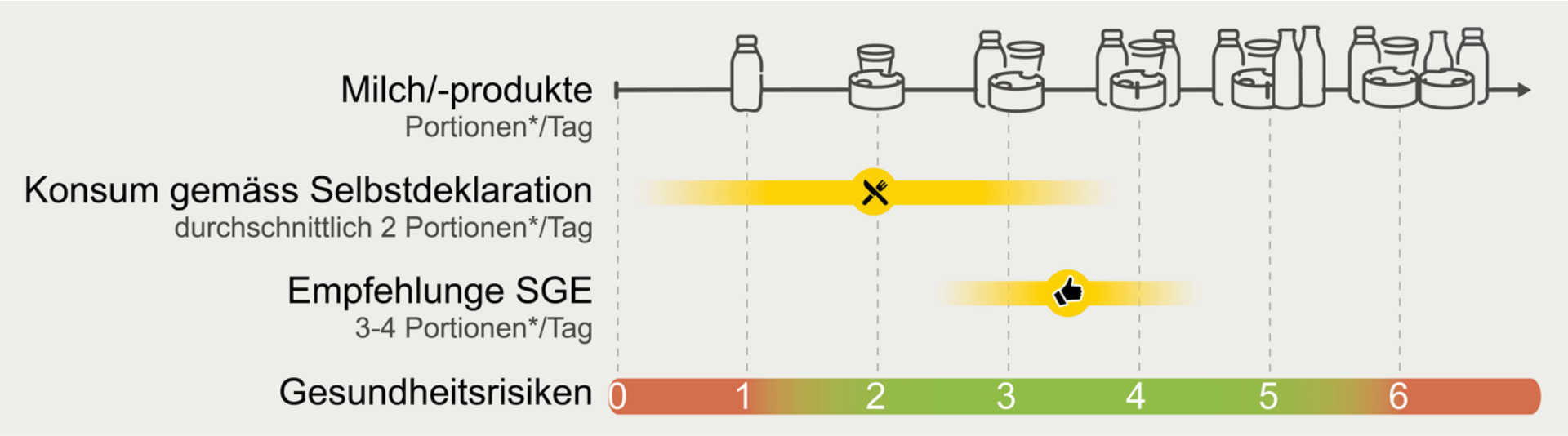
Average consumption of dairy products in Switzerland is in the ‘green’ range



*Eine Portion entspricht 200 ml Milch oder 150-200 g Joghurt/Gewürzkäse/Hüttenkäse/andere Milchprodukte oder 30 g Hart- oder Schnittkäse oder 60 g Weichkäse.

Quellen: BLV (2017a), Krieger (2018), SGE (o. J. a)

durchschnittlicher Konsum CH: 2 Portionen*/Tag (menuCH, 2014/2015)

Empfehlung SGE: 3 - 4 Portionen*/Tag

Gesundheitsrisiken (Epidemiologie): im grünen Bereich eher gesundheitsfördernd, im roten Bereich eher gesundheitsschädigend (Krieger & Fäh, 2018)

Source: https://novanimal.ch/wp-content/uploads/2018/12/2018_krieger_novanimal_faktenblatt.pdf

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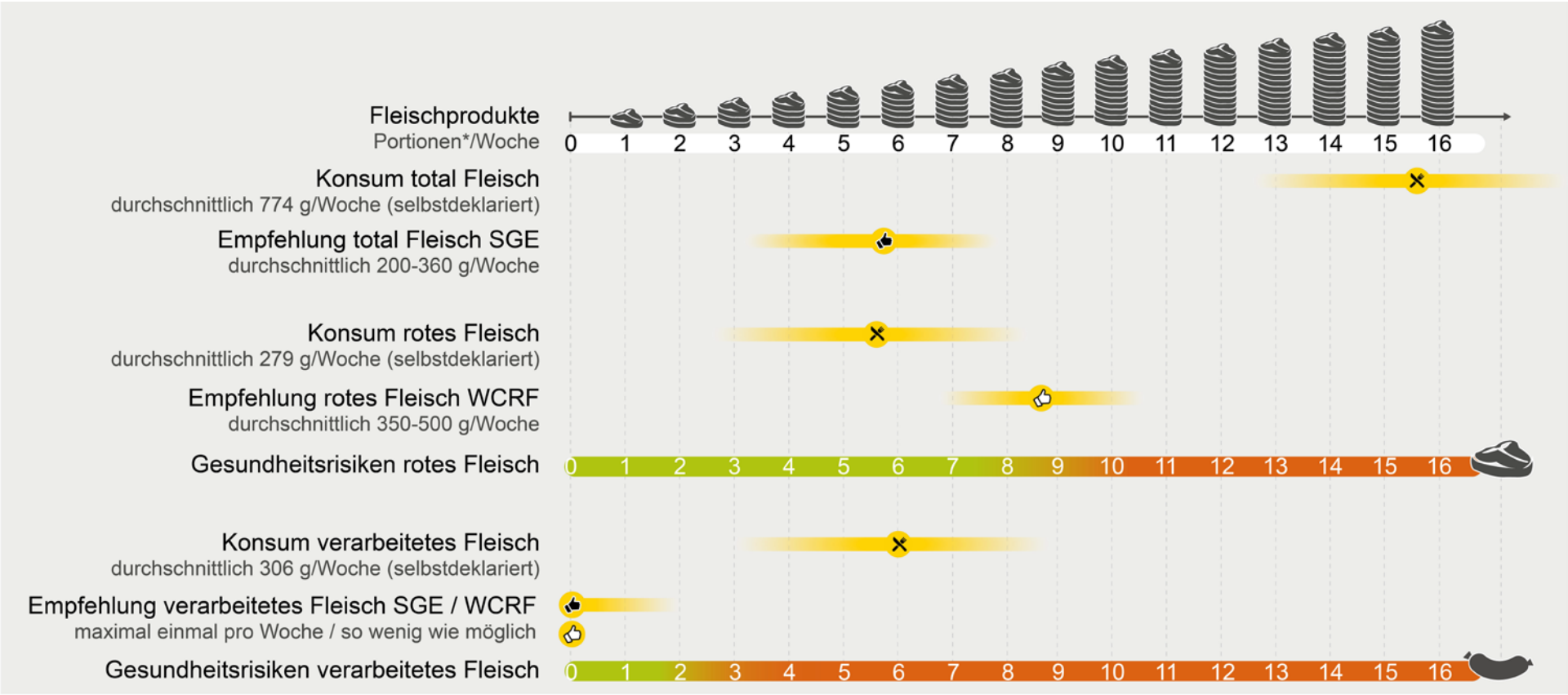
Average consumption total red meat in acceptable range, processed meat in ‘deep red’-range.



*In dieser Abbildung entspricht eine Portion 50g Fleisch.

Quellen: BLV (2017b), Krieger (2018), SGE (o. J. b), WCRF (2018)

Konsum CH (menuCH, 2014/2015) Empfehlungen WCRF Empfehlungen SGE

Gesundheitsrisiken (Epidemiologie): im grünen Bereich eher gesundheitsfördernd, im roten Bereich eher gesundheitsschädigend (Krieger & Fäh, 2018)

Source: https://novanimal.ch/wp-content/uploads/2018/12/2018_krieger_novanimal_faktenblatt.pdf

How much meat and dairy products are healthy?

This seems no new discussion.

‘Anyone who puts meat and cheese on the index for healthy people is our opponent. We fight him and do not pact with him!’

Ernst Laur (1871-1964), secretary general and director of the Swiss Farmers Association (Schweizer Bauernverband), ETH professor

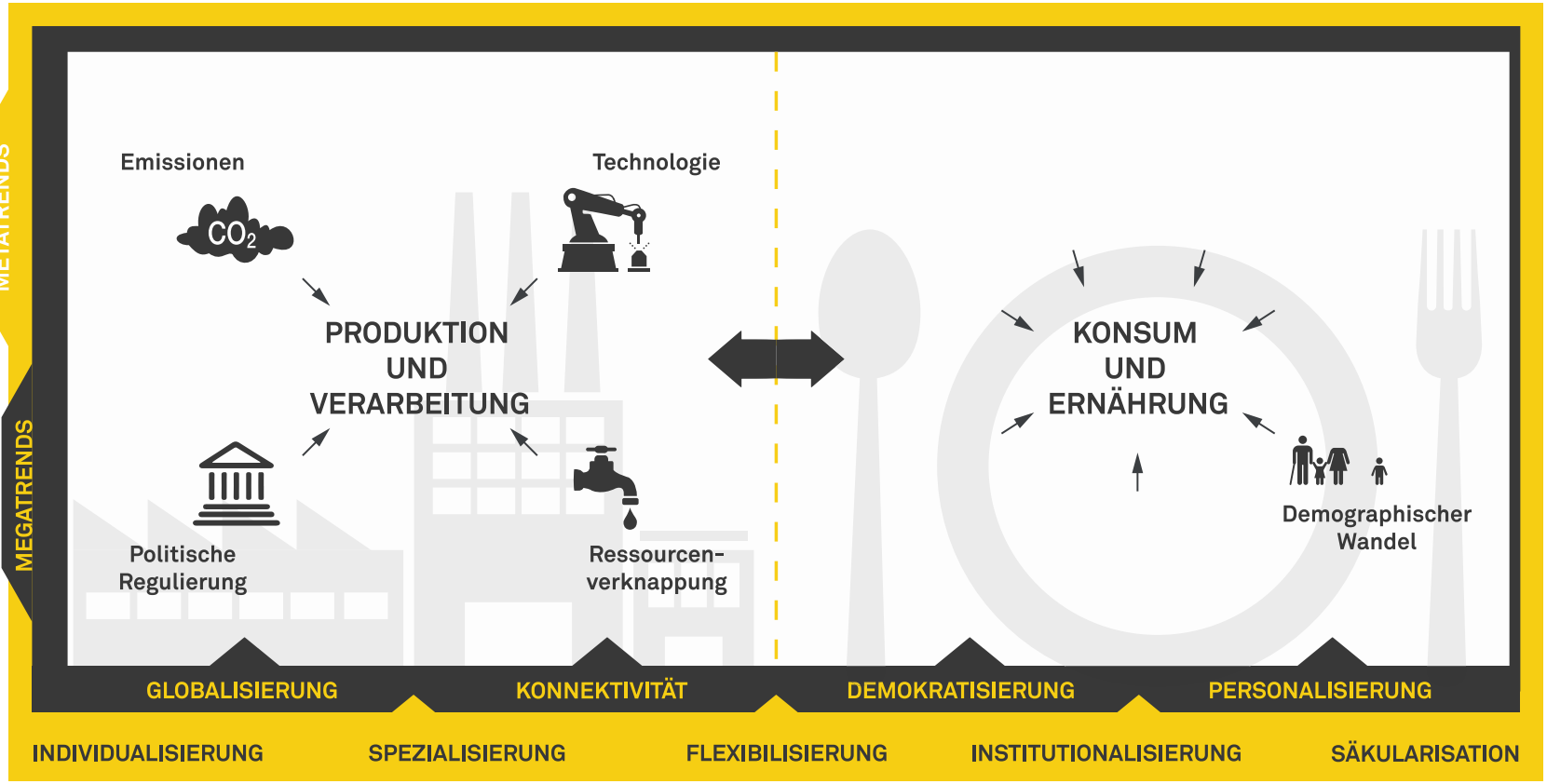
Source: https://www.swissinfo.ch/ger/gesellschaft/dr-mueesli_vor-150-jahren-wurde-ernaehrungsreformer-bircher-geboren/43462498

2 Trends and innovations

Trends by temporal range

Source: Baur, Schluep, & Minsch (2017)
Graphic: Lorenz Rieger, ZHAW

Meta- and Megatrends relevant to nutrition



Source: Baur, Schluep, & Minsch (2017)
Graphic: Lorenz Rieger, ZHAW

NOVANIMAL innovations

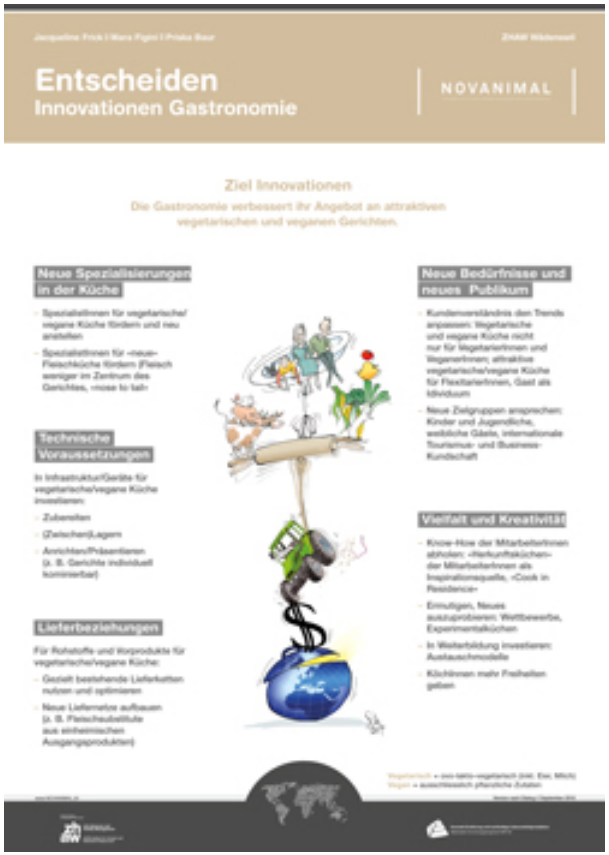
In NOVANIMAL, an innovation is defined as

- a **change compared to current practice**,
- along and/or around food supply chains,
- which is **consciously** carried out by actors and
- where an improvement in environmental, health and/or animal ethical aspects can be expected.


