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RESEARCH ARTICLE

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Do stakeholders' values support transformative change in the food system? Evidence from the Netherlands

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ABSTRACT

Research in the sustainability sciences often emphasizes values and value change as important drivers of sustainability transformations. Drawing from conceptualizations of values developed in environmental psychology and the environmental social sciences, this study offers a survey-based examination of values among stakeholders involved in or close to policymaking processes. The empirical context is the Dutch agri-food system – a hotspot of biodiversity loss, water pollution, greenhouse-gas emissions, and challenges to human and animal health. Based on a survey fielded among stakeholders, including public institutions, researchers, consultancy firms, agribusinesses, and others ($n = 174$), we investigated the prevalence of environmental and food-system values. Moreover, we asked how food-system values are related to stakeholders' views on transformative change. Our analysis yields three insights. First, biospheric and altruistic values, often considered in the literature as backbones of a socially and environmentally sustainable food system, were quite strongly endorsed among the surveyed stakeholders. By contrast, egoistic values, which revolve around the cost-benefit calculus of different courses of action irrespective of their environmental or social consequences, received comparatively less endorsement. Second, stakeholders expressed strong agreement with food-system values emphasizing health and community aspects, food and nutrition as a global public good, and ecological and animal-free agriculture, but were less favorable toward values emphasizing technology and markets. Finally, using regression analysis, we show that stakeholders' food-system values help explain the degree to which they perceive a need for change, and the extent to which they support public policies to make the agri-food system more sustainable.

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Introduction

The transformation toward a sustainable agri-food system is a complex process involving numerous actors representing different interests, values, and epistemic communities (Conti, Zanello, and Hall 2021). We conceive transformation as a dynamic, long-term process of fundamental change within a socio-techno-ecological system such as the agri-food system, giving rise to new interaction patterns and outcomes (Andersson, Lennerfors, and Fornstedt 2024; Feola 2015; Patterson et al. 2017).[1] In view of today's sustainability challenges, thorough changes are needed to "shift the current state of food systems from a less sustainable to a more sustainable model" (Hoogstra et al. 2024, 2).

To highlight the profound and deliberate nature of interventions required to initiate and sustain such shifts, both academic literature (Feola 2015; Kreinin et al. 2024; Termeer, Dewulf, and Biesbroek 2024) and science-policy assessments (IPBES 2024) emphasize the concept of "transformative change." Transformative change not only refers to the depth of systemic shifts needed but also underscores the role of agency, intentionality, and capacity to overcome entrenched structures and path dependencies.

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While the problems of the current system are well understood in academia and among many policymakers and practitioners, it is less clear how transformative change toward a more sustainable system state might be achieved. To ascertain the prospects of such change, it is imperative to understand what determines actors' choices and behaviors, and how to strengthen latent predispositions for change that are often overshadowed by structural barriers or short-term constraints, such as day-to-day business considerations. This article focuses on values, which are foundational in shaping actors' perceptions of what is desirable, possible, and legitimate, thereby influencing choices and behaviors. A deeper understanding of value orientations thus promises to identify leverage points for facilitating transformative change, while also recognizing cognitive, behavioral, socio-economic, and political obstacles (Aarts and Leeuwis 2023).

Our investigation is rooted in two strands of research. First, sociological and psychological research shows that values guide the way in which people give meaning to phenomena and events, and pre-structure action (Steg 2016; Stern 2000). Scholarly work in this tradition is particularly helpful to conceptually frame the role of agency in change processes. Second, research in the sustainability sciences emphasizes values and value change as critical drivers of transformative change (Abson et al. 2017; Bui et al. 2019; Dahlberg 1994; Horcea-Milcu 2022). Yet, efforts to empirically ascertain actors' values in the context of agri-food system transformations remain limited. Two studies examined values among local agri-food stakeholders in the United States (Belisle-Toler, Hodbod, and Wentworth 2021; Garcia-Gonzalez and Eakin 2019), and one study explored values among a global set of diverse food-related professionals (Vivero-Pol 2017).

Building upon these lines of inquiry, we offer a systematic, survey-based examination of values held by stakeholders of the Dutch agri-food system. Our study makes both a conceptual and an empirical contribution to the literature on food-system transformation.

Conceptually, we integrate two traditions for understanding values. First, values can be conceived as deep-seated, trans-situational guidelines that shape cognitive processes and decision-making – a perspective most prevalent in social and environmental psychology. Second, values are often conceptualized as context-specific priorities toward particular reference objects, such as the agri-food system – a perspective that has gained particular prominence in the environmental social sciences (ESSs). While both perspectives treat values as latent (i.e., not directly observable) properties requiring activation to guide behavior, we show how deep-seated values (such as altruism) can manifest in more specific value orientations (such as conceiving food security as a global public good). In doing so, we exemplify how different conceptualizations of values can be brought together to study cognitive and social drivers of transformative change.

Empirically, we examine values among stakeholders involved in or close to policymaking processes. This includes actors as diverse as public institutions, consultancy firms, agricultural cooperatives, banks, agribusinesses, and others (see Materials and Methods section). Our work thus complements studies examining the roles of consumers (e.g., Frehner et al. 2022) or farmers (e.g., Kopainsky et al. 2017) in the transformation of agri-food systems. While values held by these groups are certainly important, the values held by actors close to policymaking are presumably at least as consequential for the development of food systems.

At a practical level, our study provides empirical evidence to inform debates surrounding food-system change in the Netherlands. The Dutch case is particularly pertinent because it has become a hotspot of biodiversity loss, water pollution, nitrogen and greenhouse-gas (GHG) emissions, and challenges to human and animal health. As civil society actors increasingly highlight the importance of values,[2] empirically grounded knowledge about stakeholders' values might be a useful resource for these actors and initiatives. While recent research has emphasized technological innovation (Den Boer et al. 2021), alternative business models, and overcoming regime resistance (Vermunt et al. 2022), the role of values remains under-investigated.

The following section provides an overview of the empirical context. We then offer a more comprehensive foundation of the role of values, describe the data and methods, and present the results. We conclude with reflections on what can be learned from our inquiry for sustainability transformation research.

