Citizens' perceptions of agricultural policy goals—evidence from Switzerland

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A B S T R A C T

Agricultural policy goals should be legitimised by the population, as agriculture is an important recipient of governmental support in Europe. Questions arise as to how people assess these policy goals, which factors affect the perception of agricultural policy goals and to what extent cultural differences influence this assessment. We address these questions by conducting an online survey among 1,542 respondents in the German-, French- and Italian-speaking parts of Switzerland. We find that the multifunctional role of agriculture is strongly anchored in the population's perception of agricultural policy. The stated preferences of the participants show that increasing animal welfare is clearly the most important agricultural policy goal for Swiss citizens. Controlling for a range of sociodemographic characteristics and personal attitudes, we find evidence of differences between language regions and thus of cultural differences in the assessment of individual agricultural policy goals. For example, compared to respondents in the other two language regions, German-speaking respondents found increasing domestic food production significantly more important, whereas reducing food prices for consumers, increasing farmers' income, and reducing greenhouse gas emissions were perceived as significantly less important goals. Environmental attitudes were closely related to the perceived importance of agricultural policy goals; thus, we can expect heated discussions in the future, especially if environmental objectives continue to be missed.

1. Introduction

European agricultural and food policy is currently the subject of political and social debate regarding its future development (Navarro and López-Bao, 2019; Pe'er et al., 2019; Schebesta and Candel, 2020). Today, European agricultural policy goals are ambitious and multifaceted. Switzerland's agricultural policy has similar objectives to the EU's Common Agricultural Policy, covering food security, environmental protection, biodiversity, climate change mitigation, animal welfare, farmers' incomes and consumer prices (FOAG, 2022; Huber et al., 2023). However, neither the EU nor Switzerland is currently meeting all of these targets (Candel et al., 2021; Möhring et al., 2020; Möhring and Mann, 2020; Pe'er et al., 2019; Huber et al., 2023). In addition, there are often conflicting objectives in the pursuit of specific goals. For example, policies to protect the environment can result in a decline in food production and an increase in consumer prices, animal welfare may conflict with climate change mitigation and farmers'

income may conflict with consumer prices. Thus, there is a need to balance goals and set priorities at the policy level. Such steps should be aligned with societal demands and preferences. First, a high level of public support for agriculture must be legitimised by taxpayers and consumers. Second, information on how citizens weigh the importance of the different policy goals can allow for better targeting of policy measures towards society's demands. This is especially important because policy changes are often blocked by political opponents and strong political pressure to maintain the status quo (Jones et al., 2009; Swinnen, 2018). Thus, knowledge of society's demands for agriculture may allow for the negotiation of agreements between political actors (Metz et al., 2021). Third, a better understanding of how preferences towards the different policy objectives are determined by sociodemographic characteristics and citizens' personal attitudes helps people to understand differences across the population and changes in preferences over time due to population development (Ellison et al., 2010a; Variyam et al., 1990). However, knowledge about this societal demand is scarce

and, if available, often shows heterogeneous patterns. The underlying causes of this heterogeneity are not well understood.

This study contributes to addressing this gap by answering two main questions. First, which of the multiple goals of agricultural policy is most and least important to Swiss citizens? Second, to what extent do culture, personal attitudes and sociodemographic characteristics play a role in the preferences for different policy goals? Furthermore, we draw conclusions for policymaking.

Few studies have addressed the question of which of the many different agricultural policy goals the population prefers and which factors influence these preferences. Existing studies have focused on either selected aspects of agricultural policies (Hall et al., 2004; Mittenzwei et al., 2015; Caputo and Lusk, 2019) or a certain characteristic of citizens and its influence on the perception of agricultural policy goals (Tosun et al., 2023). Previous research on the US and Switzerland shows a high willingness of the population to support agriculture, even if the economic costs for taxpayers and consumers are high (Ellison et al., 2010a, 2010b; Nguyen et al., 2021). An important reason for the high willingness of the population to support agriculture is the wide range of goals pursued by agricultural policy, because such multifunctional goals motivate citizens with different preferences to support the policy, as at least some of these goals are likely in line with their interests (Kallas et al., 2007; Moon and Pino, 2018; Nguyen et al., 2021). Previous research also shows that various factors can influence citizens' preferences for agricultural policy goals, including sociodemographic characteristics (Kallas et al., 2007; Tosun et al., 2023), personal attitudes, such as political orientation (Variyam and Jordan, 1991; Tosun et al., 2023; Variyam et al., 1990) or environmental attitudes (Moon and Pino, 2018). One of the gaps in previous research is the analysis of possible cultural differences in the population's preferences for the various objectives of agricultural policy. Knowledge of cultural differences in preferences for different agricultural policy goals enables agricultural policy to be geared towards the needs of the target group. This is particularly relevant for the Common Agricultural Policy of the European Union, as objectives are set at the EU level and must be implemented at the country level. The weighting of individual policy goals varies from country to country (EC, 2020, p. 60), and agricultural policy measures must be oriented towards the needs of the population in order to be supported by them and to legitimise the high level of public support for agriculture. To our knowledge, no studies have explicitly addressed the potential effect of culture, in addition to personal attitudes and sociodemographic characteristics, on public preferences for multiple agricultural policy goals. With its different language regions, Switzerland lends itself to the study of cultural differences in a society with otherwise equal economic and political conditions.

