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Article

Shared responsibility: understanding the role of governments, farmers, retailers, and consumers in food system policies

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Abstract

This paper explores the question of responsibility for transforming food systems toward greater sustainability. While many agree on general policy goals (e.g. environmental protection, sustainable food consumption, and fair income for farmers), there is less consensus on who should be responsible for achieving these goals. We fill this gap by examining how Swiss citizens perceive the responsibilities of government, farmers, retailers, and consumers. We analyzed two Swiss citizen surveys on agricultural policy and sustainable food consumption. We find that citizens recognize the need for a shared responsibility among governments, farmers, retailers, and consumers—for both agricultural policy and for consumer policy—suggesting that they already hold a systems perspective. Only the perceived role of the government differs, which is seen as highly responsible for achieving agricultural policy goals and less responsible for ensuring sustainable food consumption. Those who perceive food consumption as a government responsibility are more willing to accept policy measures, even if these measures limit their food choices. As nutrition and food consumption have only recently become a policy focus, it may be important to clearly communicate and explain this (new) responsibility to the public.

Keywords: agricultural policy, shared responsibility, sustainable consumption, Switzerland, systems approach
JEL codes: Q18, Q28

1. Introduction

Transforming food systems is key to achieving the United Nations Sustainable Development Goals (Vermeir and Verbeke 2006; Herrero et al. 2020, 2021; Pe'er et al. 2020). The emerging food systems policy approach seeks to address the entire food value chain by recognizing the interconnectedness of food systems. It aims to integrate economic, social, environmental, animal welfare, and health issues into a single policy approach, targeting the entire value chain from production to consumption (Schebesta and Candel 2020). Hence, such a food system approach requires interaction between multiple sectoral policies

(De Schutter et al. 2020; OECD 2023). Furthermore, there is a consensus that food systems can only be transformed through the collective action of governments, farmers, retailers, and consumers (Jones 2011; Bock et al. 2022). In such a complex system with multiple actors, responsibilities tend to be interlinked and overlapping. Although this holistic systems approach may be good for conceptualizing the need for change, there is a risk of overlooking governance mechanisms and blurring the responsibilities of different actors (Harrison 2003). Furthermore, in democratic societies, citizens should understand the policy approach. They should agree on certain policy goals, be willing to accept measures that directly affect them as consumers, and agree on the responsibilities, the last sometimes overlooked. Such democratic legitimization is key to a sustainable food system transformation (Dingwerth et al. 2020). Yet, the extent to which people ascribe responsibility to the various actors in food systems is not known.

This study aims to shed light on responsibilities in food system transformation by exploring how Swiss citizens perceive these responsibilities. First, we investigate the extent to which the general public ascribes responsibility to the various actors involved in the transformation toward a sustainable food system. We do so through a survey of Swiss citizens to elicit who they hold responsible: farmers, retailers, consumers, or the government. Second, we analyze whether the degree of responsibility attributed to these actors varies between production-oriented agricultural policies and consumption-oriented food policies. Third, we analyze how the perceived responsibility of different actors affects the perception of policy goals. For example, do people who call for a powerful state have different policy priorities than people who trust market mechanisms and see farmers and retailers as highly responsible? Finally, we assess how the perceived responsibility of different actors contributes to objections—or acceptance—of policy measures targeting sustainable consumption. For example, are people who attribute a high degree of responsibility to consumers more or less willing to accept taxes on certain food items?

Existing studies have focused on consumers' perceived responsibility for their own role (Paço and Gouveia Rodrigues 2016; Čapienė et al. 2022) but not in comparison to other actors in the system. They reported that high perceived responsibility may be associated with more pro-environmental consumption behavior (Čapienė et al. 2022) but not with stronger engagement on a political level, for instance, through environmental activism (Paço and Gouveia Rodrigues 2016).

Existing literature on the concept of *responsibility* in policy contexts (e.g. Pellizzoni 2004, 2005; Arnold et al. 2022) argues that responsibility has two basic meanings: one is the possibility of tracing back an action to an agent as its causal factor ("imputability"), with causality understood as choice and the ability to influence events. The second is accountability, in the sense of justifying one's own conduct with the presence of moral or legal rules ("feeling/being responsible") as reasons for this conduct. Hence, responsibility means that the actor should be in charge—regardless of the expectations that the actor will or will not do so. Responsibility thus differs from *trust*, defined as the confidence in an actor, that is, perceived ability, benevolence, and integrity (Mayer et al. 1995).

Specifically for food systems, there have been insights into how consumers envision a transition to more sustainable food systems and what policy goals they consider important (e.g. O'Keefe et al. 2016; Van Bussel et al. 2022; El Benni et al. 2024a). Similarly, there is a strand of literature on the acceptance of food policy measures, including demand-side measures, such as labels, nudges, taxes, and subsidies, or strict interventions, such as sales bans (e.g. Hagmann et al. 2018; Cadario and Chandon 2019; Grimsrud et al. 2020; Ammann et al. 2025a).

Accompanying the evolution of agri-food systems and its increasing complexity, many scholars have discussed the challenges and possible solutions of more integrated policy approaches with multi-stakeholder partnerships (Pattberg and Widerberg 2016; Thorpe et al. 2022). It is popular and widely accepted to advocate for a food systems approach that

considers economic, environmental, and social dimensions simultaneously (Ingram 2011; Foran et al. 2014). Brouwer et al. (2020) stresses that systems approaches are needed to account for the interconnectedness of food production, distribution, and consumption processes. This discourse often highlights the importance of multi-stakeholder collaboration, but stays on a theoretical level (Lang and Barling 2012).

However, we currently lack empirical evidence on who people think is responsible for transforming our food systems. Is it governments, farmers, retailers, or themselves as consumers? Do people understand the systems approach? Because responsibility is not a binary question of yes or no but an ongoing process of negotiation, these questions are of particular interest in times of transformation, such as the current one for food systems (Arnold et al. 2022). Our study tackles these questions from the viewpoint of citizens, because in democratic societies, it is crucial that civil society understands the policy approach. People in their roles as citizens, voters, and consumers should not only agree on certain policy goals but also be willing to accept measures that directly affect them, and they should agree on the responsibilities, which is sometimes overlooked. Although this is not entirely new, it is becoming increasingly important as (1) the food policy approach becomes more complex, and (2) more demand-side measures are discussed, potentially affecting the everyday purchasing decisions and dietary behavior of consumers.

The implications of our research extend to both theoretical and applied knowledge. Theoretically, we contribute to the understanding of governance dynamics in complex policy areas, highlighting the interplay between stakeholder responsibilities and policy acceptance. In an applied sense, our findings offer guidance for policymakers seeking to design and implement policies that align with public values and priorities.