Produzieren
Innovationen Landwirtschaft
NOVANIMAL
Ziel Innovationen
Ressourceneffiziente standortangepasste Milch- und Fleischproduktion unter Einhaltung der Regenerationsfähigkeit von Boden, Wasser und Biodiversität.
Herdenmanagement Rindvieh
Futtermanagement Rindvieh
Technologiebasierte Freilandhaltung Rindvieh
Nährstoffmanagement Schweine und Geflügel
Landschaft & Biodiversität
Futtermanagement Schweine und Geflügel
FiBL
Agroscope


Verarbeiten
Innovationen Cleantech
NOVANIMAL
Ziel Innovationen
Effizienter Einsatz von Energie, Wasser und Rohstoffen bei der Verarbeitung von Milch, Fleisch und pflanzlichen Substituten.
Energie
»Betrieb als Kraftwerk«
Wasser
»Messen und verbessern«
Produktverluste
»Wertstoffe innovativ nutzen«
Abfälle
»Vermeiden - verwerten«
Organisation
»Cleantech im Alltag leben«


Priska Baur | Gian-Andrea Egeler
ZHAW Wädenswil
Anbieten
Innovationen Gastronomie
NOVANIMAL
Ziel Innovationen
Gäste essen auswärts mehr pflanzliche und weniger tierische Nahrungsmittel als heute.
Qualität
Genussvolle, vielfältige und kreative Gerichte
Nicht nur Fleischsubstitute
«Authentische» vegetarische/vegane Gerichte
Quantitatives Angebot
Substanzielle Erhöhung Anzahl und Anteil vegetarische/vegane Gerichte
Buffet mit grosswahrhaftlich vegetarischen/veganen Komponenten
Konkretes quantitatives Angebot an Gästen ausrichten
Beschriftung vegane/vegetarische Gerichte
Appetit machende kreative Beschreibungen
«Geschichten erzählen»
Nicht als vegetarisch/vegan anpreisen
Vegetarische/vegane Gerichte diskret und sachlich deklarieren, zusammen mit anderen Inhaltsstoffen
Weniger ist mehr
«Unsichtbare» tierische Nahrungsmittel aus Rezepten entfernen/reduzieren
«From nose to tail»
Fleisch nicht im Zentrum, sondern als «Gewürz»
Tierische Nahrungsmittel aus artgerechter Zucht und Haltung
Positionierung an Menü-Ausgabe
(Gemeinschaftsgastronomie)
Keine vegetarische/vegane Menü-Linien
Vegetarische/vegane Gerichte über alle Menü-Linien anbieten
Positionierung auf Menü-Karte
(Restaurants)
Keine separaten «Abteilungen» für Fleisch, Fisch und vegetarische/vegane Gerichte
Verteilung vegetarisches/veganes Angebot über gesamte Menü-Karte


Jacqueline Frick | Mara Figini | Priska Baur
ZHAW Wädenswil
Entscheiden
Innovationen Gastronomie
NOVANIMAL
Ziel Innovationen
Die Gastronomie verbessert ihr Angebot an attraktiven vegetarischen und veganen Gerichten.
Neue Spezialisierungen in der Küche
Spezialitätinnen für vegetarische/vegane Küche fördern und neu anstellen
Spezialitätinnen für «neue» Fleischküche fördern (Fleisch weniger im Zentrum des Gerichtes, «nose to tail»
Technische Voraussetzungen
In Infrastruktur/Geräte für vegetarische/vegane Küche investieren:
Zubereiten
(Zwischen)Lagern
Anrichten/Präsentieren
(z. B. Gerichte individuell kombinierbar)
Lieferbeziehungen
Für Rohstoffe und Vorprodukte für vegetarische/vegane Küche:
Gezielt bestehende Lieferketten nutzen und optimieren
Neue Lieferanten aufbauen (z. B. Fleischsubstitute aus einheimischen Ausgangsprodukten)
Neue Bedürfnisse und neues Publikum
Kundenverständnis den Trends anpassen: Vegetarische und vegane Küche nicht nur für Vegetarierinnen und Veganerinnen; attraktive vegetarische/vegane Küche für Flexitarierinnen, Gast als Individuum
Neue Zielgruppen ansprechen: Kinder und Jugendliche, weibliche Gäste, internationale Tourismus- und Business-Kundschaft
Vielfalt und Kreativität
Know-How der Mitarbeiterinnen abholen: «Herkunftsküchen» der Mitarbeiterinnen als Inspirationsquelle, «Cook in Residence»
Ermutigen, Neues auszuprobieren: Wettbewerbe, Experimentalküchen
In Weiterbildung investieren: Austauschmodelle
Küchinnen mehr Freiheiten geben


Sonja Trachsel | Flavio von Rickenbach
ZHAW Wädenswil
Lernen
Innovationen Gastronomie
NOVANIMAL
Ziel Innovationen
Köche, Köchinnen und Restaurationsfachleute sind motiviert und kompetent, attraktive vegetarische und vegane Gerichte zu kochen und zu empfehlen.
Fertigkeiten in Grundbildung
Platz in Theorie und Praxis für vegetarische Küche
Platz in Theorie und Praxis für vegane Küche
Mindestanforderungen für Lehrbetriebe bzgl. vegetarischem & veganem Angebot
Sensibilisierung Ausbildnerinnen in Lehrbetrieben
Aufwertung Lehre
Von 3- zu 4-jähriger Lehre Köchin/Koch EFZ
Von 3- zu 4-jähriger Lehre Restaurationsfachmann/-frau EFZ
Zusatzlehre vegetarischer/veganer Koch EFZ (analog Diätkoch/kochin EFZ)
Zusatzmodul Nachhaltigkeit
Gemeinsame überbetriebliche Kurse für Köche/Köchinnen und Restaurationsfachleute
Mehr Austauschprogramme für Lernende im In- und Ausland
Hintergrundwissen in Grundbildung
Vertiefte Kenntnisse:
Zusammenhänge zwischen Nahrungsmittelproduktion und Umwelt
Tierhaltung, Tierschutz und Tierwohl
Vielfalt Esskulturen und internationale Ernährungstrends
Spezialisierung Berufsbildung
Auf vegetarische & vegane Küche spezialisierte Lehrerinnen
Neue Lehre: vegetarische & vegane Köchin/Koch EFZ
Höhere Berufsprüfung: Chefkoch/-köchin vegetarische und vegane Küche
Bildungspläne & Lehrmittel
Mehr vegetarische & vegane Rezepte
Mehr Wissen:
Nahrungsmittelproduktion und Umwelt
Nahrungsmittelproduktion und Tierhaltung, Tierschutz und Tierwohl
Esskulturen und internationale Ernährungstrends
Lehrabschlussprüfung:
Vegetarisches oder veganes Menü ins Qualifikationsverfahren aufnehmen

NOVANIMAL dialogue with professionals

10th September 2018

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3 Adapting animal production to local ecosystem boundaries

8 zones with different local ecosystem boundaries

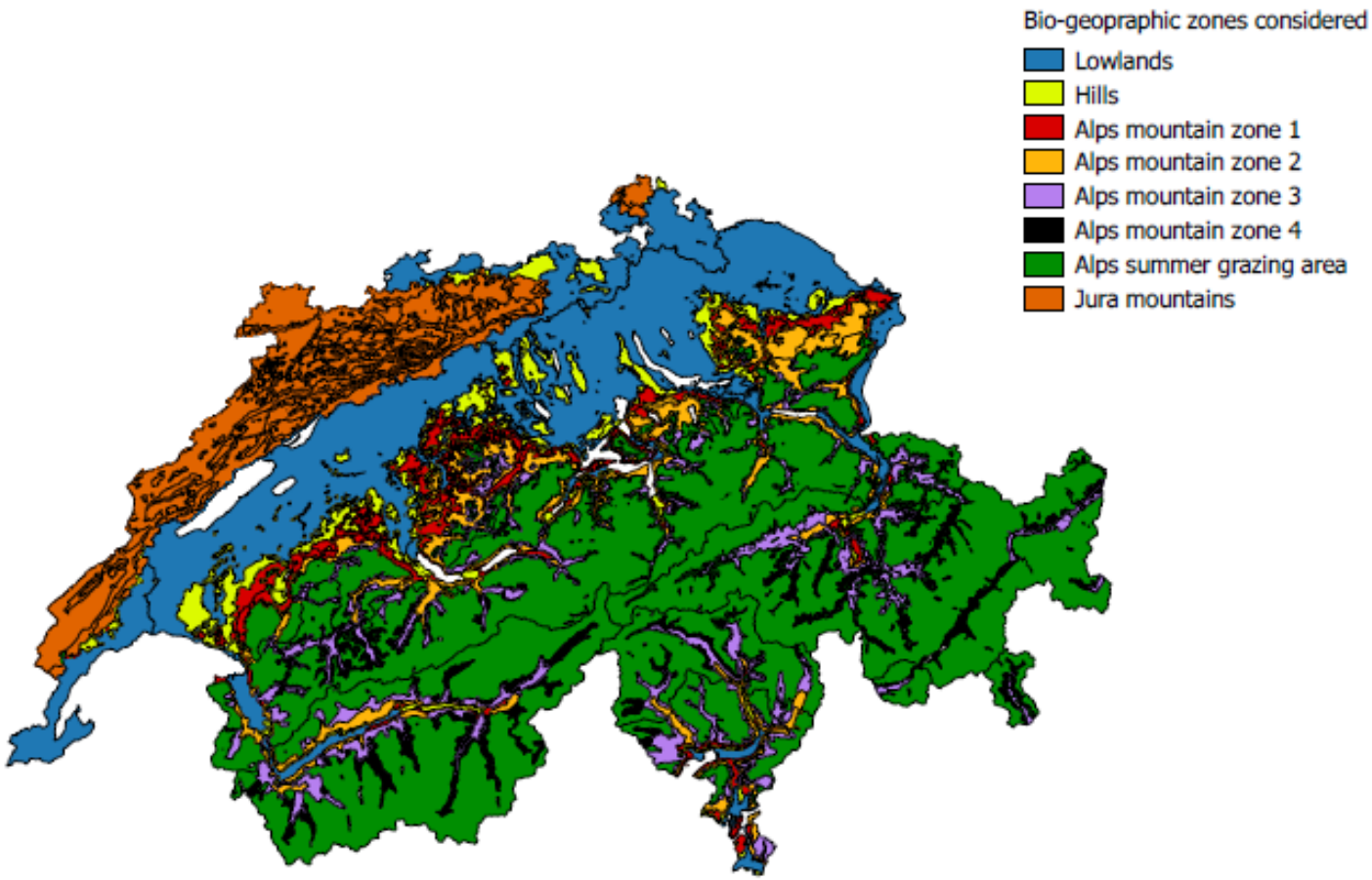


Figure: Meier & Moakes (in prep.)