Context: the Dutch agri-food system and its challenges

The Dutch agri-food sector is an important pillar of the national economy. In 2023, it accounted for 6.9% of the gross domestic product (GDP) (Berkhout, van der Meulen, and Ramaekers 2024, 20). In international comparison, the Dutch agri-food sector is particularly geared toward exports. Despite the small land area available, the Netherlands is the second largest exporter of agricultural products in the world after the United States, with agri-food exports accounting for 17.5% of the country's total exports.[3] The centrality of the agri-food sector has historical roots reaching back a long time (Lintsen et al. 2018). An important factor contributing to the intensification of agriculture in the twentieth century was the traumatic experience of the "Hunger Winter" in 1944–1945, which led the government to embrace a structural transformation of the sector. This not only entailed increasing mechanization and rationalization but also the establishment of various agricultural organizations, interest groups, and research institutes (Aarts and Leeuwis 2023; Grin et al. 2004). Corresponding to a trend observed throughout Europe, average farm size in the Netherlands grew from 5.7 hectares in 1950 to 32.4 hectares in 2018 (Afrian, van der Wal, and Hoeksma 2020), while the number of farms decreased from 410,000 in 1950 to 51,000 in 2022, half of which are livestock farms.[4] Concentration processes have also occurred in the agri-food industry, which is characterized by a decreasing number of increasingly powerful suppliers and buyers (e.g., of feed, fertilizers, and farm machinery; see IPES-Food 2017).

This transformation toward a highly efficient sector heavily oriented toward technological innovation is associated with a dominant food-system paradigm built on maximizing agricultural output and retaining a strong position in world markets through economic growth (McGreevy et al. 2022; Tschersich and Kok 2022). A "dominant paradigm" refers to a coherent system of thought consisting of commonly accepted ideas and standards – most of which are taken for granted and rarely scrutinized –that shape a system's orientation and provide normative guidance (Göpel 2016; Hall 1993). Importantly, the currently dominant food-system paradigm comes at a major cost for ecological sustainability. According to the Netherlands Environmental Assessment Agency (PBL), much of the biodiversity in agricultural areas, which cover 60% of the country, has disappeared over the last century due to landscape changes, pesticide use, and high nitrogen and phosphate emissions (PBL 2020). Most nitrogen emissions originate from livestock farming – the Netherlands has the densest livestock sector in the world, with four times more animal biomass per hectare than the European Union (EU) average (Stokstad 2019). Although technological innovations helped reduce emissions such as ammonia and phosphate between 1990 and 2010, these trends have since leveled off, and environmental pressures from agriculture remain very high (PBL 2020, 43). The agricultural sector also contributes substantially to GHG emissions, which amounted to 25 megatons of carbon-dioxide equivalents (CO_2e) in 2023 (including greenhouse horticulture; see Berkhout, van der Meulen, and Ramaekers 2024, 122).[5] Moreover, the current agri-food system is associated with unhealthy food-consumption patterns that diverge from recommendations for a healthy and sustainable diet as defined by the EAT-Lancet Commission on healthy diets (Willett et al. 2019).[6]

There is growing consensus among stakeholders that the Dutch agri-food system requires a fundamental transformation to address the harmful impacts of current production and consumption practices on humans, non-human animals, and the environment (Bakker, Hassink, and van Veluw 2023; Gonzalez-Martinez et al. 2021). This urgency has been reinforced by a landmark 2019 ruling from the *Raad van State* (Council of State), the country's highest administrative court, which mandated a halt to building permits in areas exceeding EU nitrogen limits – limits the country has been breaching for decades.[7] While the need for fundamental change is widely recognized, interpretations of what such a transformation should involve differ significantly – ranging from technological innovation to calls for widespread adoption of regenerative, organic, or circular farming systems and shifts in consumption patterns (Farokhi, Harmanny, and Schulp 2024; Hoogstra et al. 2024; Schreefel et al. 2022). Despite numerous initiatives embracing sustainability in the agri-food system, its dominant paradigm so far has remained largely unchanged (PBL 2023, 19, 72).

The role of values in food-system transformation

Researchers acknowledge the important role that values can play in driving transformative change (Abson et al. 2017; Horlings 2015; Huntjens 2021; Huntjens and Kemp 2022; IPBES 2024; Visseren-Hamakers et al. 2021). For instance, Westley et al. (2011, 762) emphasize "systemic shifts in deeply held values and beliefs" and Steffen et al. (2018, 8258) argue that avoiding Earth-system destabilization demands "a fundamental reorientation of human values." This perspective is further developed in the Transformation Flower Approach (Huntjens et al. 2025a), which entails a practical framework to guide value-based governance and institutional innovation in complex systems.

However, understandings of values vary considerably across scholarly communities and beyond, and the term "value" is used differently in diverse contexts (Tadaki, Sinner, and Chan 2017). Here, we draw on two conceptions to anchor our understanding of values as potential drivers of transformative change. First, values as fundamental principles that shape cognition and behavior; and second, values as context-specific priorities related to food, nature, and non-human animals. We lay out the two perspectives in more detail below.

In psychological research, values are understood as principles or standards that guide people's interpretations, judgments, choices, and actions (Schwartz 2012). Values are seen as deep-seated and relatively stable cognitive structures embodying desirable goals that transcend specific situations and actions (Steg 2016). Understanding how values shape perceptions and behaviors offers important insights into how transformations, such as in food systems, can be guided by shifts in underlying value orientations. With respect to choices and behaviors relevant for environmental sustainability, four types of values have been shown to be most relevant (Steg and de Groot 2012).

1. Biospheric values (such as respecting the Earth) that focus on the quality of nature and the environment for their own sake.
2. Altruistic values (such as social justice) that focus on ways to benefit others.
3. Egoistic values (such as authority) that focus on the costs and benefits of different courses of action and on furthering one's own resources, for instance, wealth and power.
4. Hedonic values (such as gratification for oneself) that focus on what makes individuals feel good and help to reduce effort in the short term.

Biospheric and altruistic values reflect prosocial tendencies and research has shown them to be positively correlated in previous studies. While strong biospheric and altruistic values tend to be positively associated with pro-environmental behaviors, the opposite is true for strong egoistic and hedonic values, which are primarily concerned with the self (Steg and de Groot 2012). Importantly, these types of values are prioritized by individuals to different degrees. In concrete decision-making situations, individuals are often faced with conflicting values, and it is the relative importance of values that helps to explain actual decisions. For example, people with relatively strong biospheric values may still make choices that are misaligned with sustainability principles if they ultimately prioritize hedonic values. Moreover, while altruistic values tend to be positively related to pro-environmental beliefs and decisions, situations in which they stand in conflict with biospheric values may result in the prevalence of environmentally malign behaviors (Steg and de Groot 2012, 85).