Our findings show that Swiss people already hold a systems perspective. They understand that it will take the shared responsibility of governments, farmers, retailers, and consumers to move toward more sustainable food systems. They assign a high level of responsibility to all these actors, both for production- and consumption-related issues. The perception of government responsibility is particularly relevant. When people believe that food consumption is a government responsibility, they are more likely to accept policy measures, even if they are inconvenient or limit their own food choices.

This paper is organized as follows. Section 2 provides some background information on food system policy. Section 3 presents the data and methodology. Section 4 describes and discusses the results. Section 5 concludes the study.

2. Concept of a food system policy

Timmer et al. (1983) stated that "food policy involves both consumers and producers." With this concept, they merged the previously distinct sectoral policies of agricultural production (farmers), industry (processing and distribution), and consumption (consumers and retailers) into one policy approach. Since then, the term *food system policy* has become popular, emphasizing the systemic and multidimensional nature of food-related policies.

In particular, the aim of "sustainable food systems" has become omni-present in research and policy discussions (De Schutter et al. 2020; Diaconeasa et al. 2024). According to the FAO (2018), a fully sustainable food system ensures "food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition for future generations are not compromised". To realize this, a systems approach is needed, ideally considering and integrating all aspects regarding food production, distribution, consumption, health, environment and social structures. In such a systems approach, a given issue (e.g. using biofuel as an energy source) is treated as one aspect of many, with direct and indirect interactions between them (e.g. land availability for food production). Hence, an issue in a particular sub-system is approached through a "holistic" perspective, accounting for interactions, trade-offs and feedback loops on other connected

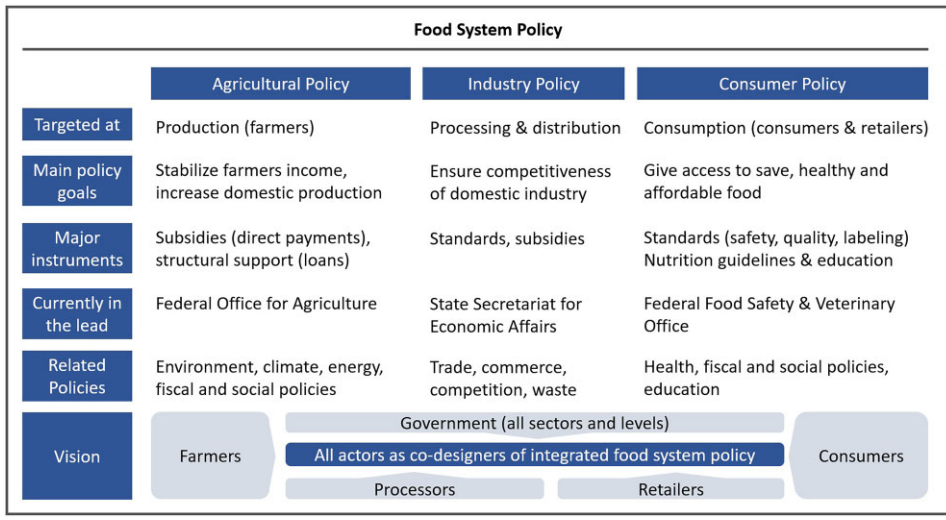

Figure 1. Concept of a holistic food system policy approach in the example of Switzerland.
Source: Own representation.

sub-systems. Rather than having a defined number and a clear map of subsystems, this is a dynamic process of changing interactions and feedback loops, with new fields such as digitalization and artificial intelligence rapidly evolving (Marvin et al. 2022).

Figure 1 illustrates our concept of such a system approach, using Switzerland as a case study. As an overarching concept, we use the term *food system policy*, which consists of agricultural policy, industrial policy, and consumer policy—the latter meaning demand-oriented food policies aimed at the consumption stage. It also includes related policies, such as environmental, social, and health policies (OECD 2023).

In recent years, such system approaches have become popular under various names: *Farm-to-Fork* in the European Union (EU), *integrated food policy* in Germany, and *Agrarpolitik 2030+*, the forthcoming Swiss policy strategy of a holistic food system approach (the Schebesta and Candel 2020; WBAE 2020; Federal Office for Agriculture [FOAG] 2024). The overall framework, as shown in Fig. 1, can therefore be applied to different countries and regions, with some adaptions in the policy instruments and goals, as well as currently leading governmental institutions. In what follows, we portray the case of Switzerland.

Similar to the EU's "Farm to Fork" strategy, Switzerland's traditionally production-focused agricultural policy is slowly evolving into a more comprehensive food system policy. A new constitutional article (104a) was introduced in 2017 that sets multifaceted objectives beyond agricultural production, such as food security, environmental protection, biodiversity, climate change mitigation, animal welfare, farmers' income, and consumer prices (FOAG 2022, 2024). Furthermore, the important role of consumption in the development of agricultural policy was taken up in the Swiss Federal Council's strategic vision for the agricultural sector (FOAG 2022). In the past, FOAG was responsible for production-oriented agricultural policy, using subsidies as the main policy instrument to support farmers' incomes, reach environmental goals, and ensure domestic food production and, thus, a certain degree of food self-sufficiency. The interrelations with other subsystems, including the energy sector through biofuels, as well as the broader interrelations with the bioeconomy sector, are now increasingly recognized (Bowman et al. 2021, M'barek and Wesseler 2023).

Industry policy, in contrast, was traditionally seen as the responsibility of the economic affairs departments. The food industry is subject to standards and receives subsidies

that increase its international competitiveness despite the high cost of sourcing inputs and producing in high-cost Switzerland. For instance, processors receive compensation payments for using Swiss inputs, such as milk powder or flour (FDFA 2025). Closely linked is international trade policy, setting different degrees of border protection through tariffs and non-tariff measures for different agri-food products (Gray et al. 2017). This, in turn, is interrelated to competition policy, ensuring fair market conditions among all players.

Finally, in the area of consumer policy, the Federal Office for Food Safety has been in charge of food safety and quality standards. In addition, information-based instruments, such as dietary guidelines and educational campaigns, have been used. In recent years, as part of an evolving food system policy, more consumer-oriented measures to promote healthier and more sustainable consumption habits have been discussed. Previously, the demand side was subject to comparatively low consumer protection legislation, which was mostly limited to addictive substances such as alcohol and tobacco, driven by the Federal Office of Public Health (FOPH 2018). However, it was not part of agricultural policies or at the core of any other sector policy. Hence, governmental interventions in personal food choices are a new phenomenon that has been accompanied by contradictions and opposition. For example, some societal groups consider consumer-oriented food policies illegitimate and paternalistic (Snowdon 2016; Lassen and Mahler 2023). There is also an active debate about whether food policies, such as taxes on sugary drinks and processed foods or restrictions on advertising (e.g. targeting children), are the responsibility of the government (Conly 2018; Dieterle 2020).