Today's production isn't adapted to local ecosystem boundaries

Assessment of how today's production is adapted to local ecosystem boundaries

Agricultural N depositions below zone-specific CNL range
Agricultural N depositions within zone-specific CNL range
Agricultural N depositions above zone-specific CNL range
(CNL: critical nitrogen load)

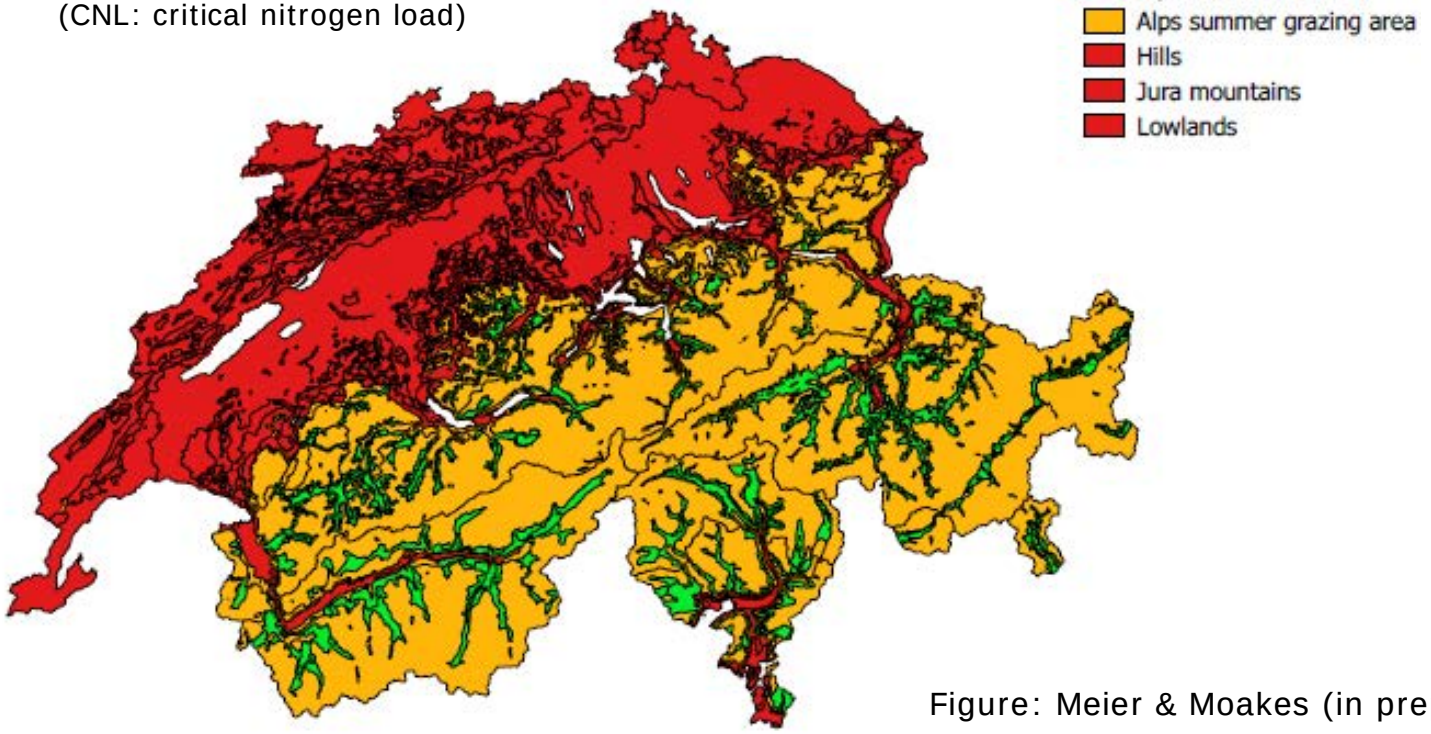


Figure: Meier & Moakes (in prep.)

Innovation options to adapt animal production to local ecosystem boundaries

Option A: 100% organic and cleaner production (100% Organic and CP)

Agriculture

- Nationwide conversion to organic production according to Bio Suisse guidelines (Guidelines: 2019).
- Ruminants can receive up to 10% concentrated feed.
- All feed must be produced in Switzerland.

Food processing

- Measures to minimise greenhouse gas emissions.
- Fossil fuels are replaced by renewable energy sources.
- A combination of solar energy and energy from biomass (e.g. wood pellets) are used to provide electricity and heat.

‘100% organic and cleaner production’ avoids N depositions above critical limits

Assessment of how ‘100% Organic and CP’ is adapted to local ecosystem boundaries

Agricultural N depositions below zone-specific CNL range
Agricultural N depositions within zone-specific CNL range
Agricultural N depositions above zone-specific CNL range
(CNL: critical nitrogen load)

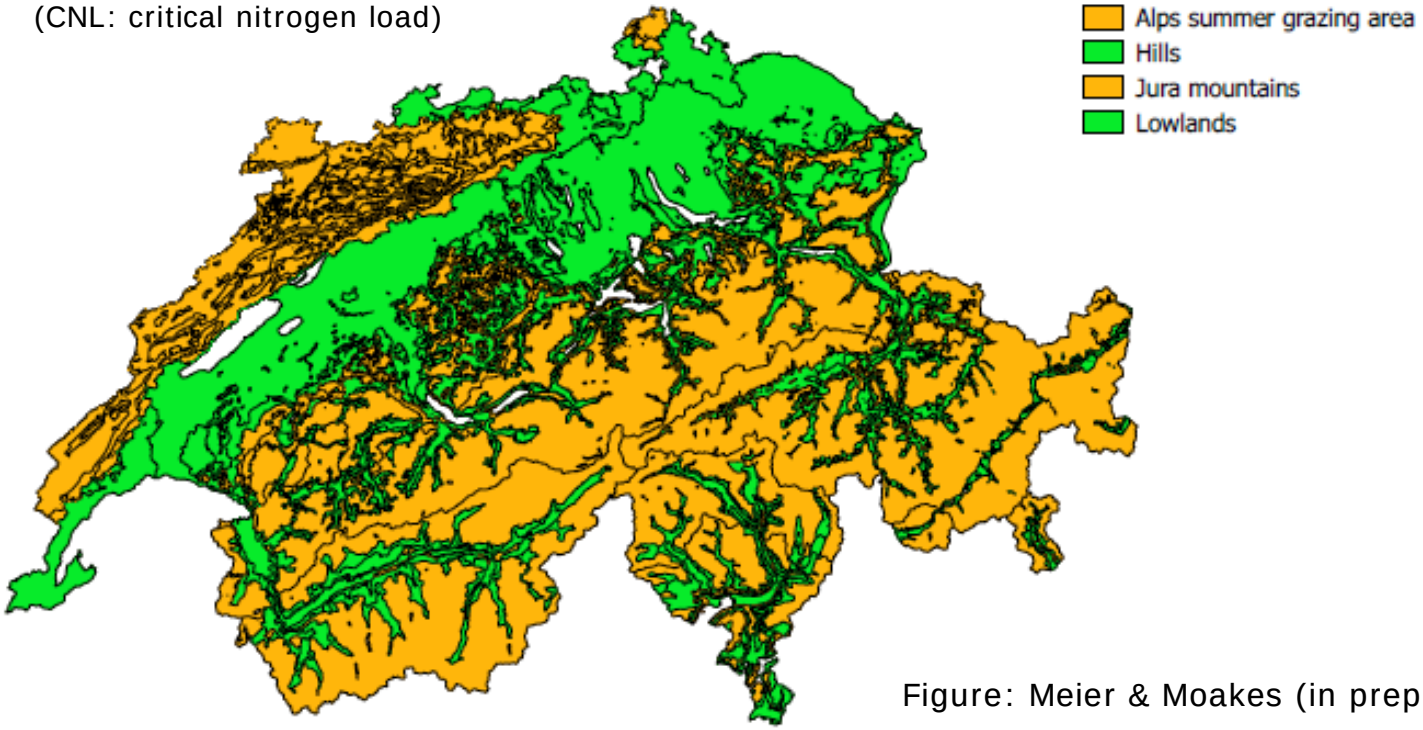


Figure: Meier & Moakes (in prep.)

Innovation options to adapt animal production to local ecosystem boundaries

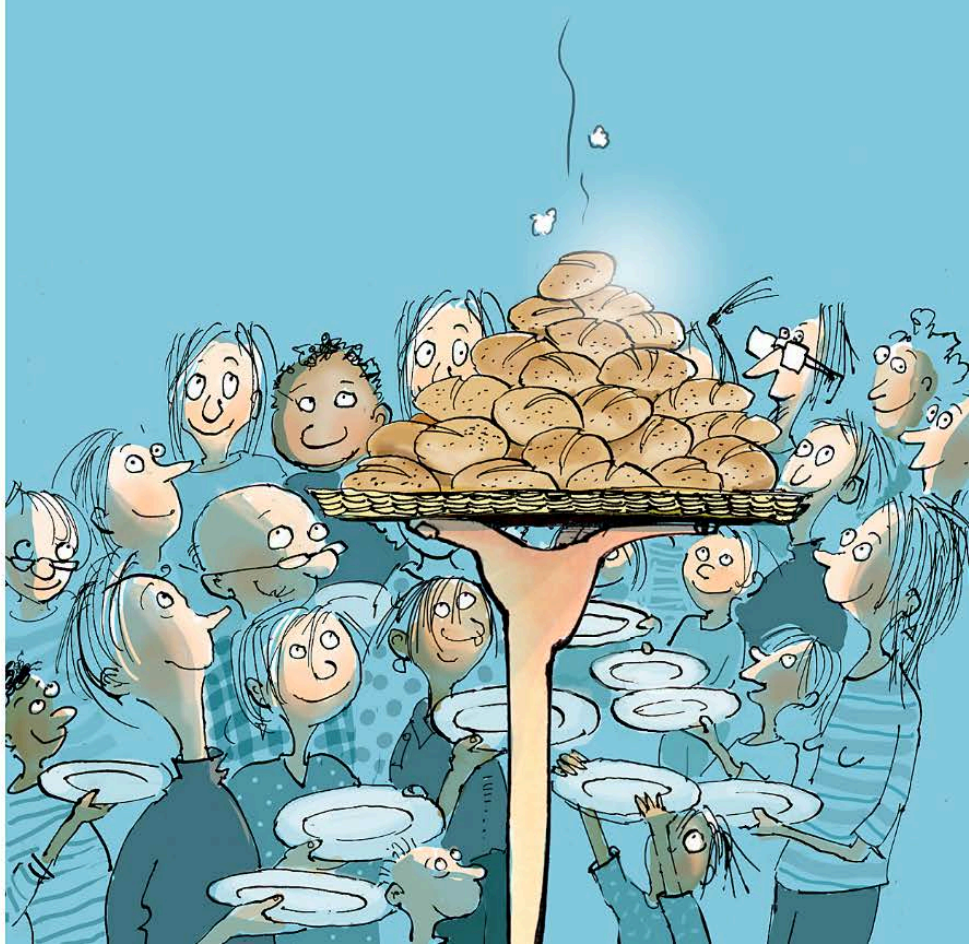
Option B: Feed no food (FnF)

Agriculture

- Ruminants fed only by roughage (grassland-based husbandry systems without concentrated feed).
- Feed and herd management adapted to this (e.g. stocking densities).
- Pig feeding based on whey from milk processing and other by-products of food industry.
- Poultry fed with by-products of food industry, especially press cakes from sunflower oil production.

Food processing

- Additional measures to make use of by-products in animal production, in particular whey from milk processing
- Fresh whey is evaporated and spray-dried



Feed no food

‚Feed no food' leads to N depositions below critical limits, except in the Jura

Assessment of how 'FnF' is adapted to local ecosystem boundaries

Agricultural N depositions below zone-specific CNL range
Agricultural N depositions within zone-specific CNL range
Agricultural N depositions above zone-specific CNL range
(CNL: critical nitrogen load)

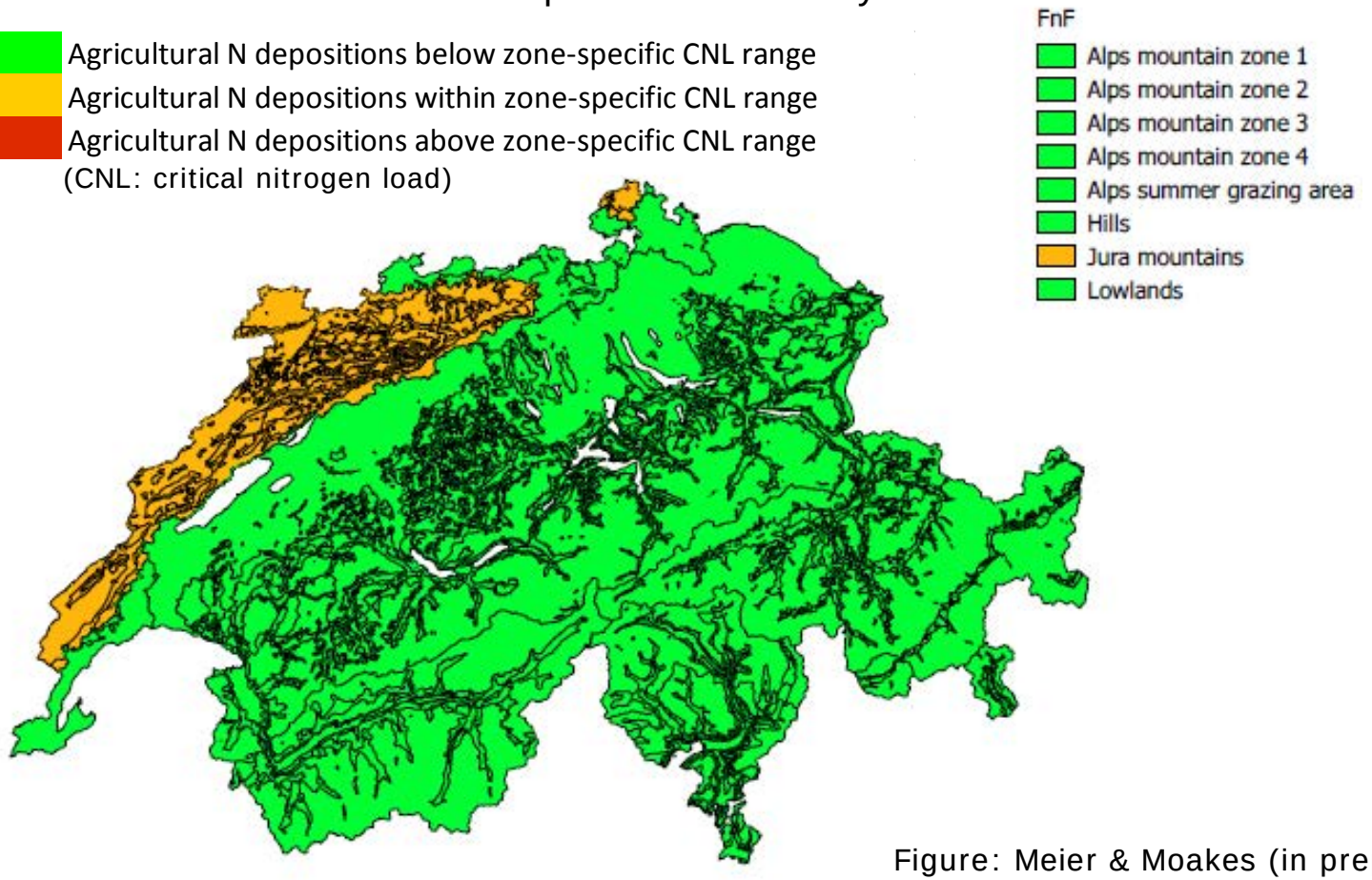


Figure: Meier & Moakes (in prep.)