This study contributes to the existing literature in two ways. First, it contributes to a better understanding of the societal demand for agricultural policy by assessing the importance of different agricultural policy goals among the Swiss population. Although Switzerland is not a member of the European Union, its agricultural policy pursues goals similar to those of the Common Agricultural Policy (Huber et al., 2023). Agricultural policy goals, as laid out in Article 104 of the Swiss Constitution (Swiss Federal Constitution, 1999, status as of 13 February 2022) and in the corresponding laws, are considered in this study. These include: (a) environmental and animal welfare-related goals (i.e. reducing nutrient surpluses, greenhouse gas emissions and pesticide use; promoting biodiversity and increasing animal welfare); (b) social and economic goals (i.e. reducing food prices for consumers and ensuring an adequate income for farmers); and (c) the goal of domestic food production. Second, differences in citizens' preferences for the various agricultural policy goals are analysed with a specific focus on the effect of culture. We use language as a proxy for culture, as it is the basis for social relations and norms and contributes to a shared social identity (Fillipini and Wekhof, 2021; Wang et al., 2023). Based on an online survey of 1,542 respondents from the Swiss-Italian, Swiss-French and Swiss-German-speaking language regions in October 2022, descriptive

statistics and regression analysis are used to identify the effect of culture (CH-Italian, CH-French or CH-German), personal attitudes and sociodemographic characteristics on preferences for agricultural policy goals. We discuss the results with respect to their meaning for policymaking.

The paper is structured as follows. Section 2 provides insights into Swiss agricultural policy, followed by a description of our empirical approach in Section 3, including information on the survey design, descriptive statistics of the sample and methods of analyses. In Section 4, the results are presented, followed by their discussion in Section 5. We conclude the paper with policy recommendations.

2. Background

2.1. Swiss agricultural policy

The Swiss Federal Constitution (1999, status as of 13 February 2022) Articles 104 and 104a define the multifunctional role of agriculture as the underlying justification for public support of agriculture. Hence, the agricultural sector should contribute towards the reliable provision of foodstuffs for the population, the conservation of natural resources and the upkeep of the countryside and the decentralised population settlement of the country. Support for farms is linked to cross-compliance regulations that require environment- and animal-friendly production standards, as demonstrated by proof of ecological performance, for direct payment eligibility (Mann, 2003). Direct payments are the predominant policy instrument to support farmers' incomes, with 75 % of the total 3.6 billion Swiss francs spent in the agricultural sector per year.

Direct payment support in Switzerland follows the so-called 'Tinbergen rule', which states that each individual instrument should address a single agricultural policy goal (Mann and Lanz, 2013). For instance, food security and cultural payments aim to keep up land for agricultural production (Möhring and Mann, 2020). Production system payments comprise a range of different programmes that aim to decrease production intensities in crop and animal production (Bystricky et al., 2023; Finger and El Benni, 2013; Mack and Kohler, 2019). Two direct payment programmes—targeting animal welfare and biodiversity—aim to promote the quantity and quality of biodiversity in agricultural areas (Mack et al., 2020). Of the total direct payment budget of 2.8 billion Swiss francs (CHF) in 2022, approximately 57 % remunerate farmers for having land in production without restrictions that go beyond the proof of ecological performance, approximately 20 % was distributed to farmers who voluntarily apply more stringent environmental and animal-friendly production techniques and approximately 21 % was spent on promoting biodiversity and landscape quality. The remaining 2 % of the direct payments budget was paid to the farmers as so-called transitional contributions to cushion the social consequences of agricultural policy changes over time.

