POLICY BRIEF - OCTOBER 2021

Circular Economy Series No. 4


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Healthy diets save more resources than food waste reduction

RESULTS IN BRIEF

Halving food waste is a prominent target in European policymaking to conserve increasingly strained food resources. However, we find that expanding the scope of political action to include dietary changes and complement targets with resource footprints hold greater resource-saving potential while avoiding trade-offs.

Comparing food waste and dietary changes for the German context, we show that:

- **Healthy, plant-based diets** are more effective in reducing land and biomass resource use than halving food waste
- A **combination** of more plant-based food consumption and food waste reduction in distribution and consumption is most effective at saving resources
- Focusing exclusively on **food waste reduction as a political target can be detrimental** to the overarching goal of saving resources because it deflects more effective policy alternatives

Policy recommendations:

- Target resource saving with **resource footprint indicators**
- Focus on **encouraging dietary change** in addition to food waste reductions

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PROMOTE DIETARY CHANGE TO SAVE RESOURCES

Global food resources are increasingly strained by resource consumption in high-income countries.

Current international and national policies like the SDGs and the EU Circular Economy Programme prioritise food waste reduction strategies over changing dietary patterns. Yet, research suggests **dietary change in high-income countries** to be promising for global resource conservation (Behrens et al., 2017; Shepon et al., 2018).

Using a resource footprint model, we find that changing current food consumption patterns to **healthier** and **more plant-based diets** has generally more leverage than reducing food waste (Figure 1).

Our **multi-regional input/output model** calculates all primary resources (biomass, land, freshwater) needed to produce the overall national food requirement.

We compare 4 main scenarios to German food consumption in 2013:

1) Halving food waste
2) Full compliance with the German *guideline* diet
3) Following a *sustainable* diet proposed by EAT Lancet
4) Following a low-dairy *vegetarian* diet

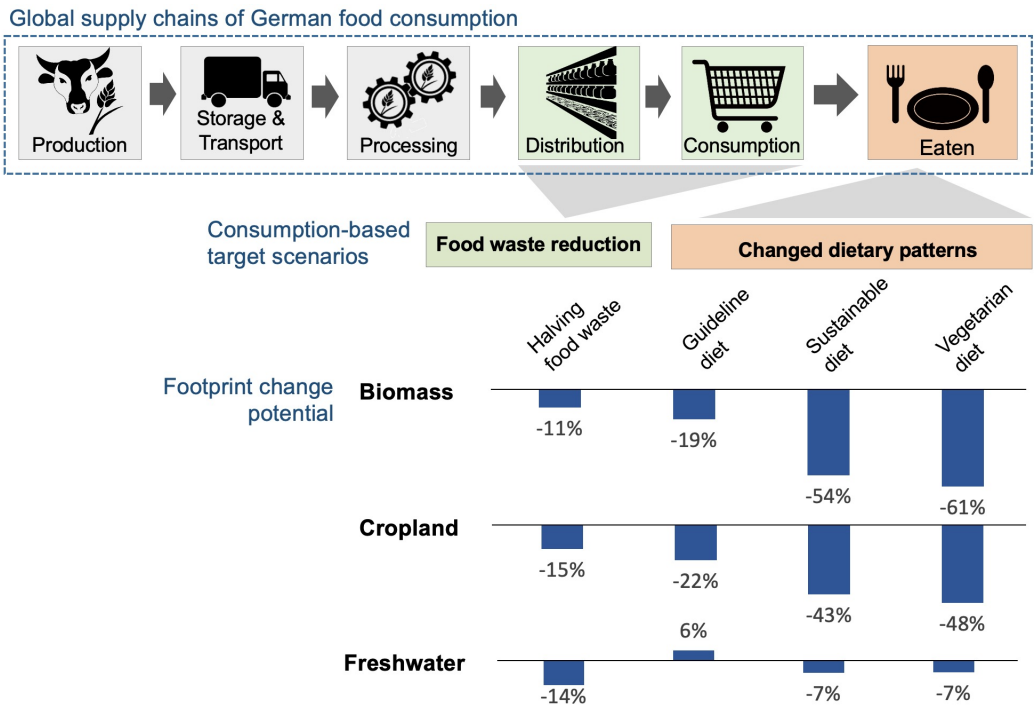

Figure 1: Resource saving potential of food waste reduction vs. dietary pattern change.