These three sectoral policies cover the main food value chains, from production to industry to consumption. In addition, related policy fields deal with the environment and climate, energy, fiscal and social issues, trade, commerce, and competition law, waste management, health, and education. The vision of a food policy approach is to engage actors from all these fields as co-designers of an integrated system policy.

Besides governmental agencies from these different sectors, non-governmental players are also seen as stakeholders, adding even more complexity to the system. Farmers, food processors, wholesalers, retailers, and consumers are not only seen as actors who are affected by food system policies but also as potential co-creators, contributing to the policy-making processes.

In summary, the food system is highly complex, with multi-layered dependencies and responsibilities, and large integrating concepts, such as food system policy, are attempts to capture some of this complexity (Welsh 2014). Brouwer et al. (2020) pointed out that despite the omnipresence of the term food system in recent research, it is almost impossible to map and analyze such a system in its whole complexity. Therefore, well-defined accountabilities are essential to drive change, even more so as the policy approach becomes more complex.

Accountability is the mechanism by which public officials are held responsible for their actions. It ensures that they meet established standards and obligations (Bovens 2007). Bovens (2007) distinguishes between political, administrative, and legal accountability. Political accountability involves elected representatives being answerable to the electorate, while administrative accountability relates to the adherence of bureaucracies to rules and performance standards. Legal accountability ensures that actions are subject to judicial review. Most relevant for the surveyed perceived responsibility of different stakeholders is the political accountability, while the other forms of accountability are mostly limited to public institutions.

The concept of legitimacy, on the other hand, is related to the perceived rightfulness of authority. This means that governance systems are recognized and accepted by the public as appropriate and justified (Beetham 1991). By ensuring that food policies are developed through democratic processes that involve public participation and consent, policymakers can enhance the legitimacy of these policies (Beetham 1991; Schmidt 2013). This is particularly important in our study, as we explore how perceived government

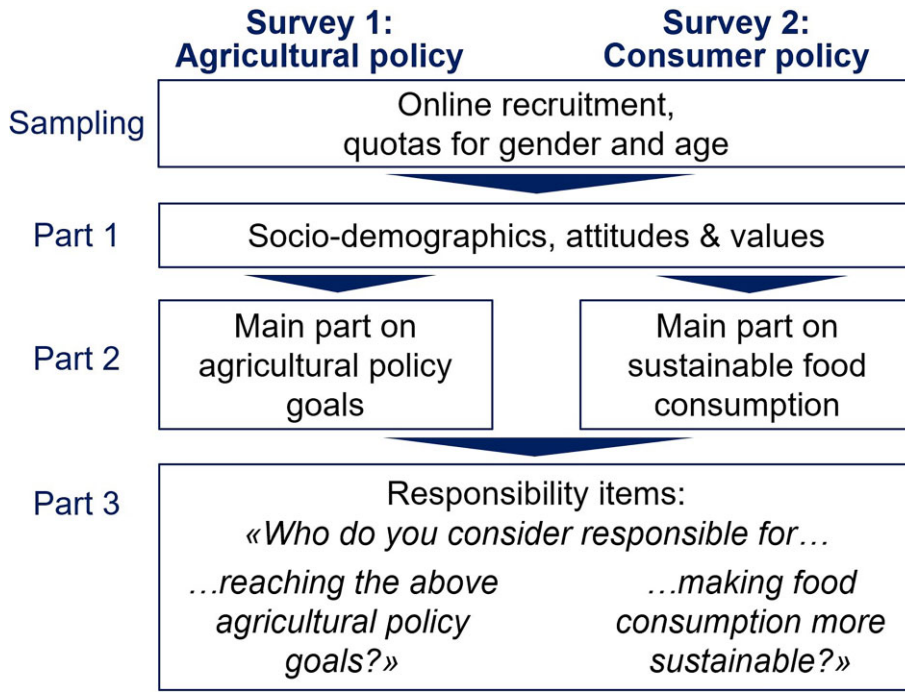

Figure 2. Survey strategy.
Source: Own illustration.

responsibility affects public acceptance of food policy measures, where legitimacy is a necessary precondition.

The interplay between accountability and legitimacy is crucial in complex policy domains such as the agri-food system. As policies become more complex, involving multiple stakeholders and crossing traditional sectoral boundaries, it becomes more challenging to ensure both accountability and legitimacy (Harrison 2003).

3. Data and methods

Our study focuses on two key aspects of the food system: production-oriented agricultural policy and consumption-oriented food policy. Here, we analyze two surveys with Swiss citizens. Survey 1 deals with production-oriented agricultural policy goals, including economic goals (e.g. increasing domestic food production and securing farmers' incomes), ecological goals (e.g. promoting biodiversity and reducing greenhouse gas emissions and pesticides), and the goal of improving animal welfare. Survey 2 deals with consumption-oriented food policy measures, asking about the acceptability of such measures, ranging from less intrusive information-based measures (e.g. labels and information campaigns) and guiding incentives (e.g. taxes, subsidies, and canteen menu defaults) to restrictive measures (e.g. mandatory veggie days in canteens and sales bans on air-imported foods).

3.1 Survey data

Both surveys were online surveys conducted in the German-speaking part of Switzerland[1]. Figure 2 summarizes the survey procedure and how the two surveys relate to each other.

Table 1. Descriptive statistics of the survey samples.

	Survey 1: Agricultural policy goals ($N = 505$) October 2022		Survey 2: Consumer policy measures ($N = 453$) February 2023	
	%	Mean (SD)	%	Mean (SD)
Gender (women)	51.3		53.2	
Age		46.3		47.5
18–35	29.7	(15.7)	29.6	(15.5)
36–54	34.5		32.2	
55–75	35.8		38.2	
Education[a]				
Low	5.1		5.0	
Medium	71.3		72.0	
High	23.6		23.0	
Place of residence				
Very rural	14.7		10.6	
Rather rural	35.1		32.9	
Suburban	27.7		28.5	
Rather urban	12.6		16.1	
Very urban	9.9		11.9	
Meat consumption (Values from 1 to 6; higher values show higher meat consumption)		3.47 (1.12)		3.38 (1.12)
Political orientation (Continuous scale: 1 = extremely left to 100 = extremely right)		53.10 (19.59)		49.71 (20.22)
Health consciousness[b] (Values from 1 to 7; higher values show stronger health consciousness)		n/a		5.11 (1.11)
Ecological attitude[c] (Values from 1 to 4; higher values show stronger ecological welfare)		3.31 (0.57)		n/a
Perception of farmers[d] (Values from 1 to 7; higher values show more positive perception)		5.51 (0.10)		n/a

[a]Low = no or compulsory school; Medium = baccalaureate, higher technical or vocational education; High = university (incl. of applied science).
[b]The health consciousness scale by Hagman et al. (2018) was used.
[c]The ecological welfare scale by Lindeman and Väänänen (2000) was used.
[d]Respondents' attitudes toward farmers were measured using a 5-item scale following Saleh et al. (2024).