If meat consumption of Swiss population stays the same, adapting meat production to local ecosystem boundaries increases environmental impact abroad.

Swiss meat production today and adapted to local ecosystem boundaries

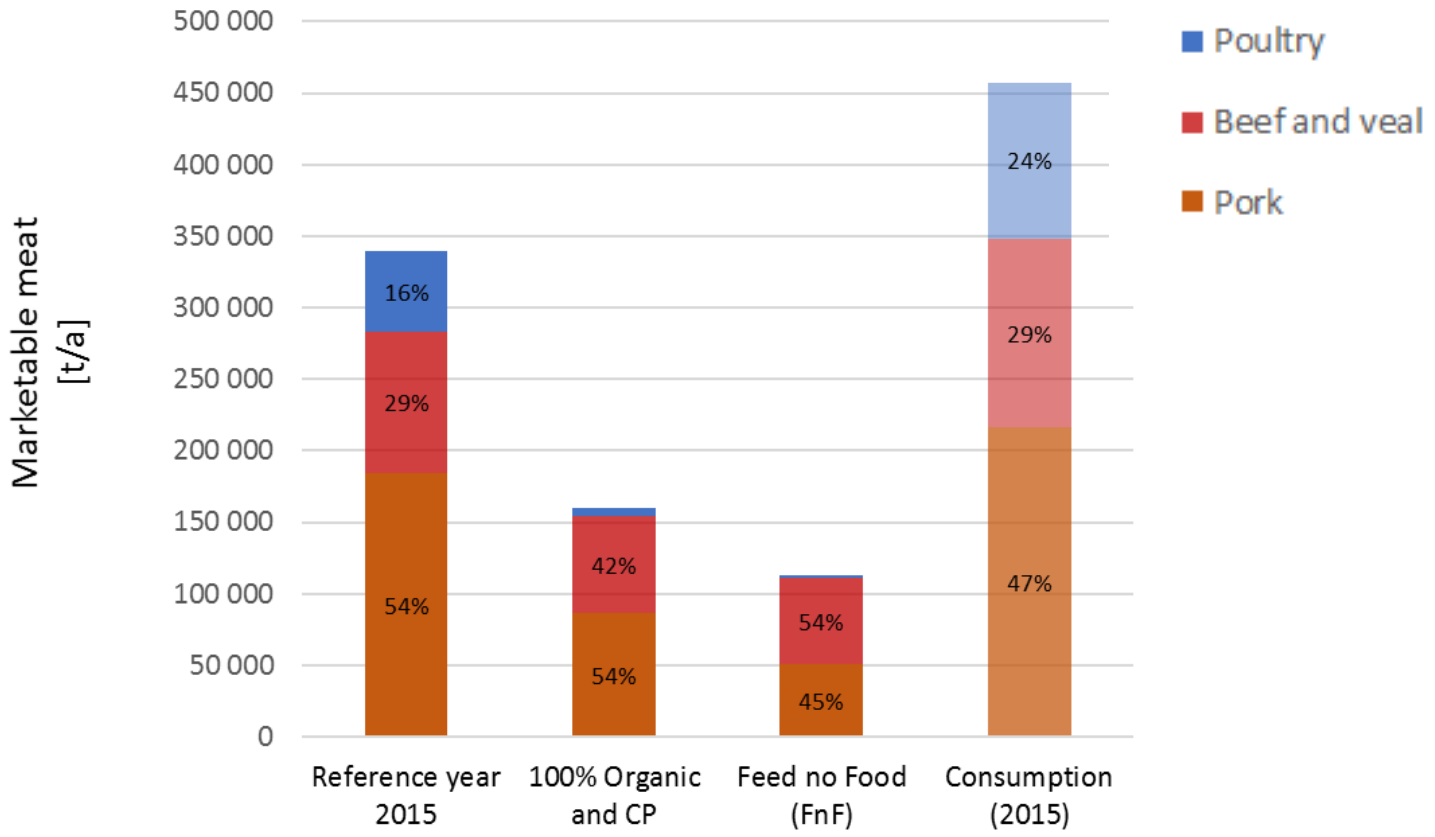


Figure: Meier & Moakes (in prep.)

If dairy consumption of Swiss population stays the same, adapting milk production to local ecosystem boundaries increases environmental impact abroad.

Swiss milk production today and adapted to local ecosystem boundaries

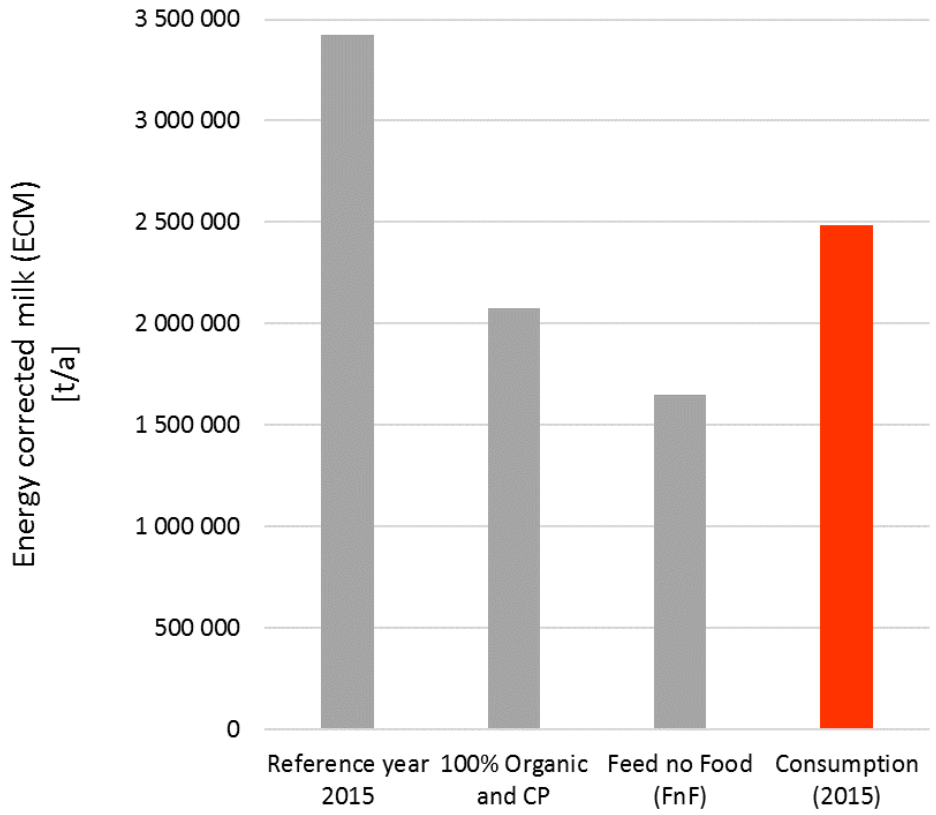


Figure: Meier & Moakes (in prep.)

4 Transdisciplinary field experiment in two university canteens

Setting field experiment and innovations

Setting

- Two canteens, one kitchen
- Duration 12 weeks (6 basis-,6 intervention-weeks)
- Daily offer: 3 menus, hot&cold-buffet

Innovations tested

- abolition of the vegetarian menu line
- randomised offering of meat, fish, vegetarian and vegan meals in the menu lines
- no explicit marketing of vegetarian and vegan menus
- for intervention weeks vegetarian and vegan meal offers were increased:
  - Basis weeks: 2 meat/fish, 1 vegetarian
  - Intervention weeks: 1 meat/fish, 1 vegetarian, 1 vegan

Four datasets

- Transaction and CampusCard owner data: max. 26234 transactions, max. 1560 canteen visitors
- Written survey of visitors (1176 usable respondents, whereof 874 canteen visitors and 302 who brought own food)
- Life cycle assessment of 93 menus
- Nutritional balance assessment of 93 menus

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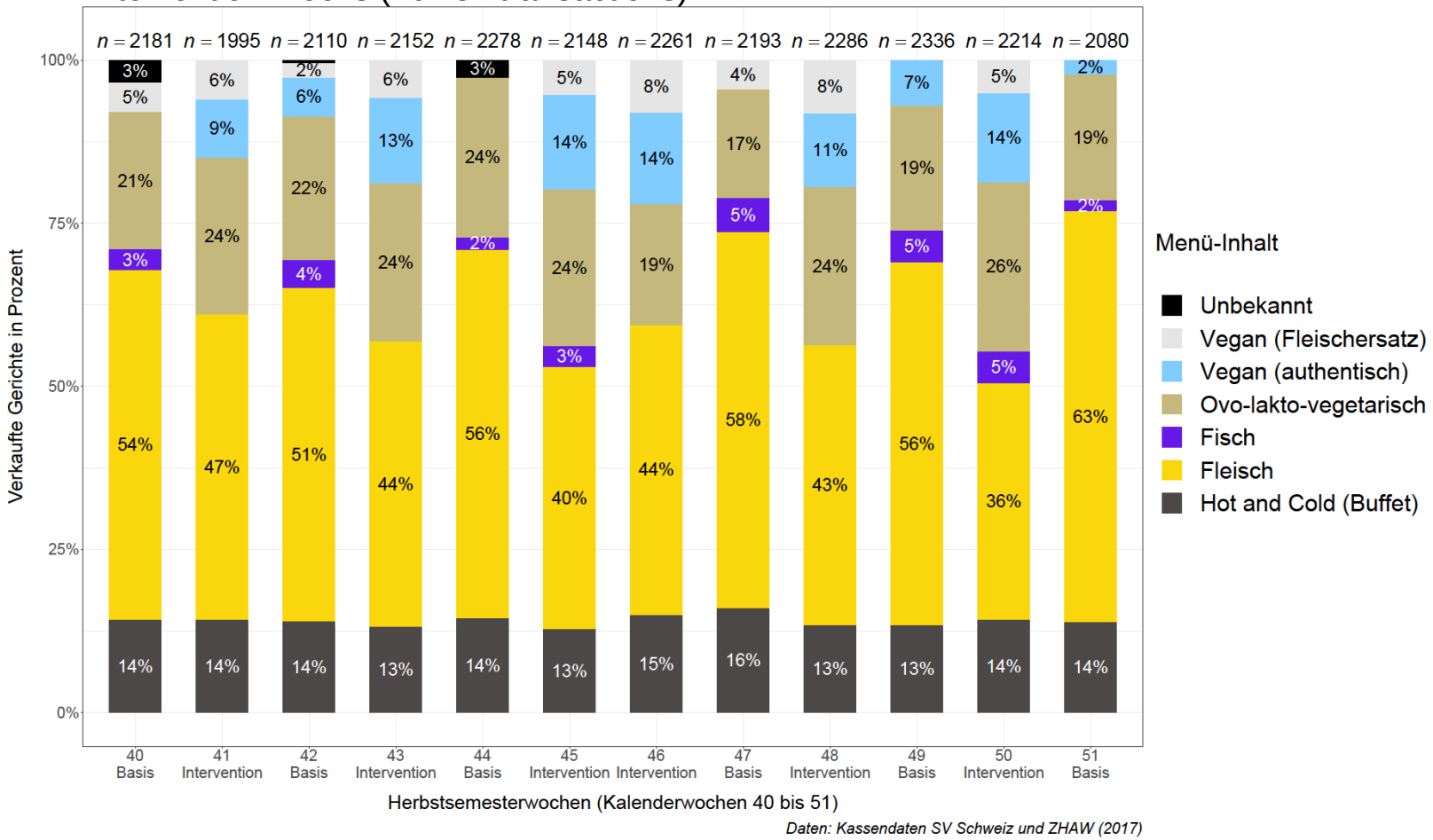
Percentage of sold meat/fish dishes dropped from 60% to 44%