Consequently, behavioral research emphasizes that holding certain values does not directly lead to certain behaviors. In particular, beliefs and personal norms, which are both derived from values but are much more specific, mediate the link between values and behavior (Stern 2000). The weight individuals place on biospheric values, for instance, determines the extent to which they develop specific beliefs about valued objects or beings such as non-human animals (e.g., the belief that animals should not be eaten) and environmental norms (e.g., the norm to avoid waste). The extent to which such beliefs and norms become activated, in turn, drives behaviors (Harland, Staats, and Wilke 1999; Schwartz 1977). For instance, in a shopping context where locally produced vegetables are labeled and the environmental benefits of short supply chains are emphasized (e.g., through advertising), individuals with strong biospheric values might engage in pro-environmental purchasing decisions. Individuals with strong egoistic or hedonic value dispositions, by contrast, may require

different conditions to behave in an environmentally friendly way – for example, locally produced vegetables would have to be cheaper and superior in look, taste, and texture than alternatives flown in, so that buying them would be perceived as pleasurable and convenient. As this example shows, egoistic and hedonic value orientations can also be associated with pro-environmental behaviors, provided that context conditions make such choices appear attractive.

These insights can also be transferred to other decision areas. For example, on one hand, if food governance defines economic efficiency as a strategic goal for a truly sustainable future food system, this may enhance the ability of stakeholders with strong egoistic value orientations to participate in the deliberation about transformative policy instruments.[8] For actors with a strong altruistic orientation, on the other hand, a focus on enhancing working conditions and collaboration in the future agri-food system might set a more productive context for this purpose.

Descriptive examinations of deep-seated values help to document the prevalence of environmentally relevant cognitive properties within a certain population. Yet, abstract environmental values rather indirectly speak to the more context-specific value conflicts relevant for the evolution of the agri-food system (see Tadaki, Sinner, and Chan 2017, 5). We, therefore, argue that to derive insights useful for practice and policy, knowledge about more specific values toward food and food systems would helpfully complement an assessment of environmental values. Conceptually, the ESS literature on environmental values offers a helpful way forward. This literature integrates the understanding of values as trans-situational and stable individual guidelines established in social and environmental psychology with a conceptually somewhat more flexible notion of values as "multiple ways in which nature, ecosystems, or ecosystems [sic] services are important for individuals or social groups" (Arias-Arévalo, Martín-López, and Gómez-Baggethun 2017, 43; see also Pascual et al. 2022). Much of the ESS literature distinguishes between different scopes of values, such as "broad" and "specific" values (Pascual et al. 2022). While "broad values" (e.g., environmental stewardship) refer to ultimate principles or goals, thereby closely resembling the psychological conception of values discussed above, "specific values" encapsulate "how people express the importance of particular elements…in given situations and contexts" (Anderson et al. 2022, 39), such as properties of food or systems of food production.

We consider recent research on environmental values that zooms in on values toward food and food systems. Several studies have used workshops or interviews with stakeholders to elicit values as "priorities for a sustainable and desirable food system" (Belisle-Toler, Hodbod, and Wentworth 2021, 362). Stakeholders in these studies repeatedly emphasized healthy food, local food production, education, and a sense of community as highly relevant values for a sustainable food system (Belisle-Toler, Hodbod, and Wentworth 2021; Garcia-Gonzalez and Eakin 2019). Recognizing that transforming the agri-food system is a deeply political endeavor, approaches based on (critical) political economy analysis have sought to unveil the variety of food values associated with current and envisioned sustainable future food systems. Along these lines, while valuing food as a commodity is standard in market economies, this might obscure and marginalize multiple non-economic values of food (Rundgren 2016). For instance, food may also be valued as a public good, a human right, or a cultural determinant that shapes identities and cohesion within communities (Vivero-Pol 2017). However, knowledge about the prevalence of such understandings among broader constituencies is lacking so far.

Taking inspiration from research on food-system values rooted in the environmental social sciences, we argue that both layers of values – values as deep-seated and trans-situational guidelines and values as more context-specific priorities regarding the food system – are connected. Specifically, the four types of deep-seated values (biospheric, altruistic, egoistic, hedonic) are likely to give rise to more specific value orientations toward the food system. While the four types of values established in psychological research have been shown to occur across the globe (Steg and de Groot 2012), food-system values are likely to differ from one context to another. Therefore, our empirical investigation entails both deductive and inductive elements: While deep-seated values will be assessed based on established measurement tools, emerging food-system values will be examined in an explorative way. To gauge the ways in which food-system values are consequential for sustainability-relevant decisions, we will also statistically explore how they relate to stakeholders' views on transformative change.

Materials and methods

Target population and sample

We developed a survey to empirically measure stakeholders' values. Our conceptualization of the target population was inspired by studies of political elites in sociology and public policy. Acknowledging the centrality of politics in the shaping and articulation of values, the population of stakeholders was defined as including domestic actors that participate in the public policymaking process related to Dutch food and agriculture. In doing so, "participation" was broadly defined, and hence not only includes direct law-drafting activities or information provision to the government or parliament, but also public expressions of opinion or having a reputation of being politically influential. The results of this study should not be generalized to a broader set of stakeholders.

Concretely, we followed four independent steps to identify stakeholders (Knoke 1993). First, based on the decisional approach of actor identification, we identified stakeholders that had actively participated in recent (2018–2023) food and agricultural policy processes. Second, based on the positional approach, we identified all actors holding an institutionalized position of authority in food and agricultural policy (e.g., relevant ministries). Third, inspired by the reputational approach, we used several data sources to identify actors with a reputation for influence in this domain. Finally, going beyond Knoke's three classic approaches in the study of political elites, we identified relevant actors mentioned in Dutch news articles (2018–2023). Here, we relied on an automated linguistic analysis provided by Factiva. Factiva is a business information and research tool that aggregates content from licensed and freely available sources, such as newspapers, journals, and magazines. These four steps were conducted independently. The resulting stakeholder lists were then merged, and duplicates removed, resulting in a target population of 592 stakeholders. Contact information was compiled for all these actors in preparation for conducting the survey. Appendix 1 provides details on the actor-identification procedure.

The survey was delivered via electronic and postal mail in July 2023, and participation was open until September 2023 (for details, see Appendix 2). A total of 223 stakeholders participated in the survey (response rate: 37.7%), of whom 155 stakeholders completed all questions (completion rate: 69.5%). We also retained the responses provided by 19 actors who did not complete the full questionnaire but responded to at least 60% of the questions, covering all variables analyzed in this article. Our analyses are thus based on responses provided by 174 stakeholders.