Survey 1 on agricultural policy goals was conducted in October 2022 (Ammann et al. 2023b). Survey 2 on food policy measures related to sustainable consumption was conducted in February 2023 (Ammann et al. 2025b). Both surveys were conducted independently of each other with different participants. The participants were recruited by a commercial and certified panel provider (Bilendi AG for Survey 1, LINK for Survey 2). For participant selection, we set quotas for gender (50 per cent women) and age (33 per cent aged 18–35, 33 per cent aged 36–54, and 33 per cent aged 55–75). These quotas had to be adapted with slightly more women and more respondents in the older age groups (see Table 1). Participants who completed the whole survey in very little time (<1/2 median time of all respondents) were excluded, assuming that they did not take sufficient time to read and respond reliably. The resulting final sample size was 505 participants for the survey on agricultural policy goals and 453 participants for the survey on consumer policy measures.

Table 2. List of agricultural policy goals included in Survey 1.

Type of goal	Survey item
Ecological goals	(1) Reducing nutrient surpluses (2) Reducing greenhouse gas emissions (3) Reducing plant protection products (4) Promoting species richness/biodiversity
Economic goals	(5) Increasing domestic food production (6) Ensuring an adequate income for farmers
Animal welfare goals	(7) Increasing animal welfare

Upon starting the survey, written informed consent was obtained from all participants. The results from Survey 1 are part of a larger project investigating the prioritization of agricultural policy objectives by the Swiss population (Ammann et al. 2023a, b; El Benni et al. 2024a, b).

We asked respondents for basic sociodemographic information, including age, gender, education, and place of residence. Further, participants were asked to self-assess their political orientation and their frequency of meat consumption. To assess respondents' attitudes and values concerning food, health, and the environment, we used previously applied and tested scales (Dunlap and van Liere 1978; Lindeman and Väänänen 2000, for ecological attitude; Dohle et al. 2014; Hagmann et al. 2018, for health consciousness). In Survey 1, participants were asked about their (positive or negative) perception of farmers (scale by Saleh et al. 2024, adapted from Pfeiffer et al. 2021). Survey 1 includes environment- and farm-related attitudes, because it deals with production-side agricultural policy. In Survey 2 with the focus on food consumption, we asked about health consciousness because it was shown to be influential on not just consumption habits, but also policy acceptance (Ghvanidze et al. 2017; Tan et al. 2022).

The main parts of the survey then focused on different topics. In Survey 1 on agricultural policy goals, respondents were asked how they would allocate a hypothetical budget to different agricultural policy goals. This indirectly measures the perceived relative importance of the different goals. Building on the ideas of Mitchell and Carson (1989) and Kahneman and Knetsch (1992), the willingness to spend money on or allocate budget to public goods is used to determine the value and importance of these goods. While we now still deal with stated preferences, budget allocation can provide some insights into behavioral tendencies (Tversky and Kahnemann 1981), at least better than importance ratings, which are prone to scale bias, that is, some respondents might only use extreme values (Weijters et al. 2010). Table 2 lists all seven production-related items included in the survey, grouping them into ecological (1–4), economic (5–6), and animal welfare (7) goals.

Survey 2 was on consumer policy measures and asked about the acceptance of 19 different policy instruments targeting sustainable food consumption. Figure 3 groups all measures according to their type and level of intervention, following the classification by the Nuffield Council on Bioethics (2007). In what follows, we aggregate these 19 policy measures into three groups: restrictions, guidance, and information. *Restrictions* are all measures that restrict or eliminate a certain choice, such as the amount of meat sold in canteens, dairy advertisements, or air-imported food. *Guidance* includes all measures that provide market-based incentives (subsidies) or disincentives (taxes), as well as nudges that set certain default settings but still allow all choices. Survey items included taxes on animal products and non-seasonal food, subsidies for milk and meat alternatives and seasonal food, and canteen measures, such as smaller portions, and vegetarian dishes as the first menu choice. *Information* measures cover labels, information campaigns, and an adjustment of cookery school curricula.

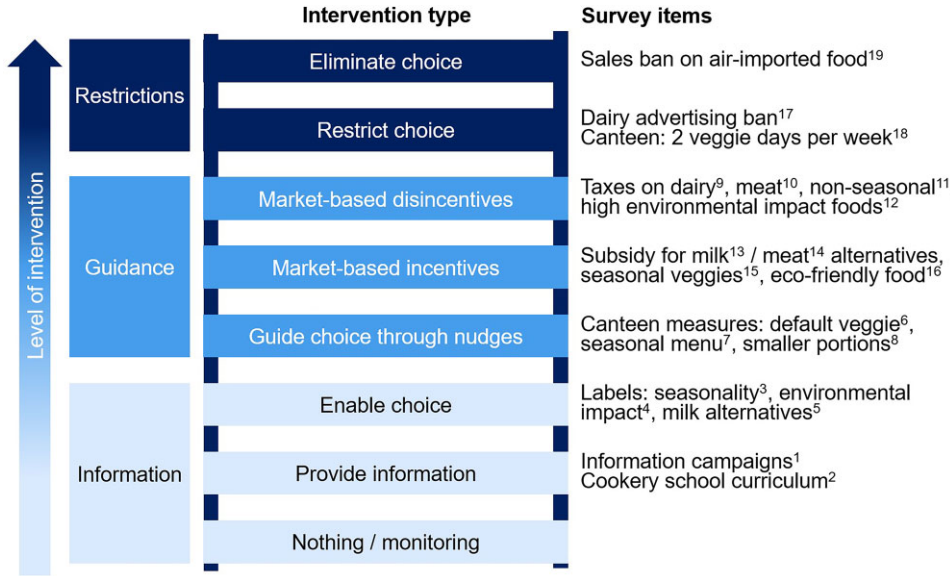

Figure 3. Overview of consumer policy measures included in Survey 2, classified according to the Nuffield Intervention Ladder.
Source: Own presentation based on the Nuffield Council on Bioethics (2007) and Ammann et al. (2023c).