Meal sales by content (meat, fish, ovo-lacto-vegetarian, etc.) in ‘basis’ and ‘intervention’ weeks (26’234 transactions)



Daten: Kassendaten SV Schweiz und ZHAW (2017)

Analysis & graphic: Gian-Andrea Egeler, ZHAW

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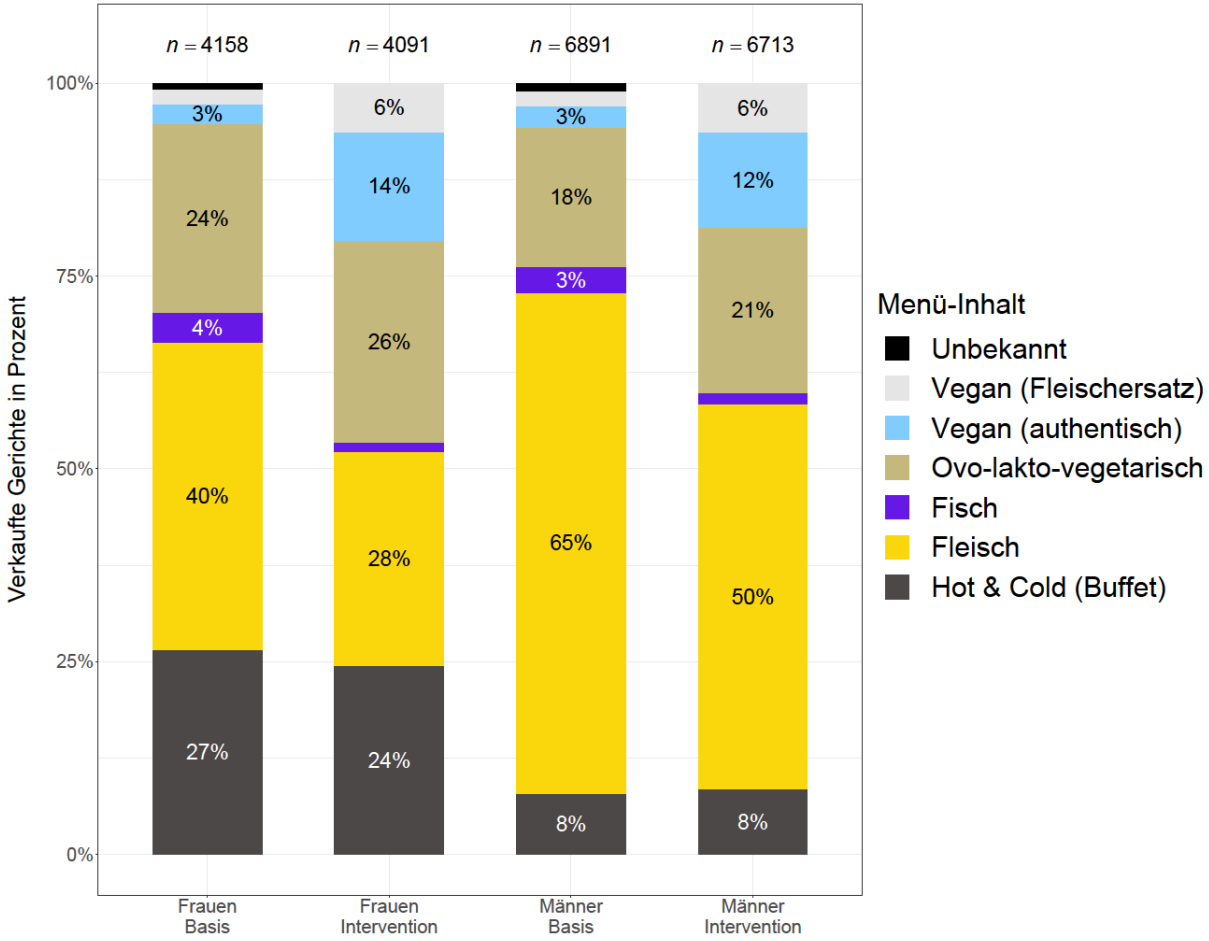
Both female and male canteen visitors bought less meat dishes

Meal sales by content and gender in ‘basis’ and ‘intervention’ weeks
(687 females & 816 males; 21853 transactions)



Daten: Kassendaten SV Schweiz und ZHAW (2017)

Analysis & graphic: Gian-Andrea Egeler, ZHAW

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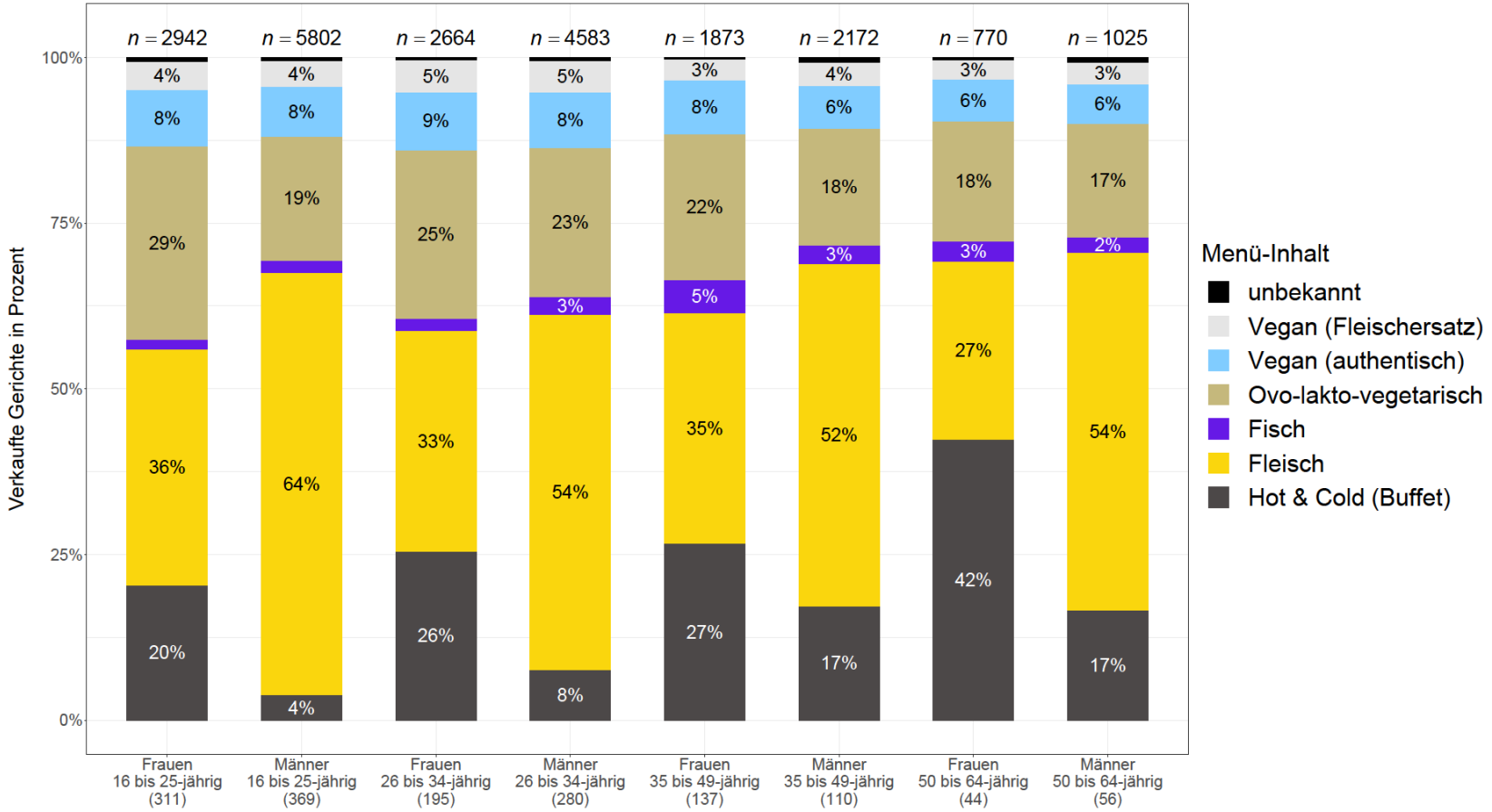
Female canteen visitors chose a meat dish 34%, male 58%

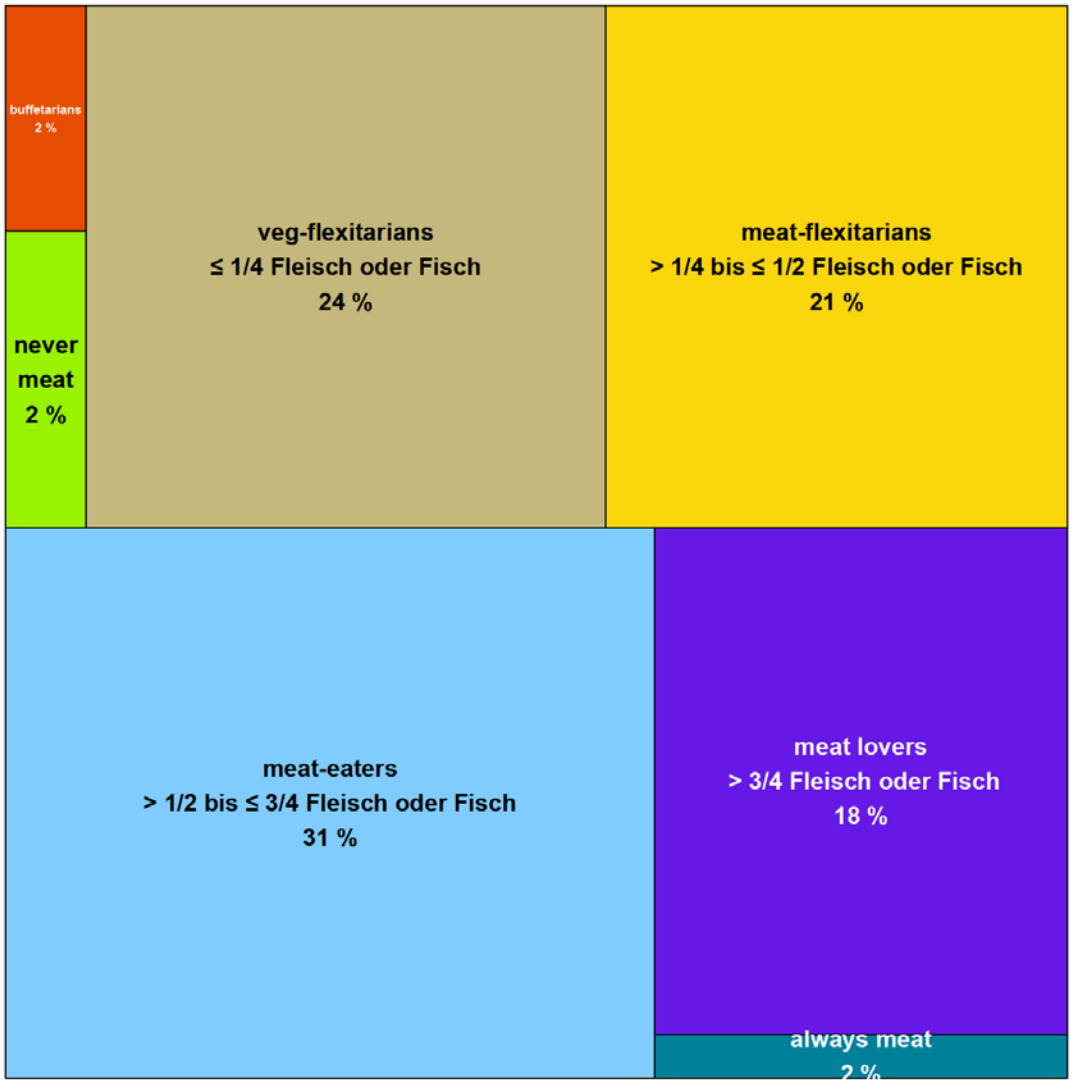
Meal sales by content, gender and age
(1502 canteen visitors with 21’723 transactions)



Daten: Kassendaten SV Schweiz und ZHAW (2017)