Participation in the survey was voluntary, and informed consent was obtained from all participants prior to participation. Respondents were assured of strict confidentiality: all data were used exclusively for research purposes, were not shared with third parties, and were presented in such a way that individual identities could not be inferred. Given the noninvasive nature of the survey, no formal ethical approval was required.

Figure 1 provides a characterization of the sample by illustrating the numbers of actors invited and the response rate per actor category. Response rates differ substantially between different actor categories. Among the categories with at least 30 invited stakeholders, nongovernmental organizations (NGOs) (64%) and interest groups (58%) are characterized by the highest response rates. Interest groups also feature the highest absolute number of respondents (29), followed by actors representing academia/research (27) and NGOs (25). While food businesses (16%) and agribusinesses (13%) achieve relatively low response rates, they were still more responsive than policymakers and government representatives (0%). The different participation rates of actors across categories should be kept in mind when interpreting the survey results. Further information on the sample is assembled in Appendixes 3 and 6.

Measurement and aggregation of theoretical constructs

We measured environmental values using the survey instrument Environmental Portrait Value Questionnaire (E-PVQ) developed by Bouman, Steg, and Kiers (2018). The E-PVQ consists of 17 statements, each answered on a 7-point scale, to measure the extent to which respondents endorse biospheric, altruistic, egoistic, and hedonic values (see Appendix 4 for details). We created an additive

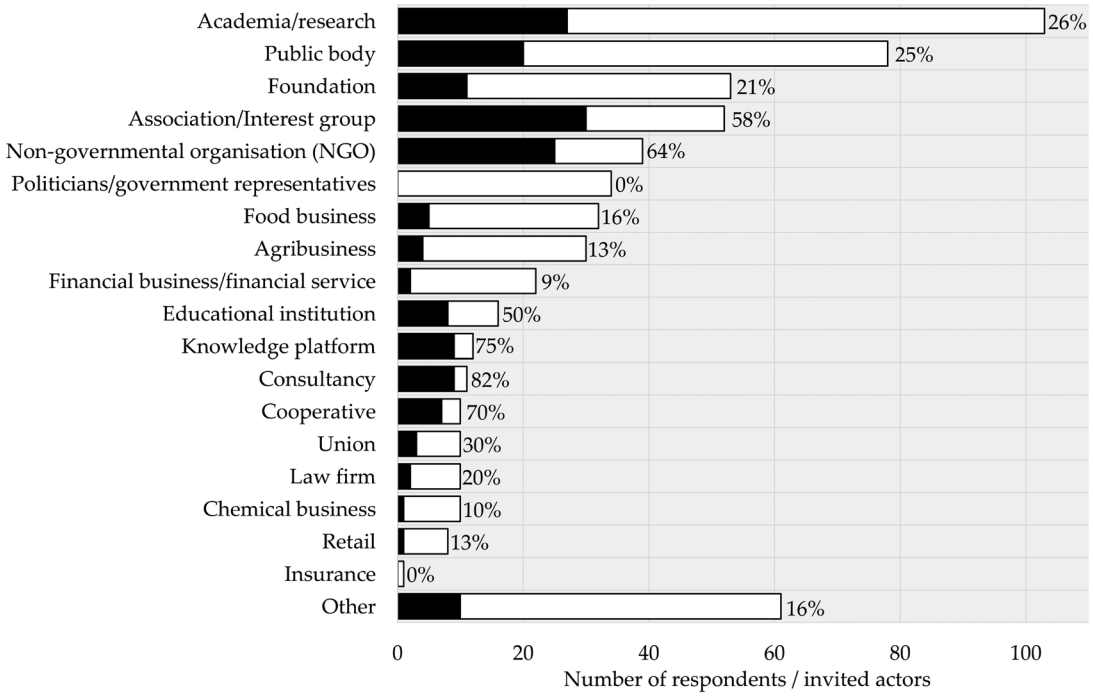


Figure 1. Participation across actor categories. *Note:* The black part of the bars represents the number of actors per category participating in the survey; the full bar represents the number of actors per category that were invited in the first place. Percentages indicate the share of participating actors per category.

index for each of the four values and standardized the resulting values to the range [0, 1], with 0 indicating no endorsement of the respective value, and 1 indicating very strong endorsement.

To measure values toward the food system, participants responded to a set of statements about its characteristics, indicating how important they considered each one. Responses were given on a 5-point scale from 1 (Not important at all) to 5 (Highly important). The statements covered diverse aspects such as the broader orientation of the food system (e.g., toward local food production, global markets, or technological innovation), food-system functions (e.g., promoting public welfare, social innovations, providing a community) and characteristics of food (e.g., accessibility of vegan or ecological food options). In constructing the survey items, we took inspiration from Garcia-Gonzalez and Eakin (2019), Belisle-Toler, Hodbod, and Wentworth (2021), and Vivero-Pol (2017). In addition to 16 survey items that were based on these studies, we developed 8 new items to capture aspects underrepresented by these works (see Appendix 5 for the final set of items).

To identify broader clusters among the 24 survey items, we applied an inductive statistical method known as exploratory factor analysis (EFA). EFA groups survey items based on how similar respondents rated them, revealing underlying value orientations that emerge from the data rather than being imposed by the researcher. Hence, while the formulation of most survey items was guided deductively by recent academic studies, the categorization into four value orientations emerged inductively from the factor analysis. We then created additive indices for the emerging food-system values described below and standardized them to the range [0, 1].

To explore how food-system values guide stakeholders' views on transformative change, we assessed two additional properties that serve as dependent variables in the analysis. First, we measured stakeholders' perceived need for change: on a scale from 0 (No changes necessary) to 100 (Fundamental changes necessary), stakeholders indicated whether they saw a need for change in the Dutch food system. Second, we asked respondents to rate their support for different policies to transform the Dutch food system. Using a scale from 0 (No support at all) to 10 (Full support), they indicated whether they endorsed the introduction of (a) a program to support civil society initiatives for climate-friendly agriculture and nutrition (e.g., food councils, educational projects), (b) a CO_2 levy on food and food products, and (c) a program to help farmers transition to more extensive farming

methods (e.g., with fewer animals and larger land areas). These measures reflect current policy proposals. Based on these three items, we created an additive index of policy support. Before fielding the survey, we conducted pretests with six colleagues with expertise in survey methodology and the research subject. Based on their feedback, we refined the questionnaire to enhance clarity and minimize cognitive overload for respondents.