Swiss citizens can influence public policy via plebiscites. The failure to achieve the full range of agricultural policy goals has led to a massive number of popular initiatives related to agriculture in recent years (Huber and Finger, 2019). The political and social discussions on the initiatives show differences in how the Swiss population weighs the importance of the various policy goals. For example, the Swiss people voted on two popular initiatives in 2021 that proposed stricter pesticide policies (Finger, 2021; Schmidt et al., 2019). The political discussion centred on two conflicting aspects: (a) crop yields and farm income and thus the livelihood of farmers and food security and (b) the health of humans and nature. In 2022, there was a vote on a popular initiative against 'factory farming' (Huber and Finger, 2019). Political arguments were positioned between improved animal welfare and consumer prices and farmer's income. While most of these popular initiatives were rejected, they often induce compromises at the political level; that is, some adjustments are made in favour of the popular initiatives (Huber and Finger, 2019).

Thus, societal and political discussions on agricultural policy are often about a balance between the lowest possible consumer prices and

the highest possible incomes for farmers. This is especially relevant in a country like Switzerland, which has one of the highest levels of support for agriculture (OECD, 2023a, 2023b). More precisely, measured by the producer support estimate (OECD, 2023a, 2023b), Swiss farmers receive 48.7 % of their gross farm receipts from consumers and taxpayers through agricultural policy intervention (subsidies and border protection), compared to farmers in the European Union, where the producer support estimate was approximately 17.6 % in 2021. The implicit tax on consumers through market price support (higher prices) was 28.5 % in Switzerland compared to 2.6 % in the EU (OECD, 2023b). Furthermore, border protection measures increase domestic producer prices to ensure domestic production (due to higher prices), with farmers in the EU receiving prices that are 3.1 % higher than the international market and farmers in Switzerland receiving up to 45.1 % higher prices compared to the international market (OECD, 2023a). These ratios show, on the one hand, Switzerland's great support for its agriculture and, on the other hand, the comparatively large trade-off between consumer prices and producer prices (i.e. farmer's incomes).

2.2. Culture and citizens' preferences

With its different language regions, Switzerland lends itself to the study of cultural differences in a society with otherwise equal economic and political conditions. Cultural backgrounds shape people's attitudes (e.g. with respect to environment and agriculture) and political preferences (Guiso et al., 2006; Litina et al., 2016; Schumacher, 2015; Steg, 2016). Although culture is a multi-dimensional concept, we here use language as a proxy of culture, as it is the basis for social relationships and norms and can be the basis for a common social identity (Fillipini and Wekhof, 2021; Wang et al. 2023). Thus, differences in behaviour and preferences across language groups can reflect cultural differences (Eugster et al., 2011; Filippini and Wekhof, 2021). This is especially relevant in Switzerland, given its three main language regions (German, French and Italian), with language borders being located even within cantons (Federal states).[1] Multilingualism is cultivated in Switzerland. Television and radio programmes are available in German, French and Italian and the school system differs between the language regions (Hega, 2010). The linguistic proximity to the neighbouring countries of France, Italy, Germany and Austria also influences life in the various language regions of Switzerland. Supported by the bilateral agreements signed with Italy in 1928, France in 1946, Germany in 1970 and Austria in 1973, cross-border workers who commute daily across the national border are common (Beerli and Peri, 2015), and they bring their culture with them. Previous studies in other areas have shown cultural differences across the Swiss language regions (e.g. with regard to the demand for social insurance) (Eugster et al., 2011), work attitudes (Eugster et al., 2017), the spread of COVID-19 and policy compliance (Mazzonna, 2020), public service motivation (Ritz and Brewer, 2013), preference for imported goods from different countries (Egger and Lassmann, 2015), diets (Chatelan et al., 2017; Pestoni et al., 2019) and governmental interventions (Brügger et al., 2009), including those related to food (Hagmann et al., 2018). That cultural differences exist with respect to agricultural policy preferences is supported by a survey of 700 Swiss citizens from the German- and French-speaking parts of Switzerland on their opinions about agriculture conducted by the market research institute Univox in 2022 (Umbricht and Schaub, 2022). Their descriptive results show differences between the language regions and sociodemographic characteristics such as age, education or place of residence.

3. Empirical approach

3.1. Survey

An online survey was conducted in October 2022. Participants were recruited by a commercial and certified panel provider (Bilendi AG). For participant selection, quotas were used for gender (50 % women), age (33 % aged 18–35, 33 % aged 36–54 and 33 % aged 55–75) and language region (33 % German, 33 % French and 33 % Italian). The age distribution for the Italian-speaking region could not be met, and quotas had to be adapted with more respondents in the middle-aged group (see Table 1). Based on these selection criteria, 1663 participants completed the survey. We excluded participants who completed the whole survey in very little time (less than half the median time of all respondents), assuming that they did not take sufficient time to read and respond reliably. This procedure resulted in a final sample size of 1,542 participants. Upon starting the survey, written informed consent was obtained from all participants. The survey received ethical approval from the ETH Zürich Ethics Commission (EK 2022-N-174). The results presented herein were part of a larger study investigating the prioritisation of agricultural policy objectives by the Swiss population (Ammann et al., 2024).