Analysis & graphic: Gian-Andrea Egeler, ZHAW

>90% of canteen visitors ate both, meat and vegetarian



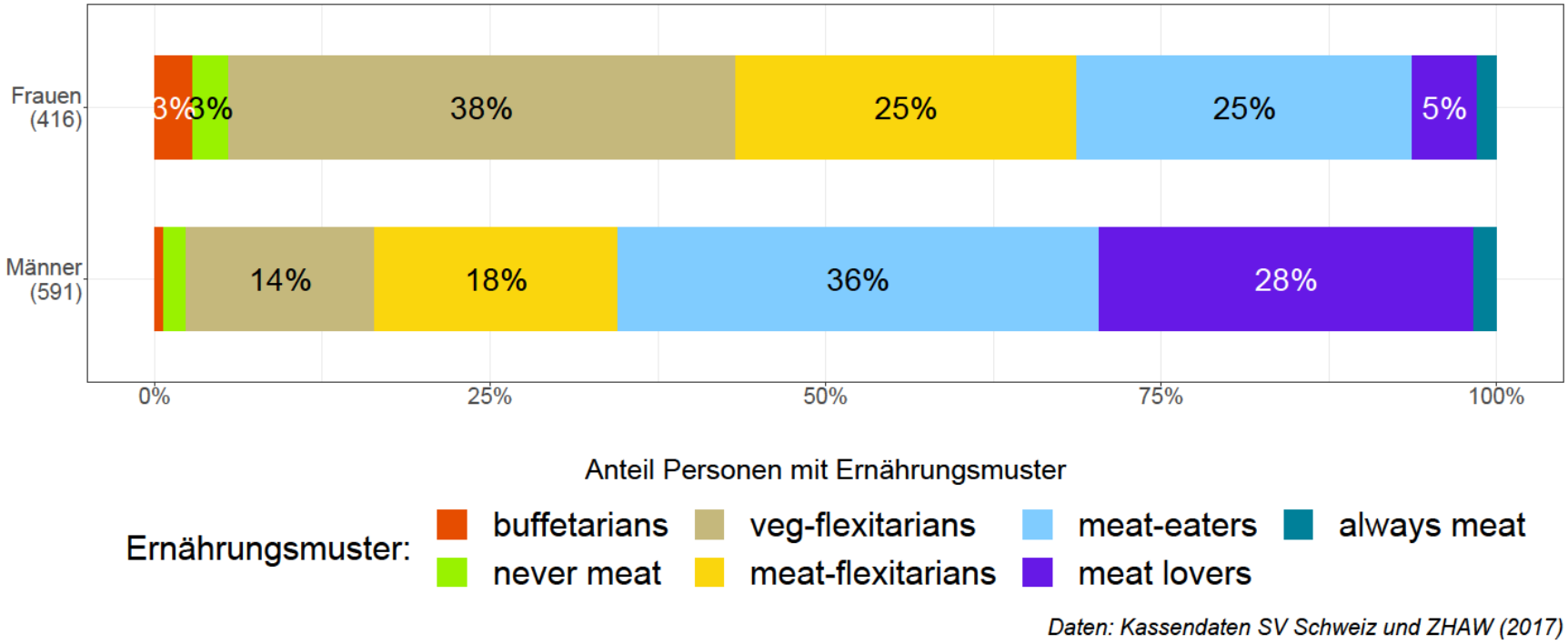
Meal choice patterns of 1’007 regular canteen visitors

Daten: Kassendaten SV Schweiz und ZHAW (2017)

Analysis & graphic: Gian-Andrea Egeler, ZHAW

Female canteen visitors are less often meat-eaters or meat lovers than male (30% vs. 64%)

Meal choice patterns by gender (1007 regular canteen visitors)



Daten: Kassendaten SV Schweiz und ZHAW (2017)

Analysis & graphic: Gian-Andrea Egeler, ZHAW

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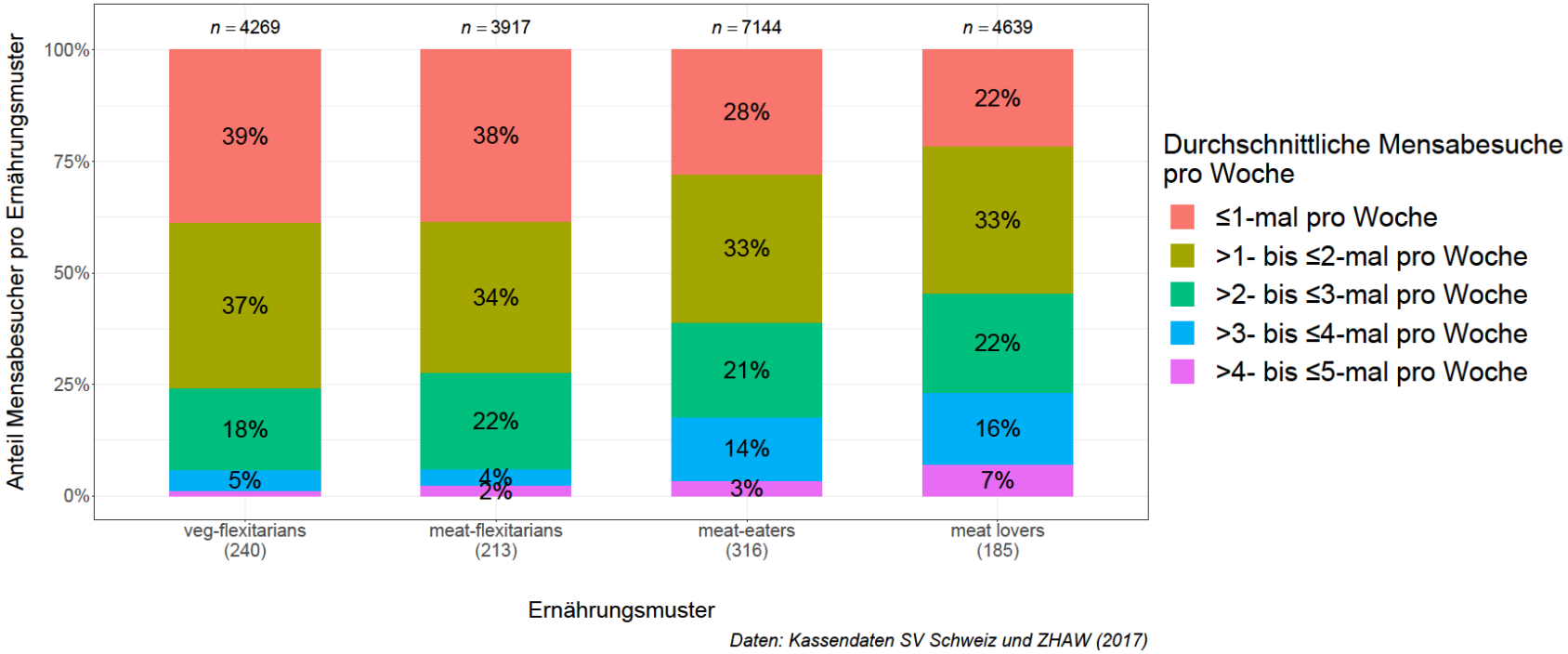
Meat-eaters and meat lovers visit the canteen more frequently

Meal choice patterns by frequency of canteen visit (954 regular canteen visitors)



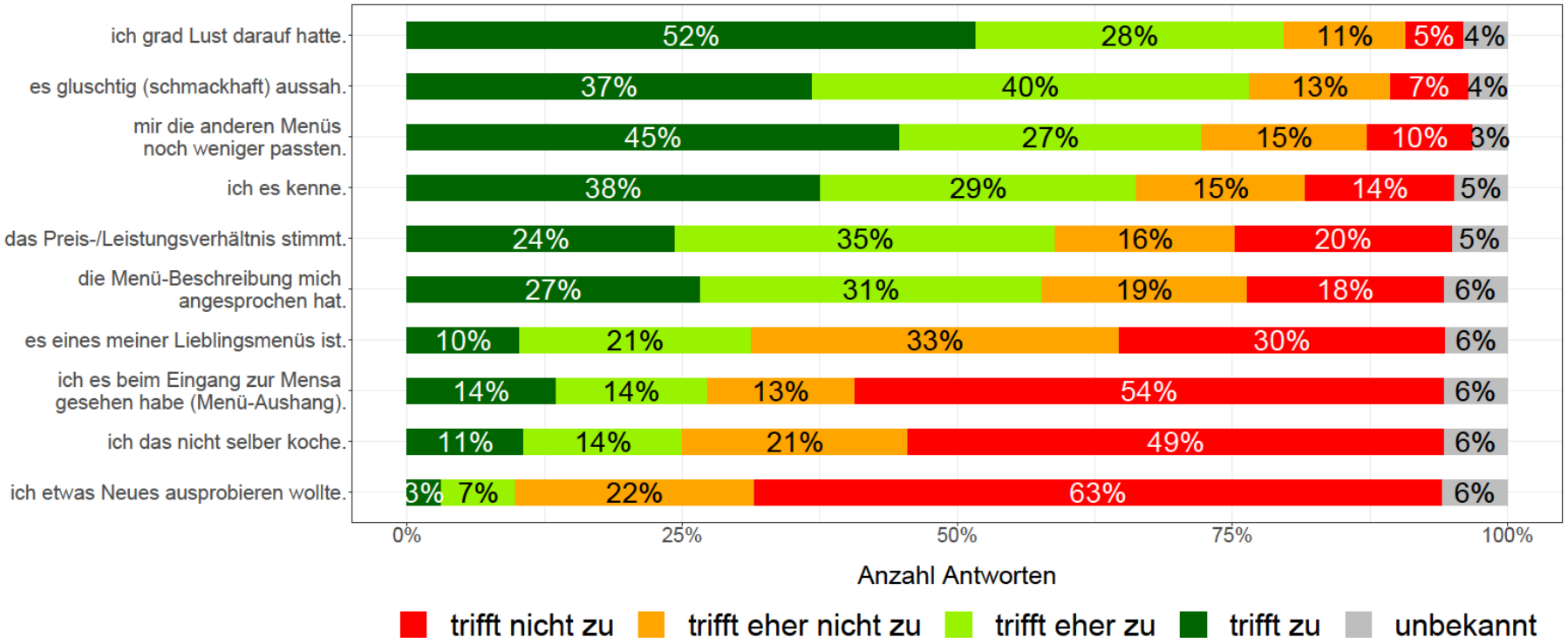
Daten: Kassendaten SV Schweiz und ZHAW (2017)

Analysis & graphic: Gian-Andrea Egeler, ZHAW

Respondents who ate in the canteen chose what they liked most (positive) or disliked least (negative). (874 canteen visitors)

Wie treffen die folgenden Aussagen auf Ihre heutige Menü-Wahl in der Mensa zu?

Ich habe dieses Menü heute gewählt, weil...

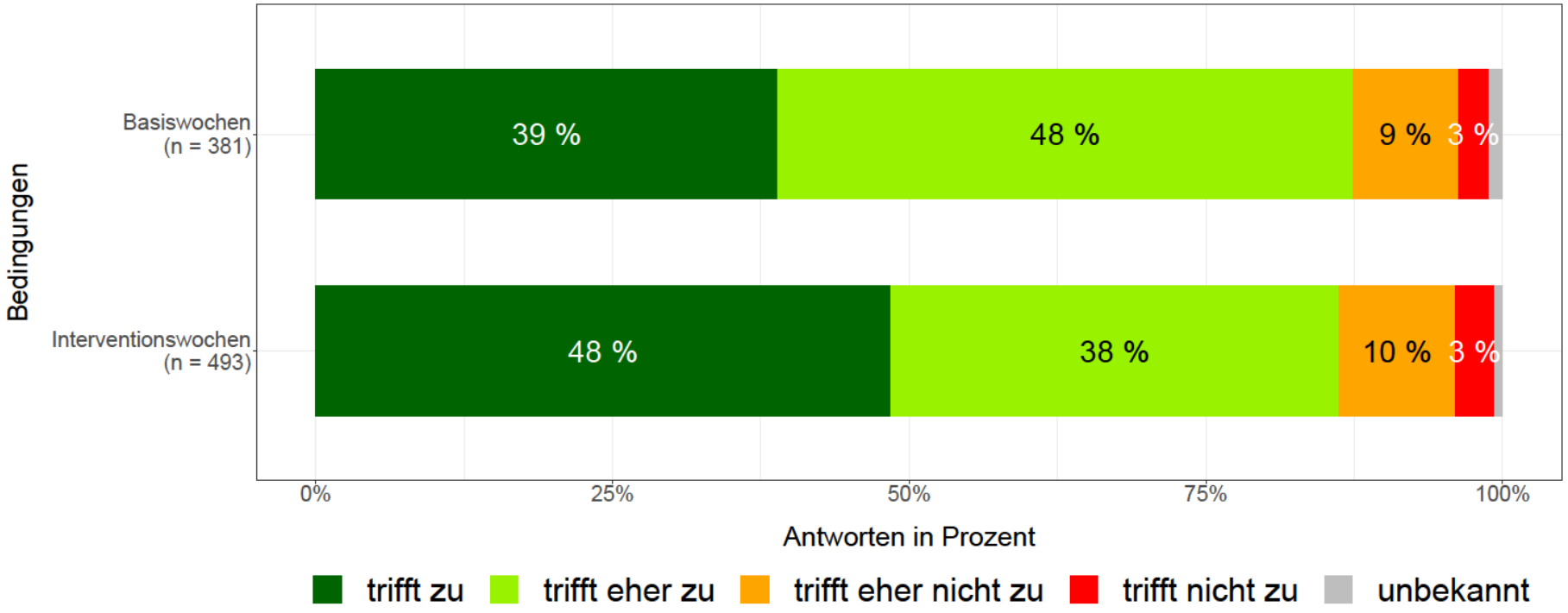


Daten: ZHAW (2017)

Analysis & graphic: Flavio von Rickenbach, ZHAW

Respondents who ate in the canteen were not less satisfied with the chosen menu in the intervention weeks. (874 canteen visitors)

Ich fand das Menü gut.