Data analysis

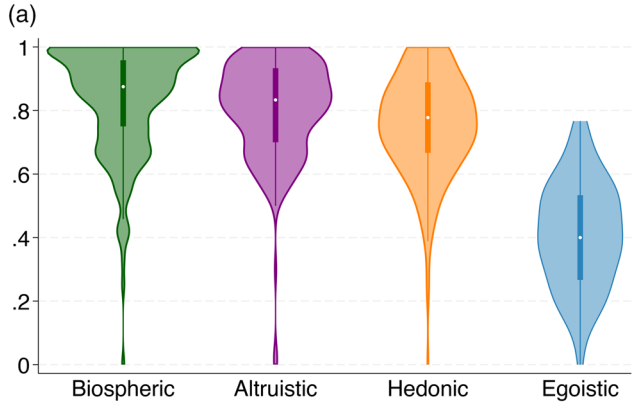
Our data analysis proceeds in four steps. First, we map the prevalence of environmental values among stakeholders based on combined density and box plots (so-called violin plots). Second, we use the same descriptive tool to examine the prevalence of food-system values obtained via factor analysis. Third, we use linear regression analysis to explore the relationship between general environmental values and food-system values. And finally, we regress the two dependent variables (need for change and policy support) on food-system values and a battery of control variables.

Results

Environmental values

Figure 2(a) illustrates the extent to which stakeholders of the Dutch food system endorsed the four types of environmental values. For each of the four values, the so-called violin plots show the median (mdn, indicated by the white dot), the range of values within the second and third quartiles of the distribution (the darker boxes), and the overall distribution of data points, as indicated by the surrounding colored areas. Figure 2(a) shows that biospheric (mdn = 0.88), altruistic (mdn = 0.83), and hedonic (mdn = 0.78) values were all relatively strongly endorsed by most respondents, while egoistic (mdn = 0.40) values were considerably less pronounced. The correlation matrix in Figure 2(b) unveils the relations of our indicators of environmental values. The strongest correlation ($r = 0.495$) can be found between biospheric and altruistic values. Conversely, biospheric and egoistic values are not correlated ($r = 0.051$).

The fact that both biospheric and altruistic values were endorsed relatively strongly by the surveyed stakeholders suggests that there is generally a strong motivational basis for acting toward a more sustainable food system among stakeholders. At the same time, hedonic values, which were also endorsed rather strongly, often stand in the way of pro-environmental choices, especially if the latter would be perceived as compromising comfort or pleasure. In such situations, biospheric or altruistic values can be suppressed by hedonic or egoistic values.



(b)

	Biospheric	Altruistic	Hedonic	Egoistic
Biospheric	**.925**			
Altruistic	.495	**.788**		
Hedonic	.285	.462	**.800**	
Egoistic	.051	.217	.281	**.714**

Figure 2. (a) Prevalence of environmental values among stakeholders ($n = 174$) and (b) correlation coefficients. *Note:* Based on 17 items measuring biospheric, altruistic, hedonic, and egoistic values. For all four value types, additive indices were constructed, and the resulting scores were normalized to the range [0, 1] (see y-axis). The bold values in the diagonal indicate Cronbach's alpha.

Values toward the food system

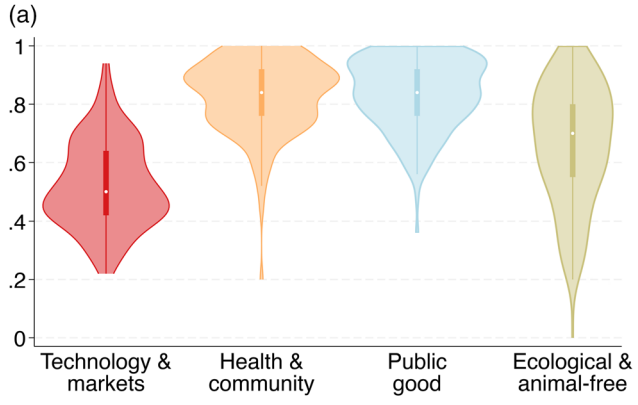
The EFA revealed four underlying dimensions based on patterns of covariance among the survey items. Based on the set of items associated with each dimension, we interpret and label these as broader value orientations among stakeholders of the Dutch food system. The four value orientations are as follows:

1. *Technology and markets*: An orientation emphasizing technological innovation, financial profitability, world markets, and improved conventional production methods.
2. *Health and community*: An orientation highlighting public welfare as a food-system function, along with an emphasis on health, community, education, and social innovation.
3. *Public good*: An orientation emphasizing food and nutrition security as a global public good and the state's role in ensuring the right to food, for example, by improving access to food for people in need.
4. *Ecological and animal-free*: An orientation highlighting accessibility of ecological and vegan-food options, as well as endorsement of urban and animal-free agriculture.

Figure 3(a) illustrates the extent to which stakeholders endorsed these four value orientations. *Health and community* (mdn = 0.84) and *Public good* (mdn = 0.84) found rather strong endorsement among almost all stakeholders. In contrast, *Ecological and animal-free* was considered less important (mdn = 0.70) but was still more strongly endorsed compared to *Technology and markets* (mdn = 0.50). The dispersion around the mean as indicated by the standard deviation (SD) is higher for *Ecological and animal-free* (SD = 0.21) compared to *Health and community* (SD = 0.13), *Public good* (SD = 0.15), and *Technology and markets* (SD = 0.15), pointing to more strongly diverging views for this value orientation among stakeholders.

Apart from these univariate distributions, we assess how the four value orientations are related to each other. As indicated by the correlation coefficients in Figure 3(b), *Health and community* is positively correlated with *Public good* ($r = 0.464$) and *Ecological and animal-free* ($r = 0.454$), but negatively (though rather weakly so) with *Technology and markets* ($r = -0.300$). The strongest negative correlation can be found between *Ecological and animal-free* and *Technology and markets* ($r = -0.599$).