Both the production- and consumption-related items were identified through a comprehensive literature review of existing food policy frameworks and stakeholder roles (Nuffield Council on Bioethics 2007; Herrero et al. 2021; Heyl et al. 2021; Ammann et al. 2023c). This was backed up by an open question, asking respondents to name agricultural policy goals they consider important (Ammann et al. 2023b).

In the last part of the survey, all participants were asked who they thought was responsible for the issues discussed in the main section. They had to position different actors on a 7-point Likert scale (1 = no responsibility; 7 = a lot of responsibility): (1) farmers, (2) retailers, (3) consumers, and (4) government. In Survey 1, this referred to "reaching the above-mentioned agricultural policy goals." In Survey 2, this referred to "making food consumption more sustainable." This final responsibility item has not been included or analyzed in any of the previous studies on these surveys.

3.2 Empirical methodology

First, we analyzed how much responsibility the Swiss respondents assign to the different actors in the food system in an agricultural policy context, and in a consumption context. To this end, we compared the distributions and calculated the mean values of the Likert scale responses (from 1 = not responsible to 7 = highly responsible) for each of the four actors. We tested for significant differences between the two surveys using non-parametric Wilcoxon rank sum tests.

In the second step, we analyzed the extent to which the respondents' perceptions of who was responsible for food system transformation affected their acceptance of agricultural policy goals and consumer-related measures. The acceptance of agricultural policy goals was proxied by the preferred budget allocation to different policy goals (Equation 1, data from Survey 1). The acceptance of consumer-related policy instruments was measured by the stated willingness to accept specific demand-related measures (Equation 2, data from Survey 2). We ran ordinary least square (OLS) regressions, estimating how respondent *i*'s

($n = 505$) outcome of the *budget* allocation to each of the three policy goal types p (ecological, economic, and animal welfare) depended on the *responsibility* attributed to each of the four actors a (government, consumers, farmers, and retailers). We applied OLS regression because of the intuitive interpretation of the results (Angrist and Pischke 2009) and computed probit models as robustness checks:

$$\begin{aligned} budget_{ip} = {} & \beta_{0p} + \beta_{1pa} responsibility_{ia} + \beta_{2p} gender_i + \beta_{3p} age_i + \beta_{4p} education_i \\ & + \beta_{5p} residence_i + \beta_{6p} politicalorientation_i + \beta_{7p} meatconsumption_i \\ & + \beta_{8p} ecology_i + \beta_{9p} farmerperception_{i_i} + \varepsilon_{ip}. \end{aligned} \quad (1)$$

We controlled for sociodemographic characteristics, such as *gender* (1 = female), *age* measured in years, and *education* (1 = no formal degree to 7 = university degree), treated as continuous variables. To account for potential rural—urban differences, we included *residence* (1 = very rural, 5 = very urban), again treated as a continuous variable. Further, we included variables related to self-reported values, beliefs, and habits. $Politicalorientation_i$ ranges from 1 (extremely left) to 100 (extremely right). $Meatconsumption_i$ indicates respondent i's frequency of meat consumption (1 = never, 6 = multiple times a day). The variable $ecology_i$ captures pro-environmental attitudes with values from 1 (low) to 4 (high), applying a scale developed by Lindeman and Väänänen (2000). $farmerperception_i$ *can* take values from 1 (very negative) to 7 (very positive perception of farmers), using a 5-item scale following Saleh et al. (2024). We controlled for these variables because previous studies have shown that they can predict preferences for certain policy goals (e.g. for political orientation and meat consumption, de Boer and Aiking 2022a, b; for ecology, Dunlap and van Liere 1978; and for farmers' perception, Saleh et al. 2024).

Analogously, in a second OLS regression, we estimated *the acceptance* of the different groups of consumer policy measures m (restriction, guidance, and information) by respondent i ($n = 453$), depending on an almost identical set of indicators. The estimation procedure and all explanatory variables were the same. The only difference was that in this survey, we did not ask about pro-environmental attitudes (*ecology*) and *farmerperception*. Instead, we include a scale on *healthconsciousness*, ranging from 1 (lowest) to 7 (highest), which has been shown to be relevant for the acceptance of food-related policy interventions (Hagmann et al. 2018):

$$\begin{aligned} acceptance_{im} = {} & \beta_{0m} + \beta_{1ma} responsibility_{ia} + \beta_{2m} gender_i + \beta_{3m} age_i + \beta_{4m} education_i \\ & + \beta_{5m} residence_i + \beta_{6m} politicalorientation_i + \beta_{7m} meatconsumption_i \\ & + \beta_{10m} healthconsciousness_i + \varepsilon_{im}. \end{aligned} \quad (2)$$

We report standardized regression coefficients in the main text to enable a better comparison across models.[2]

To check whether and to what extent all of these explanatory variables are correlated with one another, we computed Pearson's correlation coefficients. To further disentangle the effects and get a better idea of how much explanatory power the responsibility item really has, we compared different model specifications using hierarchical regression. In addition to the full model (Equations 1 and 2), we ran a regression without the responsibility item (β_1) and a regression using only a constant and the responsibility item, excluding all sociodemographic and attitude variables.

As a robustness check, we applied a multivariate probit model (Chib and Greenberg 1998; Henningsen 2022). The methodology is described in more detail in the appendix. The main intuition is to estimate all outcome variables simultaneously (budget for all types

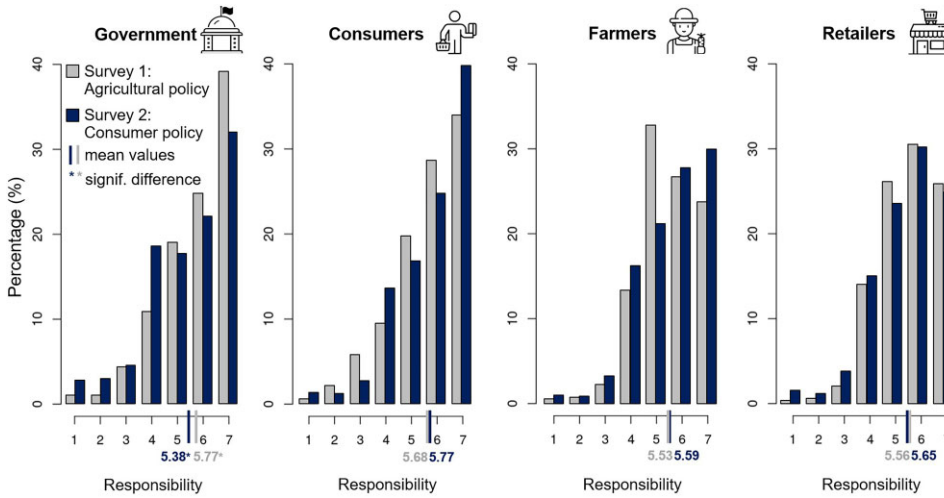

Figure 4. Perceived responsibility of different actors: Graphical results (7-point Likert scale).
Source: own representation based on survey data (Survey 1: October 2022, $n = 505$; Survey 2: February 2023, n = 453).

of policy goals in Survey 1, acceptance of all policy intervention types in Survey 2), with correlated error terms. Also, the dependent variable (budget and acceptance respectively) is now simplified to a binary variable: (Very) high budget as opposed to medium or low budget allocation to a policy goal; and (rather) accepting as opposed to neutral or not accepting a policy measure. We consider such an alternative model specification useful to reflect that a Likert scale is an ordinal scale.