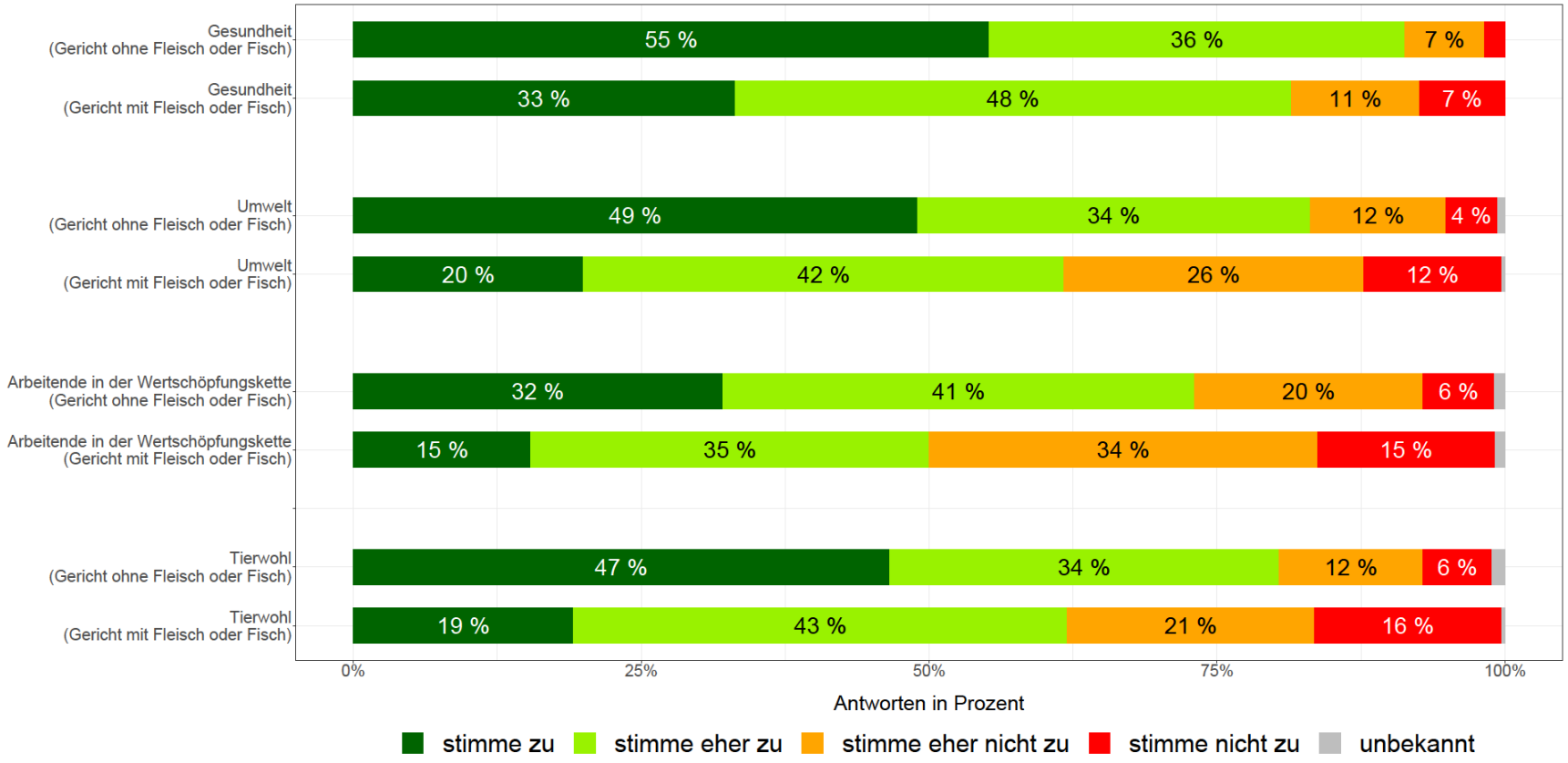


Daten: ZHAW (2017)

Analysis & graphic: Flavio von Rickenbach, ZHAW

Respondents who had chosen a meat dish worried less frequently about the consequence of their diet for their health, the environment, animals or the workers in the supply chain. (799 canteen visitors)

Ich mache mir allgemein Gedanken über die Folgen meiner Ernährungsweise für...



Daten: ZHAW (2017)

Analysis & graphic: Flavio von Rickenbach, ZHAW

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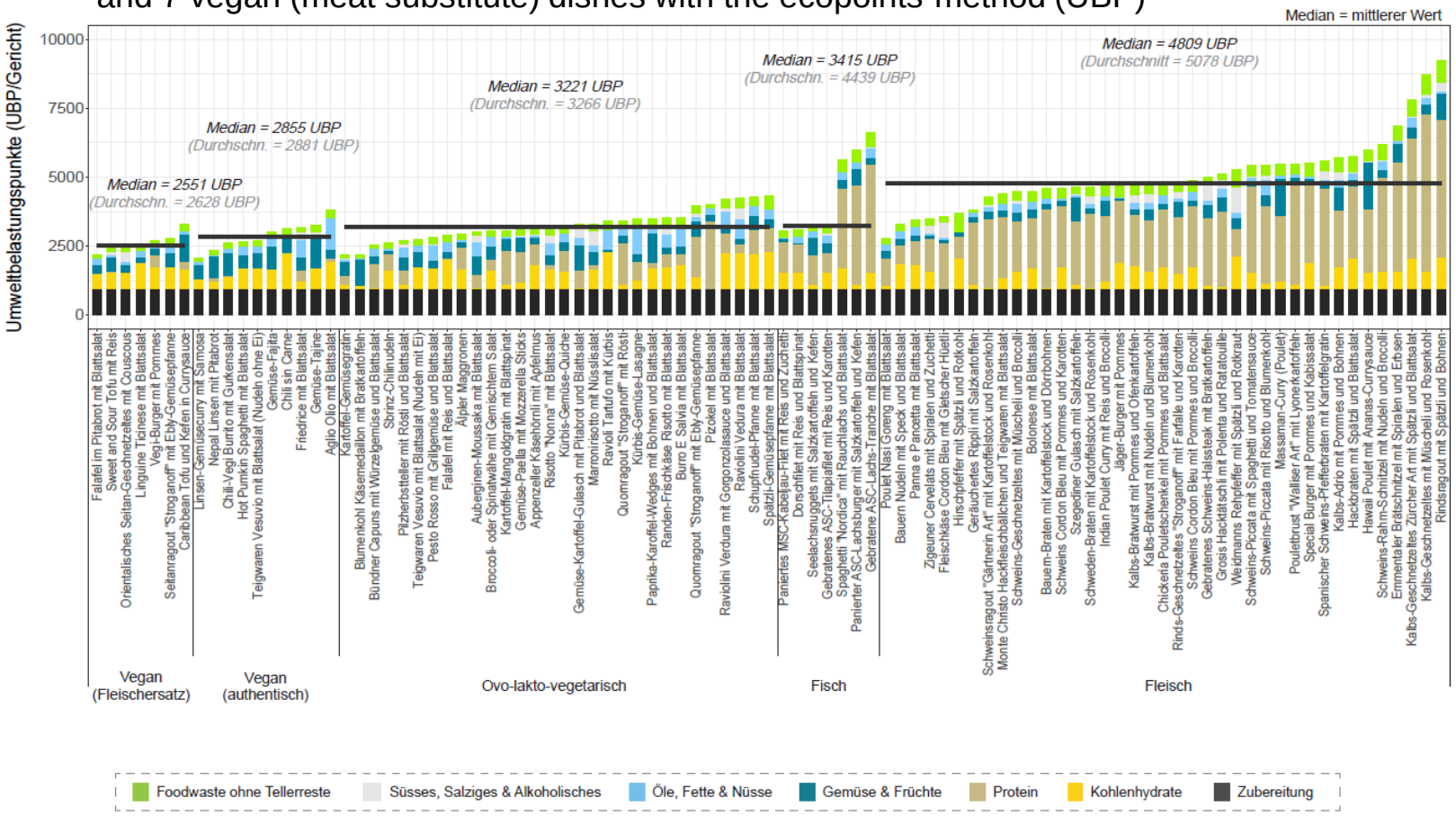
Mean and median environmental impact of meat meals are higher, but there is also a clear variance within the menu categories.

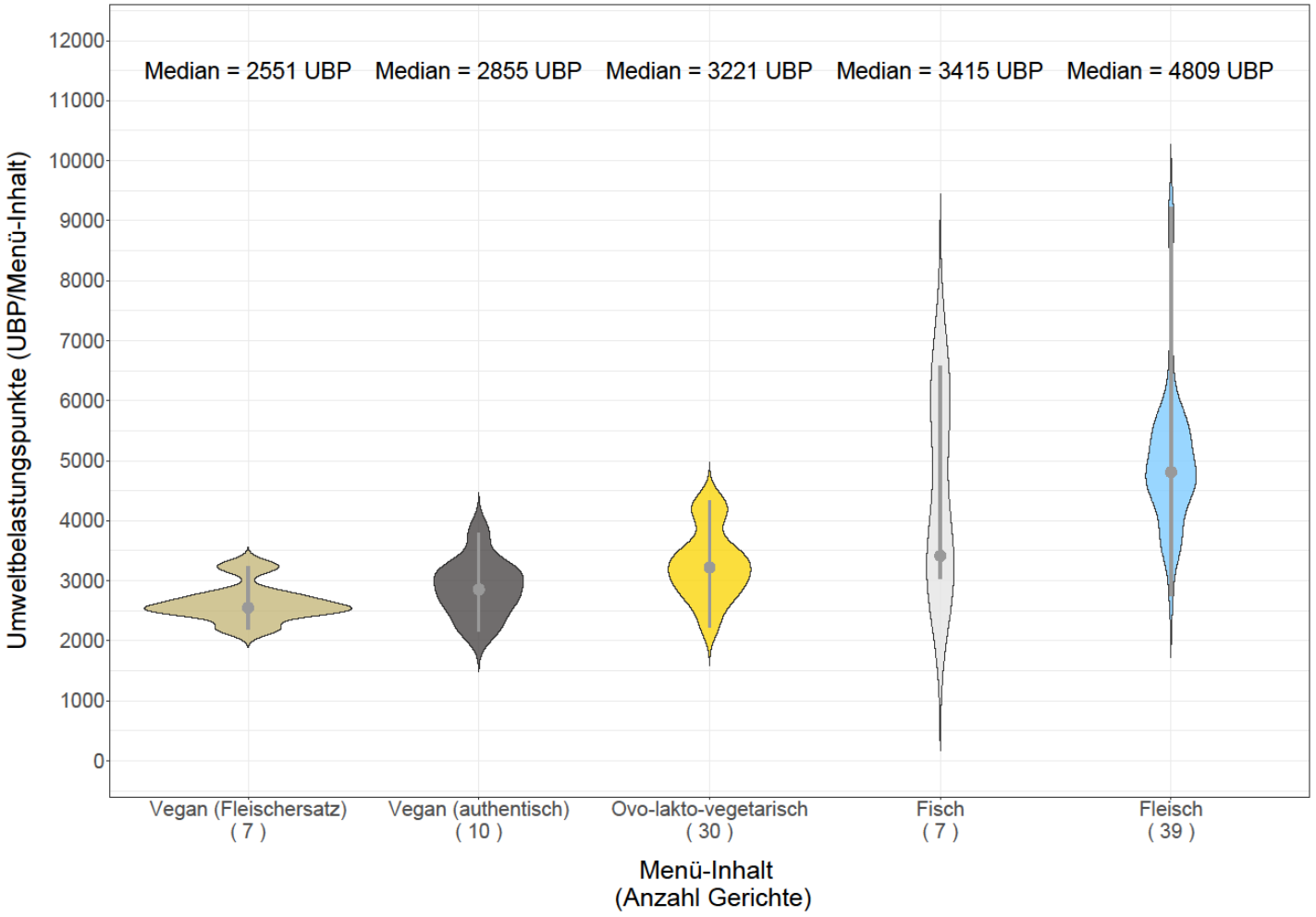
Life cycle assessment of 39 meat , 7 fish, 30 ovo-lacto-vegetarian,10 vegan (authentic) and 7 vegan (meat substitute) dishes with the ecopoints-method (UBP)



Daten: Agribalyse, Agrifood, ecoinvent
Berechnungen: Karen Muir

Graphic: Gian-Andrea Egeler, ZHAW

The meat menus have a significantly greater impact on the environment than the vegetarian and vegan menus.