Figure 4 provides a more detailed assessment of value orientations among Dutch food-system stakeholders by distinguishing between types of actors. As can be seen, the value orientations *Health and community* and *Public good* found rather strong endorsement among all types of actors. The more interesting patterns relate to the ways in which different types of actors prioritized *Technology and markets*, onone hand, and *Ecological and animal-free* on the other. *Technology and markets*, an orientation that reflects the currently dominating food-system paradigm, found relatively strong



(b)

	Tech & markets	Health & comm.	Public good	Ecol.
Tech & markets	**.808**			
Health & comm.	-.300	**.725**		
Public good	-.242	.464	**.717**	
Ecol.	-.599	.454	.363	**.796**

Figure 3. (a) Prevalence of values toward the food system among stakeholders ($n = 174$) and (b) correlation coefficients. *Note:* Based on 24 items measuring values toward the food system. Four broad value orientations were derived from exploratory factor analysis. For all four value orientations, additive indices were constructed, and the resulting scores were normalized to the range [0, 1] (see y-axis). The bold values in the diagonal indicate Cronbach's alpha.

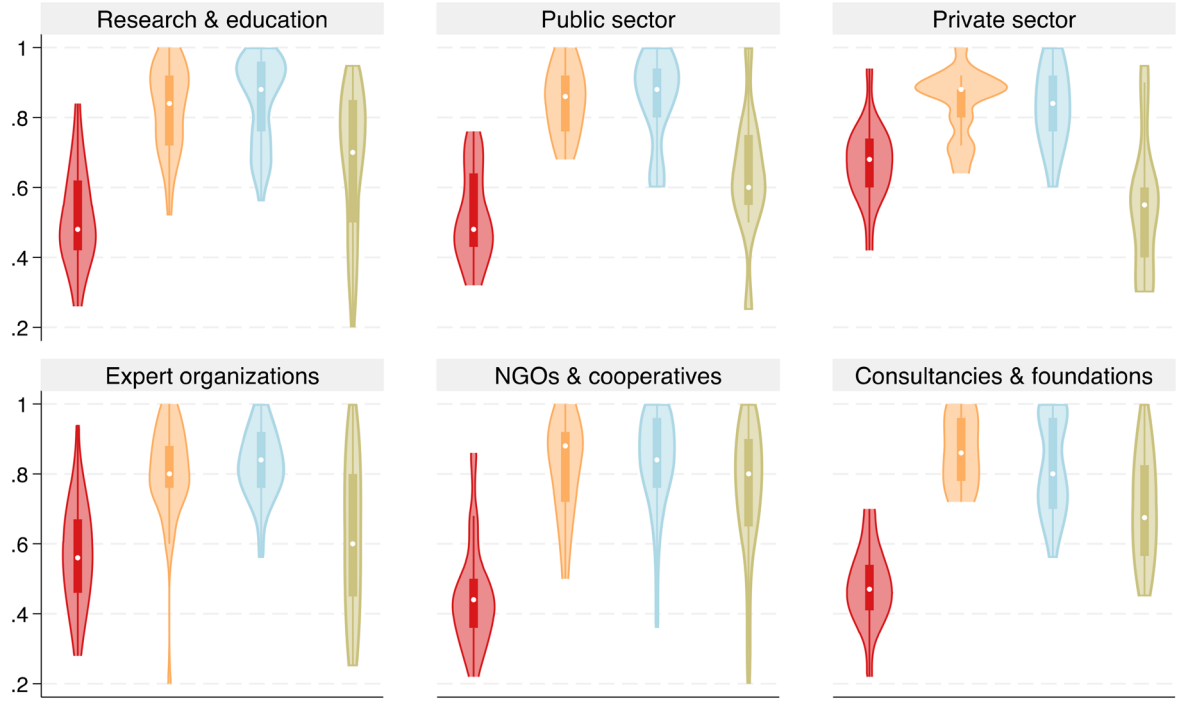


Figure 4. Prevalence of values toward the food system among stakeholders ($n = 168$) representing different types of organizations. *Note:* Same color codes as in Figure 3. Residual actor category "Other" ($n = 6$) omitted.

Table 1. Linear regressions of general environmental values and food-system values.

	Technology and markets	Health and community	Public good	Ecological and animal-free
Biospheric	−.452 (.065)**	.171 (.061)**	.081 (.056)	.614 (.095)**
Altruistic	.201 (.078)*	.118 (.073)	.347 (.067)**	−.182 (.113)
Hedonic	.080 (.069)	−.047 (.065)	−.141 (.059)*	−.075 (.100)
Egoistic	.209 (.063)**	−.095 (.059)	−.149 (.054)**	−.064 (.091)
Constant	.593 (.062)**	.667 (.059)**	.655 (.053)**	.378 (.090)**
N	174	174	174	174
R^2	.281	.107	.226	.210

Note: Results from four separate regression analyses with food system values as dependent variables and environmental values as independent variables. *$p < .05$, **$p < .01$.

endorsement among actors representing the private sector (mdn = 0.68) but tended to be deprioritized by the other actor types. *Ecological and animal-free* found strong endorsement among NGOs and cooperatives (mdn = 0.80), stakeholders representing research and education (mdn = 0.70), and consultancy firms and foundations (mdn = 0.68), but considerably less approval among others. As indicated by the shapes of the density distributions in Figure 4, there was less congruence among stakeholders across all types regarding their level of endorsement of *Ecological and animal-free* values.

Regression analysis

Next, we explore how environmental values and food-system values relate to each other. We do so by regressing the four value orientations obtained by factor analysis on the four environmental values – biospheric, altruistic, hedonic, and egoistic – established by Steg and de Groot (2012). As can be seen in Table 1, endorsement of food-system values can be explained by general environmental values to varying degrees. Of the four environmental values, biospheric values are most strongly associated with food-system values. There is a statistically significant relationship between biospheric values and *Ecological and animal-free* and *Health and community* (both positive), as well as *Technology and markets* (negative). Somewhat surprisingly, altruistic values are positively and significantly related not only to *Public good*, but also to *Technology and markets*. Hedonic values provide limited explanatory leeway, as they are associated only with *Public good*, in fact in a negative and rather weak (albeit

statistically significant) relationship. Finally, egoistic values are significantly related to *Technology and markets* (positive) and *Public good* (negative).

We now use regression analysis to examine the explanatory leverage of food-system values in the context of two focal variables relevant for the transformation of agri-food systems: (a) the perceived need for change and (b) the support for public policies to make the agri-food system more environmentally sustainable. Table 2 entails regression coefficients obtained from four models. Models (1) and (3) include fewer control variables to avoid losing observations with missing data, while Models (2) and (4) represent the full models but entail fewer observations. For both dependent variables, however, the models yield qualitatively very similar results.