4. Results

4.1 Descriptive results

We found that people in both surveys expressed quite similar views when asked who they considered responsible for achieving production-oriented agricultural policy goals (Survey 1) and ensuring sustainable food consumption (Survey 2). All actors were considered responsible—governments, farmers, retailers, and consumers alike. In both surveys, the mean values for all these actors were close, ranging from 5.38 to 5.77, based on a 7-point Likert scale, with values from 1, indicating no responsibility, to 7, indicating a high level of responsibility. Figure 4 shows that very few respondents gave low ratings (1–3) to any of the actors. This suggests that respondents already hold a systems mindset, assigning responsibility to many actors.

Although the mean values were close, there were some differences in the responsibilities assigned to the different actors. In Survey 1 on production-oriented agricultural policy goals, the government was perceived as the most responsible actor. In Survey 2 on consumption-sided food policy, consumers were perceived as the most responsible actor. This underscored the importance of the subject and framing, as shown by the differently framed surveys: Survey 1 had a strong focus on (government) policy, whereas Survey 2 dealt with food consumption and related interventions. Wilcoxon rank sum test results showed that the responses for government responsibility were statistically significantly different between the two surveys, with a mean of 5.77 in Survey 1 and 5.38 in Survey 2 ($P = 0.002$; see Appendix Table A1). For all other actors (consumers, farmers, and retailers), the responsibility scores were very similar in both surveys.

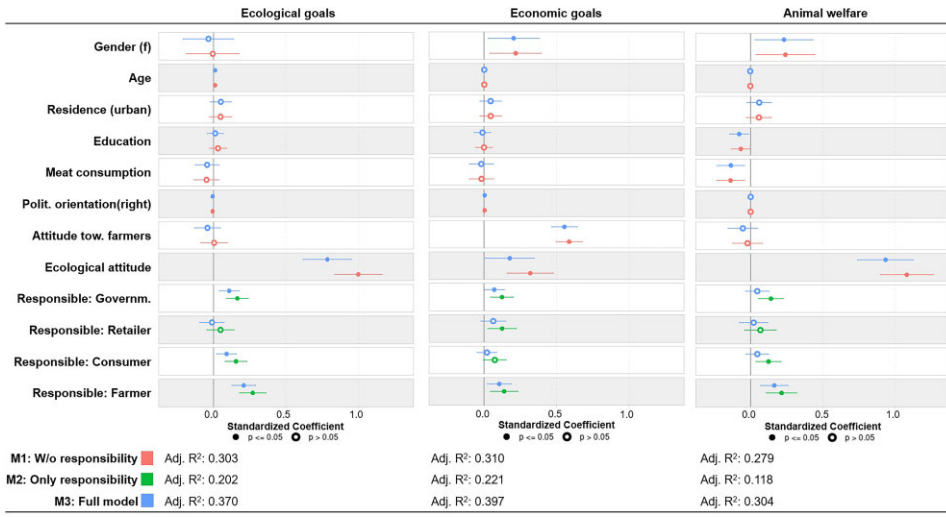

Figure 5. Results of a hierarchical OLS regression on desired budget allocation to different agricultural policy goals.
Notes: $n = 505$, survey date October 2022. The intercept is estimated but not displayed. For a better comparison, standardized coefficients are displayed. For full estimation results and original effect sizes, see Appendix Table A4. For model specifications, see Equation 1.

In a Pearson Correlation analysis (Appendix A, Figures A1 and A2), we found that sociodemographic variables (gender, age, education, and urban/rural) do not correlate significantly with the responsibility ratings for the different actors. The same holds for political orientation. Rather, values and beliefs matter: people with a strong pro-environmental attitude tended to rate the responsibility of governments and farmers higher. People with a positive attitude toward farmers see more responsibility at consumer and government level. A high health consciousness is correlated with high responsibility attribution to retailers, consumers, and governments.

4.2 Regression results on the importance of agricultural policy goals

We found that the perceived responsibility of the different actors was related to how important respondents rated agricultural policy goals with an ecological, economic, or animal welfare focus. Standardized regression coefficients are displayed in Fig. 5, and full estimation results are presented in Appendix Table A4. Respondents who attributed a high responsibility to farmers tended to allocate more hypothetical budgets to all policy goals, indicating a high perceived importance and need for action. These respondents emphasized the high responsibility of a market actor—here, farmers—while acknowledging that animal welfare targets and ecological and economic goals should be a policy priority and cannot be met by farmers alone.

Ecological goals tended to be considered more important by respondents who perceived not only farmers but also the government and consumers as highly responsible actors. Ecological goals, such as reducing greenhouse gas emissions and promoting biodiversity, were apparently considered a societal topic that requires efforts from all actors in the food system. In contrast, economic goals, such as ensuring a fair income for farmers and enhancing domestic production, as well as animal welfare, were more narrowly considered agricultural policy topics that concerned farmers and the respective government institutions.

However, one player seemed to play no role in the respondents' policy priorities: retailers. The respondents did not associate retailers' responsibilities with any agricultural policy

goals. The surveyed economic, ecological, and animal welfare goals are indeed primarily production-focused, but there are strong vertical integration structures in the Swiss agri-food sectors up to retail level (Grass and Stocker 2007). Therefore, retailers could certainly be considered a relevant player for reaching these goals. Even where not vertically integrated, they could include sustainability requirements in their contracts or introduce labeling solutions. Yet, in this survey, the Swiss people do not seem to acknowledge this link.

Further, some sociodemographic variables were associated with preferences for particular policy goals. Women allocated more budget to animal welfare and economic goals, while animal welfare was of lower priority for people who reported lower formal education and higher meat consumption. Attitudes and habits also seemed to help predict agricultural policy preferences. A positive attitude toward farmers was related to the high perceived importance of economic goals, such as a fair income for farmers. The higher the pro-environmental attitude, the more budget respondents allocated to animal welfare, ecological, and, to a lesser extent, economic goals. Comparing the adjusted R^2 of the different model specifications M1–M3 showed that the responsibility items contributed significantly to the explanatory power of the model. Moreover, the estimates for all sociodemographic and attitudinal variables were consistent in direction and significance across the model specifications. This suggests that the inclusion of perceived responsibilities added a new explanatory factor for agricultural policy preferences but did not change the estimated effect of all other explanatory factors.