Daten: Kassendaten SV Schweiz und ZHAW (2017)

Analysis & graphic: Gian-Andrea Egeler, ZHAW

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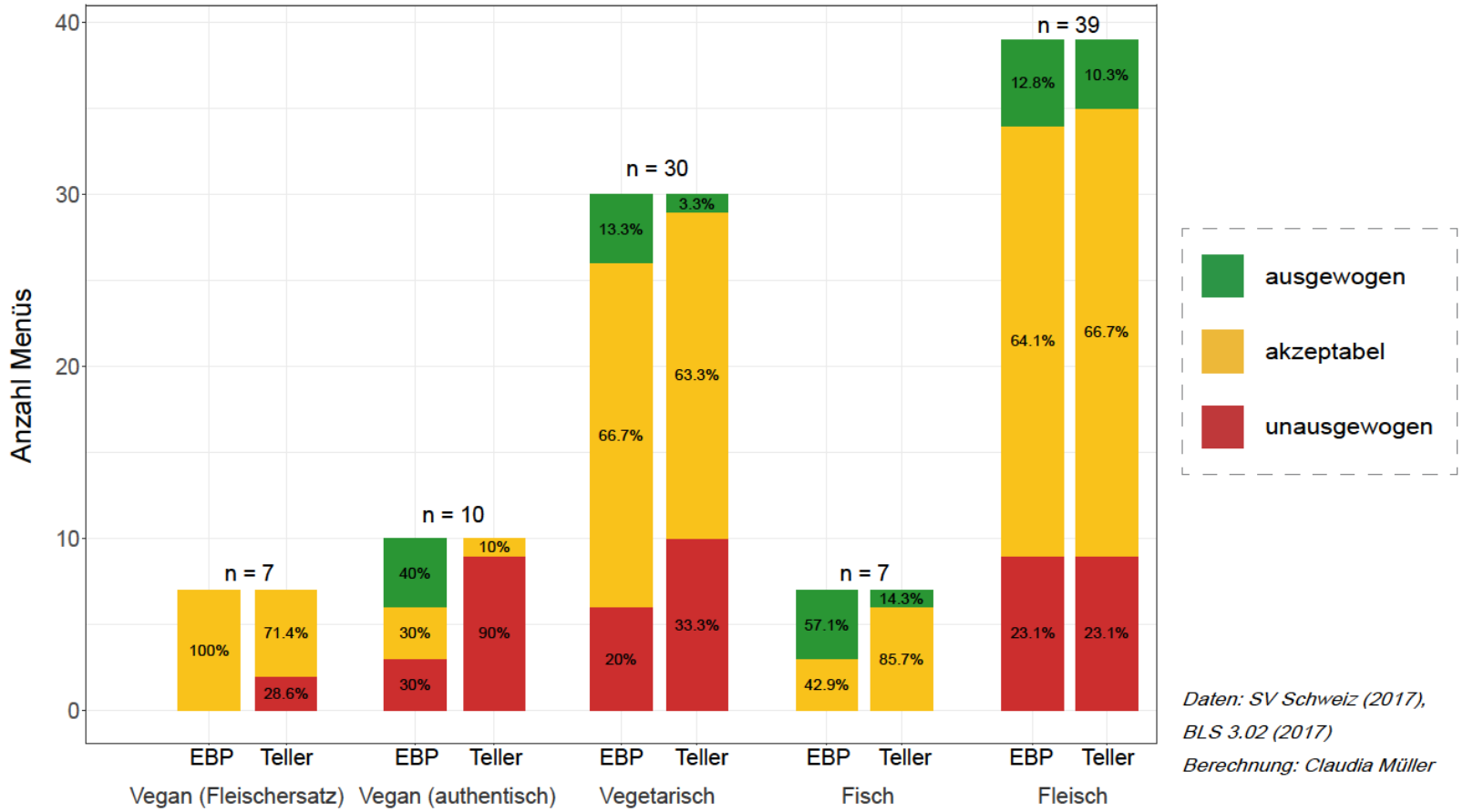
Innovations for a future-oriented consumption and animal production

SGE-SSN's 'plate-model' rates meat meals better than vegetarian and vegan meals.

Nutritional balance assessment of 93 meals with the EBP- and the 'plate model'
The 'Ernährungsphysiologische Balancepunkte' (EBP)-model is based on the nutrient profiling of the UK Food Standard Agency; the 'plate model' on the 'optimal plate' by the SGE-SSN.



Graphic: Gian-Andrea Egeler, ZHAW

The EBP- and ‘plate-model’ match for 52% of meals (48 of 93). Only 3 are rated balanced by both, 2 of them with poultry, 1 with fish.

Matching of the two rating methods EBP and ‘optimal plate’.

EBP-MODELL \ TELLER-MODELL	Ausgewogen	Akzeptabel	Unausgewogen	Total
Ausgewogen	3	7	7	17
Akzeptabel	2	39	17	58
Unausgewogen	1	11	6	18
Total	6	57	30	93

Daten: SV Schweiz (2017), BLS 3.02 (2017)
Berechnung: Claudia Müller

5 Drivers of innovations

Drivers of innovations

- **13 megatrends relevant to nutrition**
  - 7 motivate a moderate animal products consumption: Gender Shift, Health, Knowledge Culture, Neo-Ecology & Smart New Green, Security, Silver Society & Millennials, Urbanisation
  - 4 promote resource-efficient production and processing: Globalisation, Global Scarcity of Natural Resources, Neo-Ecology & Smart New Green, urbanisation

- **Specific drivers in agriculture and food processing**: economic opportunities arising from a change in nutrition habits and food demand; technological development; competition; increasing resource prices.

- **Specific drivers in demand, gastronomy and vocational education**: economic opportunities arising from changing eating habits and attracting a new clientele, in particular women; emergence of a global society; competition; chef's professional ambitions.

6 Constraints to implementing innovations

Constraints in agriculture and processing

- habits & routines
- meat and milk production subsidies
- direct and indirect natural resource subsidies (water, energy, etc.)
- political regulations
- in agriculture: income support allows production to be maintained even if it is not profitable
- in processing: efficiency gaps seem often to be perceived as ‘minor problems’ (‘Geringfügigkeitsproblem’).

Constraints in consumption, gastronomy and education

- nutrition and cooking habits & routines
- the 4 Ns: meat is considered ‘natural’, ‘normal’, ‘necessary’ and ‘nice’
- meat is the most valuable item on the plate
- the expectation is that vegetarian dishes should cost less
- positive images of animal husbandry in Switzerland
- local, regional or national products are preferred which means, for Switzerland, meat and dairy

Constraints in consumption, gastronomy and education (cont.)

- meat is the rule, vegetarian the exception and vegan a disturbance
- vegetarian/vegan is cooked and marketed for the minority of guests with vegetarian/vegan lifestyle
- kitchen hierarchy
- vegetarian/vegan cuisine is more demanding and time consuming
- lack of skills and knowledge
- well-established supply chains
- promotional meat predominates (‘Aktionsfleisch’)
- widespread ideas about a balanced diet (each day and each meal has to be ‘balanced’)
- ‘male chefs cook for male guests’.

7 Solutions to overcome constraints

Solutions to overcome constraints in consumption, gastronomy and education

- Professionalisation and specialisation in the kitchen
- Role models and inspirations
- Places with potential and pioneers
- New products and supply networks
- Revision of the Swiss dietary guidelines (SGE-SSN)

8 Conclusions

Conclusions concerning agriculture

- Implementation of agricultural innovations leads to less intensive animal production systems in Switzerland
- Extensification means less milk, meat and egg production and less environmental pollution in Switzerland
- Production adapted to local ecosystem boundaries, but decrease of eco-efficiency of pork and poultry (environmental impact per kilogram)
- Even though eco-efficiency of beef is lower than of pork and poultry, grass-based milk and beef production adapted to the local ecosystem boundaries improves eco-efficiency for many environmental impact categories.
- Further arguments in favour of maintaining a comparatively high cattle population in Switzerland:
  - Economy: comparative advantage in producing grassland-fed milk and beef
  - Animals: feasible to keep cattle in species-appropriate manner; for the same amount meat fewer animals needed
  - Climate policy: current Swiss methane emissions the same as before WW I
  - Feed no food: no competition with human nutrition

Conclusions concerning food processing

- Relevant cleantech-potential which can be cost-saving in the long term
- However, benefits are minor compared to potential in production and consumption
- Underestimated challenges:
  - Small-scale production and processing structures in Switzerland reduce efficiency
  - This is exacerbated by large variety of products with various labels and local products

Conclusions concerning consumer demand, gastronomy and education

- Gastronomy is at risk of missing the development: demand for vegetarian and vegan dishes seems greater than perceived by gastronomy. However, culinary quality often unsatisfactory.
- Flexitarian eating habits with moderate meat consumption become the norm
- Vegetarian/vegan cuisine: From a niche to everyday life
- Female customers as an economically interesting target group that seems to have been neglected
- Rising out-of-home consumption increases catering industries' economic opportunities but also their responsibilities:
  - Guests make spontaneous and pleasure-related decisions
  - Gastronomy can make rational strategic decisions
- Gastronomy as 'scout and guide' on the way to more plant-based eating habits
- Specialisation in the kitchen is crucial
- Better education not enough, a new apprenticeship for vegetarian/vegan cuisine, including specialised further training opportunities, could make a difference

9 Differences between NOVANIMAL and common positions in research

Differences between NOVANIMAL and common positions in research

- **Political postulates and appeals**: Innovation ideas primarily address commercial enterprises along the food supply chains.
- '**Action knowledge**': Research often enhances system and target knowledge, NOVANIMAL focuses in particular on action knowledge: the questions are how meat consumption can be reduced and how animal production can be adapted to the location.
- **Gastronomy**: Out-of-home consumption/catering seem blind spots in sustainability research although importance is high and will probably increase. Searching for impact, NOVANIMAL research addresses gastronomy in particular.
- **Cattle vs. poultry**: General position is to reduce cattle and promote poultry. In NOVANIMAL, in contrast, we conclude that in the Swiss context (relatively little arable land and a great deal of permanent grassland), grassland-fed cattle is ecologically and economically more sustainable, if livestock density is adapted to the local ecosystem boundaries, rather than producing pork and chicken on the basis of imported fodder.

Differences between NOVANIMAL and common positions in research, cont.

- **Health effects of meat consumption**: Health effects of meat consumption are discussed controversially. We conclude that in Switzerland the average (self-declared) consumption of red meat is not within the health risk range. In contrast, declared processed meat consumption could increase population health risks.
- **Health effects of milk and dairy consumption**: We criticise the scientific basis of the general positive image of milk and dairy over a very large range, and the negative image of cream and butter. Criticisms:
  - No general differentiation in analyes between very different dairy products, such as milk, yoghurt and cheese, but simple aggregation
  - Neglection of invisible milk components which are finely distributed over many processed foods

  We conclude that existing data is not sufficient to call for a consumption of 3-4 portions of dairy products per day, as recommended by the SGE-SSN.

Differences between NOVANIMAL and common positions in research, cont.

Animal husbandry / protection: In current debates concerning healthy nutrition and sustainable food production, animal protection is a marginal issue. In NOVANIMAL, we have taken into account animal husbandry and protection from the beginning because of different reasons:

- Animal protection is **important** for many people. Therefore, it could **motivate**
  - consumers to reduce animal food product consumption
  - gastronomy to increase quantitative and qualitative vegetarian/vegan and 'less is more'-offers
- **Conflicting objectives** between environmental sustainability and health, and animal protection: Today, there seems to be a broad consensus to recommend resource-efficiently produced 'healthy' chicken instead of beef, thus potentially resolving the conflict at the expense of the animals.
- **Systemic risks** of resource-efficiently produced pig meat and chicken: Resource-efficient means highly specialised 'factory farming' with elevated epidemiological and zoonose risks and antibiotics use

In NOVANIMAL, we aim at **innovations with synergies** between environment, health (systemic health risks included) and animal protection.

Every recipe a symphony ☺

FNSNF
Swiss National Science Foundation

Healthy Nutrition and
Sustainable Food Production
National Research Programme NRP 69

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