LIMITATIONS

While our findings have important food policy implications, they are limited by the following:

- Ideal healthy diets are modelled, not what people might practice as a plant-based diet
- Footprints of fish are not modelled, but for cropland and freshwater use the impacts of fish are insignificant
- Resource footprints do not directly indicate the carbon footprint or scarcity incurred by resource withdrawal

TARGET RESOURCE FOOTPRINTS

Increasing the share of plant-based food in national diets substantially reduces biomass and land use footprints. But our analysis also reveals a **trade-off** between food waste and dietary changes.

Fruits and vegetables generate more food waste and a higher water footprint than other food products**.** In other words, encouraging change towards plant-based diets alone can save biomass and land use but counteract waste reduction targets and freshwater conservation. Thus, **we need to set the right targets** to effectively conserve natural resources for food production.

Focusing exclusively on food waste reduction as a political target can be detrimental to reaching the overall goal of resource conservation. Since food products differ in terms of footprints and associated food waste amounts, food waste quantities do not necessarily reflect resource savings.

Instead, food policies should be complemented with resource footprint targets. **Biomass footprints** capturing the material intensity of food demand offer a holistic tool that can account for trade-offs between dietary and waste reduction strategies. Together with the other resource footprints, they can better indicate if strategies effectively increase the efficient use of natural resources.

COMBINE BOTH STRATEGIES FOR THE GREATEST BENEFIT

To achieve a strong reduction in the use of all three types of resources (freshwater, cropland and biomass) a combination of strategies is necessary.

Current supply-focused food waste policies should be coupled with **policies encouraging change in food waste-related behaviour** (Schanes et al., 2018) **and in dietary behaviour**.

Halving food waste while changing the average German dietary pattern to a sustainable diet can save as much as 59% of biomass, 48% of cropland and 17% of freshwater use.

Simultaneously, the diets are not just **healthy** for the planet, but also for our people as they are based on **medical nutritional recommendations**. *But what do the healthy diets consist of?*

The main changes to the current diet entail:

- More fruits and vegetables
- More pulses, beans and nuts
- More cereals
- Less meat
- Less milk and dairy products
- Less sugar and alcohol

Possible **policy instruments to encourage change in food consumption**:

- fiscal measures to disincentivise animal-based and incentivise plant-based diets
- strict marketing rules for unhealthy food
- educational campaigns and nudging
- empowering community initiatives that promote and normalise plant-based diets
- using public canteens and procurement as a lever

See Garnett et al. (2015) for more detail.

FURTHER INFORMATION & SOURCES

Full research article:
"Eating healthy or wasting less? Reducing resource footprints of food consumption" (2021) by: Hanna Helander, Martin Bruckner, Sina Leipold, Anna Petit-Boix, Stefan Bringezu. Access here: doi.org/10.1088/1748-9326/abe673

Environmental potential of dietary change:
Behrens et al. (2017). Evaluating the environmental impacts of dietary recommendations. doi.org/10.1073/pnas.1711889114
Shepon et al. (2018). The opportunity cost of animal based diets exceeds all food losses. doi.org/10.1073/pnas.1713820115

EAT Lancet Planetary Health Diet
Recommendations, recipes and best practices**:** https://eatforum.org/learn-and-discover/the-planetary-health-diet/

Policy alternatives to change food wasting and eating behaviour:
Garnett et al. (2015). Policies and actions to shift eating patterns: What works? https://www.tabledebates.org/sites/default/files/2020-10/fcrn_chatham_house_0.pdf
Schanes et al. (2018). Food waste matters - A systematic review of household food waste practices and their policy implications. https://doi.org/10.1016/j.jclepro.2018.02.030

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This brief can be cited as: Kopp, M. & Helander, H. (2021). Healthy diets save more resources than food waste reduction. *Circular Economy Series, 4.*

The **Circular Economy Series** presents research results of the research group "Circulus - Opportunities and challenges of transition to a sustainable circular bio-economy". The researchers are developing a comprehensive understanding of possible pathways to a circular economy in Germany and Europe. To this end, they combine perspectives from the social, environmental and engineering sciences to analyse the ecological and socio-economic consequences of the circular economy in various sectors.

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