4.3 Regression results on acceptance of consumer policy measures

We performed the same analysis for Survey 2, estimating how responses to the responsibility item relate to willingness to accept consumption-oriented food policy measures. Overall, we found that the responsibility items had a very high explanatory power in predicting the acceptance of consumer policy measures. Comparing the adjusted *R*-squared of model specification M1 (all variables except responsibility) and M2 (responsibility only), we observed that the responsibility items alone can explain the acceptance of information and guidance measures better than all other sociodemographic, attitudinal, and behavioral variables combined.

In particular, the perceived responsibility of the government was a strong predictor. The more respondents perceived the government as responsible for sustainable food consumption, the higher their acceptance of all policy measures. This was true for information, guidance, and intervention measures (Fig. 6). Respondents who believed that food consumption was a government responsibility were also more willing to accept government actions, even if some of them might limit their own food choices. In contrast, respondents who believed that food consumption was not the responsibility of governments viewed such measures, especially the more intrusive ones, as paternalistic threats to their personal choices.

Respondents who perceived a high level of consumer responsibility preferred information measures that allow consumers to make informed but otherwise free food choices. Those who rated farmers' responsibility high also exhibited a high willingness to accept information measures but were opposed to market-based guidance measures, such as taxes and subsidies on specific food groups. Perhaps they trusted market mechanisms and did not see (price) intervention as necessary to steer consumption.

Respondents who emphasized the responsibility of retailers had comparatively high acceptance of restrictive measures, such as a ban on the sale of air-transported foods or a ban on advertising dairy products. These are indeed measures at the level of the retailer, directly restricting what they can sell or advertise, whereas many of the information and advice measures are aimed more at influencing individual consumer behavior.

None of the control variables—gender, age, place of residence, meat consumption, or political orientation—was associated with any of the acceptance outcomes. Self-reported

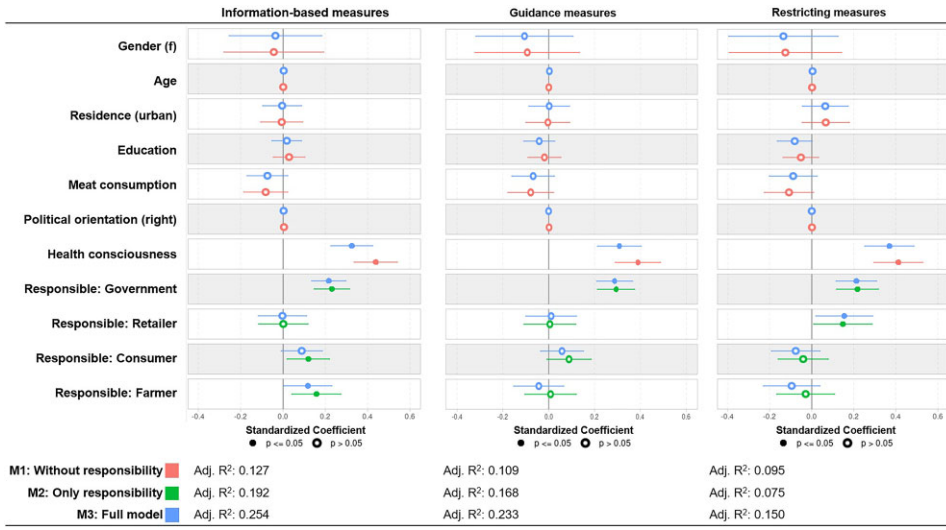

Figure 6. Results of a hierarchical OLS regression on the acceptance of consumer policy measures. Notes: $n = 453$, survey date February 2023. The intercept is estimated but not displayed. For a better comparison, standardized coefficients are displayed. For full estimation results and original effect sizes, see Appendix Table A5. For model specifications, see Equation 2.

health consciousness, however, was the single most important predictor of a respondent's willingness to accept consumer policy measures. While there may be some trade-offs between what is considered an ecologically sustainable and a healthy diet, the similarities predominate (FAO and WHO 2019). Hence, people aiming for a healthy diet will support many policy measures targeting ecological sustainability, given the large overlap with positive health outcomes.

As a robustness check, we applied a multivariate probit model (Chib and Greenberg 1998; Henningsen 2022), the detailed methodology and results of which are presented in the appendix (Tables A2 and A3). The results were comparable in direction and significance to the OLS results above, supporting our main findings.

4.3 Discussion

Our results show that Swiss people have internalized an important feature of the food system and related policies. They understand that it will take the shared responsibility of governments, farmers, retailers, and consumers to move toward more sustainable food systems. This is true for both production-related agricultural and demand-related consumer policies. However, the respondents perceived these actors as more or less responsible, depending on the context of the policy. When asked about *making food consumption more sustainable*, the respondents perceived the most responsibility at the consumer level and the least responsibility at the government level. It seems that on the consumption side, many people want to make individual decisions and do not want "politicians telling them what to eat," as mentioned in a free-text field. However, when asked about the *responsibility for achieving agricultural policy goals*, the opposite is true: governments are seen as primarily responsible for achieving agricultural policy goals, suggesting that a production-oriented policy is seen as the responsibility of government. Perhaps agricultural policy as a sector policy that is aimed at a clearly defined target group (i.e. farmers in our case) is more likely to be associated with government responsibility than a policy that currently barely exists, as is the case with consumption-oriented food policies. For agricultural production, Swiss citizens

are used to strong government interventions, and maintaining multifunctional agriculture is part of the constitution. However, on the consumption side, some of the respondents called for consumer responsibility and showed a certain fear of paternalistic government intervention.

For consumer policy measures, a key finding is that the willingness to accept different measures depends strongly on the perceived responsibility of the government, and hence the perceived legitimacy. Only if people consider (sustainable) food consumption as an issue for which governments are responsible will they potentially accept related policies.

To achieve this, it may be necessary to emphasize that food consumption is a societal issue that goes beyond individual choices and is therefore also a responsibility of governments. Furthermore, the strong positive effect of individual health consciousness on acceptance may be an important mediator: appealing to people's health consciousness and communicating the positive health effects may be more effective than framing a measure as an environmental intervention, as suggested by Ghvanidze et al. (2017) and Tan et al. (2022).