For both dependent variables, the coefficients for *Technology and markets* are consistently negative and highly statistically significant. This indicates that endorsement of this value orientation is associated with a significantly lower perceived need for change in the Dutch food system and with significantly reduced support for public policies such as a CO_2 levy on food products or support programs to make domestic agriculture more sustainable. The inverse pattern can be observed for the value orientation *Ecological and animal-free*, which is strongly positively associated with both a perceived need for change and policy support.

The other two value orientations, *Health and community* and *Public good*, carry less explanatory leverage. Stronger endorsement of *Health and community* is significantly and positively related only to policy support, while the coefficients for *Public good* are statistically significant only for the perceived need for change. The fact that these two value orientations are less strongly associated with the dependent variables might partly be due to ceiling effects, given the relatively high mean values and low variance of the univariate distributions.

Interestingly, none of the control variables (with one exception) is statistically significantly related to our dependent variables. In other words, stakeholders' characteristics such as their age, place of residence, gender, self-perceived competence, seniority, or organizational type do not matter when it comes to explaining perceived need for change or policy support. The only exception is the size of the organization, which is significantly and positively related to policy support. Put differently, bigger organizations tend to support policies for the transformation of the Dutch food system more strongly compared to smaller organizations.

Discussion and conclusion

Our investigation delivers the following insights. First, biospheric and altruistic values, which we consider as backbones of a socially and environmentally sustainable food system, were quite strongly

Table 2. Linear regressions of standardized dependent variables on food-system values and control variables.

	(1) Need for change	(2) Need for change	(3) Policy support	(4) Policy support
Technology & markets	−2.273 (.502)**	−2.441 (.552)**	−1.768 (.498)**	−2.058 (.534)**
Health & community	.279 (.557)	.508 (.587)	1.444 (.552)*	1.431 (.567)*
Public good	1.408 (.525)**	1.548 (.601)*	.303 (.522)	.558 (.582)
Ecological & animal-free	1.719 (.381)**	1.978 (.456)**	2.010 (.379)**	1.967 (.442)**
Age	.005 (.005)	.011 (.006)	.002 (.005)	.003 (.006)
Place of residence	−.041 (.005)	−.009 (.077)	.002 (.074)	−.013 (.075)
Gender	−.007 (.065)	−.073 (.069)	−.088 (.065)	−.118 (.067)
Competence	–	.027 (.081)	–	−.015 (.078)
Size of organization	–	.104 (.054)	–	.136 (.052)*
Seniority	−.019 (.027)	−.030 (.027)	−.021 (.026)	−.008 (.027)
Org. type: Research & education	.060 (.326)	−.402 (.370)	−.029 (.324)	−.313 (.357)
Org. type: Public sector	.257 (.346)	−.039 (.384)	.247 (.343)	.140 (.371)
Org. type: Private sector	.172 (.358)	−.094 (.390)	−.075 (.355)	−.223 (.377)
Org. type: Expert organization	.018 (.322)	−.197 (.352)	−.159 (.319)	−.114 (.340)
Org. type: NGOs & cooperatives	.107 (.325)	−.046 (.351)	−.089 (.322)	.039 (.339)
Org. type: Consultancies & foundations	.244 (.341)	.222 (.367)	−.215 (.340)	−.138 (.357)
constant	−1.493 (.764)	−2.258 (.897)*	−1.594 (.760)*	−1.975 (.868)*
n	174	146	173	145
R^2	.518	.594	.526	.596

Note: Results from four separate regression analyses. For the measurement and distributions of independent variables, see Appendix 6.
*$p < .05$, **$p < .01$.

endorsed among the surveyed stakeholders, while egoistic values, which revolve around the cost-benefit calculus of different courses of action, were comparatively less endorsed. This pattern is in line with the distribution of value endorsement across Europe according to the European Social Survey 9 (2018/2019), as reported by Bouman et al. (2021). This consistency of findings between general population surveys and our stakeholder survey in the Dutch food system context suggests that values conducive to sustainability transformations are widely held across different societal segments. However, their salience and interpretation can vary depending on situational and institutional contexts (Schwartz 2012). Hence, even widely held values may differ in how strongly they influence concrete behaviors and decisions in different settings, a point to which we return below.

Second, with respect to our explorative examination of food-system values, stakeholders on average strongly endorsed a *Public good* orientation, which emphasizes security of food and nutrition as a global public good, as well as a value orientation called *Health and community,* which revolves around health, community, education, social innovation, and public welfare as a food-system function. The third value orientation, *Ecological and animal-free,* received somewhat less endorsement on average, but still substantively more than a value orientation emphasizing *Technology and markets*. Importantly, *Technology and markets* underpins key aspects of the currently dominating food-system paradigm, which revolves around technological innovation, financial profitability, world markets, and improved conventional production methods. Our findings hence suggest that stakeholders' values align more closely with calls for a "paradigm shift" (IPES-Food 2016; Ruben et al. 2021; Tschersich and Kok 2022) than with the currently dominant food-system paradigm.

Still, our analysis does not forecast the likelihood of transformative change. While the prevalence of pro-change values among stakeholders may create openings for transformation, institutional and policy changes are required to overcome systemic inertia and translate pro-change values into sustained systemic shifts. This entails addressing structural dynamics, notably the dominance of market incentives and competition logics, which often prevent values related to health, community, and ecological sustainability from being activated at the point of decision-making. Our analysis thus offers complementary insights to political economy analyses that emphasize the need for institutional changes (such as better representation of non-farm interests in policymaking), improved vertical governance coordination (particularly between the European Union and member states), and greater efforts to empower consumers to shift dietary behaviors as necessary conditions for change toward more sustainable agri-food systems (Matthews et al. 2023).

Third, our regression analyses suggest that stakeholders' food-system values help explain the degree to which they perceive a need for change, and the extent to which they support public policies to make the agri-food system more environmentally sustainable. While an emphasis on *Technology and markets* underpins a preference for the status quo and rejection of policy interventions, the value orientation *Ecological and animal-free* is associated with a perceived need for change and support for public policies.