For production-oriented agricultural policy goals, it is the perceived responsibility of farmers that matters the most. People who consider farmers to be highly responsible for reaching ecological, economic, and animal welfare goals are willing to spend more hypothetical budgets on all proposed policy goals, indicating that they see a greater need for action. This is not surprising, as much of the budget would be spent on farm-level measures. However, this finding suggests that to increase people's buy-in for certain agricultural policy goals, they should first understand the high responsibility that farmers have in addressing production-related issues. Whether someone would allocate more budget to achieve ecological, economic, or animal welfare goals depends largely on personal characteristics, such as environmental attitude and meat consumption. However, neither sociodemographic variables nor political orientation were relevant to our results. Instead, we demonstrated that perceived responsibility significantly influences views on agricultural and consumer policy more than sociodemographic variables, personal values, and beliefs do. This is the first empirical study to introduce perceived responsibility as a relevant survey variable for understanding entry points for food system transition measures.

At the time of our surveys (late 2022), there was also a Citizens' Assembly, consisting of 80 randomly selected people living in Switzerland, who developed policy recommendations for a future food and nutrition policy (Amos 2023; Lehner 2023). From a citizens' perspective, the assembly also emphasized the shared responsibility of all actors, including industry players, consumers, and government agencies at different levels, as well as restaurants, canteens, and research institutes, and called for a systemic approach to address challenges along the value chain. Its recommendations highlight the current lack of regulation and consumer protection on the demand side, for which it proposes several measures to reduce sugar intake, improve child nutrition, and ease access to health-related information. On the production side, which is already heavily regulated, the assembly proposed coupling support even more to ecological and animal welfare outcomes and stressed the importance of fair incomes for farmers. Thus, the overall direction is similar to our findings, supporting the notion that a systems approach, although complex, is understood and valued by civil society and is, therefore, the way forward to drive change.

4.4 Limitations

The following limitations should be considered when interpreting the findings of this study and can guide future research. First, our study design relied only on self-reported survey data. Respondents were not confronted with the costs of different measures, trade-offs, or budget constraints. Costs of policy change differ both between individuals and by measures, which cannot be covered in such a general study. We are aware that in a setting with more restricted choices, respondents may rate certain responsibilities lower or give less weight

to some policy goals. El Benni et al. (2024b) discussed these trade-offs between different agricultural policy goals. Furthermore, the chosen set of potentially responsible actors is not exhaustive. We excluded the food processing industry, non-governmental organizations, and other interest groups, such as the farmers' association, for two reasons. First, people find it difficult to assess the responsibility of actors with whom they have no direct relationship (Pellizzoni 2005). Second, since responsibility was not the main topic of either questionnaire, we decided to keep these questions short and simple by limiting the choice to four actors that require little explanation: the government, consumers, retailers, and farmers. Prasanna et al. (2024) provided an overview of the role of the food industry in the sustainability transition. Yates et al. (2021) discussed the role and responsibility of "Big Food," that is, transnational food companies. Moreover, while our findings suggest that shared responsibility is needed to transform food systems toward greater sustainability, we do not address the outlook of such collaborative governance approaches (see Irish et al. 2024 for a discussion).

Our sample aims to be representative of the population in the German-speaking part of Switzerland. While this is the majority of the Swiss population, our findings may not be applicable to Switzerland as a whole. More specifically, there is some evidence of different views on agricultural policy in the Italian- and French-speaking parts of the country compared to the German speaking part (El Benni et al. 2024a). Also, note that this is a secondary analysis of existing studies. The questionnaires only asked about the perceived responsibility for "reaching agricultural policy goals" and "making food consumption more sustainable" in general. For a more nuanced understanding, future studies should ask more detailed questions about perceived responsibility and distinguish between different types of policy goals and measures. Finally, rather than using linear regressions, future studies may employ structural equation modeling to examine more intricate relationships between our measured survey items and latent variables, such as trust in various stakeholders. By introducing perceived responsibility as a relevant factor, our study provides an important foundation for such future research.

5. Conclusion

This study contributes to the under-researched topic of responsibilities in food system transformation. The evolving food system policy landscape has eroded the traditional boundaries between farm-level agricultural policy, demand-level consumer protection, and industry policy. Our findings, based on two surveys of Swiss citizens, indicate a clear recognition of the need for a unified approach to food system governance involving governments, farmers, retailers, and consumers. Most respondents see a strong joint responsibility by all these actors for agri-food policy issues, both for production and consumption-related topics. We find that respondents' perceptions of the importance of agricultural policy goals and their acceptance of various food policy measures are related to who they see as most responsible, that is, whether they call for a strong state, emphasize consumer responsibility, or shift responsibility to market actors such as farmers and retailers. From a policy perspective, one finding is particularly relevant. Strengthening the perceived responsibility of the government can increase the acceptance of policy measures aimed at more sustainable food consumption. This is true for all levels of intervention, from information-based measures, nudges, and taxes to highly restrictive measures, such as sales and advertising bans. People who believe that food consumption is a government responsibility are also more willing to accept any of these measures, even if inconvenient or limiting their own food choices. As nutrition and food consumption have only recently become a policy focus, it may be important to clearly communicate and explain this (new) responsibility to the public. Governments can then play a pivotal role in coordinating efforts and setting the stage for successful multi-stakeholder collaboration. This does not imply a call for increased central planning. Rather, it emphasizes the responsibility of governments to establish a regulatory framework that

encourages cooperation and accountability among diverse actors so that they can live up to the responsibilities citizens assign to them.

Ultimately, this paper advocates for a nuanced approach to governance that recognizes the diverse roles and responsibilities of all stakeholders involved in food systems. By fostering environments of mutual accountability and collaboration, we can move toward more sustainable and resilient food systems that address the challenges of today and tomorrow.

Finally, we want to stress that our study treats responsibility as a concept and somewhat abstract, as if shares of responsibility could simply be assigned to different actors in percentage terms. Further research could build on this study by exploring how citizens envision the practical implementation of such shared responsibilities within our food system, for instance, through polycentric governance models (Ostrom 2010; Thiel and Moser 2019; Penker et al. 2022; Baldwin et al. 2024). These models emphasize de-centralized decision making and strong linkages among multiple authorities, allowing various stakeholders to participate in governance processes.

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Supplementary material

Supplementary data are available at *Q Open* online.

Conflict of interest

None declared.

Funding

None declared.

Data availability

All data and code available as supplementary materials.

End notes

1 (Swiss-)German is the primary language for about 62 per cent of the total Swiss population (FDFA 2024)

2 Standardized regression coefficients are computed by multiplying the regression coefficients β_i by S_{Xi} and dividing it by S_Y with S being one standard deviation of the dependent variable Y or independent variable X. We report absolute regression coefficients (β_{1-10}) in the supplementary material.

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