Stakeholders' values appear to be favorable to transformative change in the Dutch agri-food system, but actors aiming to foster such change need to be aware of the value-action gap, which describes the discrepancy between endorsement of latent values and actual decisions (Blake 1999; Te Velde, Aarts, and van Woerkum 2002). Several approaches could help leverage values for transformative change. First, stakeholders themselves could work toward shaping decision contexts that favor the activation of biospheric and altruistic values. Along these lines, cultural change within businesses toward "true business sustainability" would move companies from an egoistic, inside-out perspective (taking the business as starting point for all actions) to an outside-in perspective (asking how a business can effectively contribute to solving sustainability challenges) (Dyllick and Muff 2016). Supermarkets and restaurants, for example, can foster healthier, more sustainable food environments by steering their product portfolios, using targeted marketing, or adjusting pricing strategies (e.g., offering plant-based options at a discount), thereby supporting the activation of pro-environmental values (van Hoeven et al. 2024). Second, changes in decision-making procedures and the implementation of institutional innovations can help stakeholders articulate and translate their values into tangible decisions. Food-policy councils (Schiff 2008) and multi-stakeholder platforms (Herens, Pittore,

and Oosterveer 2022) exemplify mechanisms that can bridge the value-action gap, provided they are granted sufficient authority to influence binding policies. Third, public policy can deploy a range of instruments to promote value-based sustainable actions. Fiscal measures, such as tax breaks or subsidies, can make plant-based and meat-alternative food more affordable and accessible (Fesenfeld et al. 2023), thereby appealing particularly to consumers who prioritize hedonic or egoistic values. Moreover, clear labeling of environmental and social impacts helps consumers make more sustainable choices, responding to their stated preferences for transparency (Ammann et al. 2023). As these examples show, a combination of strategies at different levels can help create enabling contexts that facilitate the translation of latent values into decisions supporting transformative change toward a sustainable agri-food system.

Along with prior scholarly work on environmental values (e.g., Anderson et al. 2022; Steg 2016), our study seeks to inform the literature on natural or eco-social contracts (Gough 2022; Huntjens 2021; Huntjens et al. 2025b; UNRISD 2022). A central tenet of this emerging body of work is that confronting today's sustainability challenges requires a new social contract. Biospheric and altruistic values are assigned critical roles in shaping the principles and governance instruments of this new social contract, as they are understood to engender pro-environmental choices, fostering a harmonious relationship between humans and nature, and ensuring sustainable, equitable societies (Huntjens 2021). Our study documents the prevalence of pro-social and pro-environmental values among stakeholders of a core system of production and consumption, and scholars working on new social contracts and other models of transformative governance may take these results as encouragement for developing practical and evidence-based principles to guide sustainability transformations based on these values.

This study is not without limitations. First, our descriptive analysis of environmental and food-system values does not provide a representative picture of all stakeholders in the Dutch agri-food system. Despite a comprehensive stakeholder-identification procedure, some groups were harder to reach than others (see Figure 1). Moreover, we deliberately focused on domestic actors participating in relevant public policymaking processes and thereby did not study the values of marginalized stakeholders. As such, the findings should not be generalized beyond this specific context. Nonetheless, we hope our approach will inspire further empirical research on the role of values among other groups (including marginalized ones) and in other settings relevant to sustainability transformations. We would also welcome longitudinal approaches to study how stakeholder values evolve and reconfigure in response to changing context conditions.

Second, while our study offers a bird's-eye view of food-system values, it does not capture a more contextualized understanding of the situated meaning, interpretation, or lived experience of different value orientations, nor of their emergence and dynamic reconfigurations (see Nijland, Aarts, and van Woerkum 2018 for a more contextualized approach). We leave such a more comprehensive analysis to future work.

Finally, we acknowledge that conceptualizing values as an individual-level phenomenon has its limitations. Future studies should build more strongly on the work of cognitive anthropologists, cultural economists, and organizational scholars who conceptualize values as a property that permeates social groups. Values, accordingly, encapsulate "collective social structures" rather than individual cognitive patterns (D'Andrade 2008). Organizational values are emergent phenomena fundamentally shaped by power relations, group dynamics, preexisting institutions, and values prevailing in institutional fields (Bourne and Jenkins 2013; D'Andrade 2008). Importantly, socialization processes may lead to a dominance of organizational values vis-à-vis personal values when it comes to individual judgment and decision-making. The prevalence of organizational values might thus help to explain why individuals do not always act in line with their personal values. We would welcome future research proceeding from a less individualist ontology to empirically examine manifestations of values at both the personal and organizational levels. Although such an exercise would be methodologically demanding, it might enable a better understanding of how individuals resolve situations of conflicting values in specific contexts. These insights might be helpful for developing interventions that contribute to resolving such situations in a way that fosters sustainable actions (see also Finegan 2000; Vandenberghe and Peiro 1999).

While research in the sustainability sciences often hypothesizes values and value change as key drivers of sustainability transformations, empirical examinations of values held by relevant actors remain limited. Drawing on environmental psychology and the ESSs, this study has proposed ways to measure environmental values and food-system values among policy-relevant stakeholders. Relying on the case of the Dutch agri-food system, our findings suggest that pro-environmental values and values favoring food-system change are widely shared among stakeholders. At the same time, the primary logics of the current agri-food system find relatively little correspondence in stakeholders' value orientations. Initiatives to accelerate transformative change in the agri-food sector may be well advised to focus on the creation of enabling contexts that favor the translation of values into sustainable actions. Creating such contexts requires addressing the structural barriers – such as economic constraints, special interests, and non-inclusive institutions – that can hinder the activation of pro-change values.

Notes

1. While the terms "transition" and "transformation" are often used interchangeably, we define transitions as more incremental, process-oriented changes within existing systems, and transformations as deeper, systemic shifts that challenge dominant paradigms, structures, and value systems (IPBES 2024).
2. For instance, Food Otherwise Netherlands (https://www.voedselanders.nl/manifest), the Food Transition Coalition (https://transitiecoalitievoedsel.nl/english), and the Participation Table Food Transition (https://www.duurzaamdoor.nl/participatietafel-voedseltransitie).
3. See https://www.government.nl/topics/agriculture/agriculture-and-horticulture.
4. See https://opendata.cbs.nl/statline/#/CBS/nl/dataset/71904ned/table?ts=1530728489806.
5. This is nearly as much as the entire Danish economy (27.3 megatons) and equivalent to the combined emissions of Croatia, Montenegro, and Albania in 2023 (see https://ourworldindata.org/co2-emissions).
6. For instance, while the reference diet recommends between 0 and 10.2 kilograms (kgs) intake of red meat per year, the average Dutch resident consumed 51.3 kgs of red meat in 2022 according to Dagevos et al. (2023).
7. See https://www.politico.eu/article/netherlands-nitrogen-headache-pollution.
8. It is a different question to what extent transformative food-system governance is compatible with the concept of efficiency.

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Data availability statement

Participating stakeholders were guaranteed strict confidentiality, which is why the dataset cannot be shared in public. Anonymized extracts can be made available upon request by the corresponding author.

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