The questionnaire focused on eight agricultural policy goals that are connected to the respective articles in the Swiss Constitution by asking participants two slightly different questions on a Likert scale from 1 (not at all important) to 7 (very important): (a) 'Please indicate for the following aspects how important you think they should be for agriculture in Switzerland' and (b) 'Imagine you could dispose of the agricultural budget in Switzerland. Please indicate for the following aspects how important they should be in the distribution of the agricultural budget (or subsidies)'. The similarity of the questions allowed us to check the robustness of the results.

The policy goals considered are: (1) reducing nutrient surpluses, (2) reducing greenhouse gas emissions, (3) reducing plant protection products, (4) promoting species richness/biodiversity, (5) increasing animal welfare, (6) increasing domestic food production, (7) reducing food prices and (8) ensuring an adequate income for farmers.[2]

We collected the following sociodemographic information from the participants: age in years, gender, education on a scale from 1 to 7 (1 = no or in education to 7 = university degree), place of residence on a scale from 1 to 5 (1 = very rural to 5 = very urban) and whether the participant had experience as a farmer or was currently working as a farmer.

With regard to personal attitudes, participants were asked to self-assess their political orientation on a continuous scale from 1 (extremely left) to 100 (extremely right). Furthermore, we used commonly applied scales to gain insights into the respondents' attitudes and values concerning food and the environment. In particular, we used an ecological welfare scale developed by Lindeman and Väänänen (2000), made up of five questions measuring ethical food choice motives

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[2] Before the closed question on the importance of predetermined agricultural policy goals were asked, an open question was asked 'Agricultural policy or agricultural production in Switzerland pursues various objectives. Please name three agricultural policy goals below that you consider to be the most important'. Answers to this question revealed that 10% of the participants had difficulties formulating any policy goals. Those who responded cited animal welfare as the most important objective, followed by sustainability and environmental protection (see Ammann et al., 2024). We therefore assumed that the majority of respondents had a relatively good understanding of the questions asked.

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[1] The distribution of the three main official languages is as follows: 63% German, 23% French and 8% Italian. The fourth official language is Romansch (0.5% of population). Remaining shares are native speakers of other languages.

Table 1
Descriptive statistics of the sample.

	Whole sample (N = 1,542)		CH-German (N = 505)		CH-French (N = 517)		CH-Italian (N = 520)	
	%	Mean(SD)	%	Mean(SD)	%	Mean(SD)	%	Mean(SD)
Gender (women)	51.5		51.3		51.1		52.1	
Age		44.6		46.3		45.8		41.7
18–35	32.9	(15.1)	29.7	(15.7)	30.2	(15.4)	38.8	(13.9)
36–54	35.7		34.5		34.6		37.9	
55–75	31.4		35.8		35.2		23.3	
Language region			32.7		33.5		33.7	
Education [a]								
Low	4.7		5.1		3.7		5.2	
Medium	63.4		71.3		56.1		63.1	
High	31.9		23.6		40.2		31.7	
Place of residence								
Very rural	10.7		14.7		8.5		3.8	
Rather rural	29.5		35.1		28.8		24.6	
Suburban	25.5		27.7		21.5		35.6	
Rather urban	20.6		12.6		26.3		24.8	
Very urban	13.7		9.9		14.9		11.2	
Work experience in farming								
Currently work as farmer	5		3.8		8.7		2.5	
Used to work as farmer	11.1		10.1		11.4		11.7	
Never worked as farmer	83.9		86.1		79.9		85.8	
Ecological welfare [b]								3.33
(values from 1 to 4; higher values show stronger ecological welfare)		3.32		3.31		3.31		(0.57)
		(0.58)		(0.57)		(0.60)		
Perception of farmers [c]								5.64
								(0.93)
(values from 1 to 7; higher values show more positive perception)		5.64		5.51		5.75		
		(0.96)		(0.10)		(0.95)		
Meat commitment [d]								
(values from 1 to 7; higher values show higher meat commitment)		3.87		3.96		4.02		3.64
		(1.75)		(1.71)		(1.72)		(1.79)
Political orientation								
(continuous scale: 1 = extremely left to 100 = extremely right)		52.23		53.10		52.50		51.11
		(21.83)		(19.59)		(21.95)		(23.70)

[a] Low = no or in education, compulsory school; Medium = (vocational) baccalaureate, higher technical or vocational education; High = university of applied science or university of education, university. [b] The ecological welfare scale by Lindeman and Väänänen (2000) was used. [c] Respondents' attitudes towards farmers were measured using a 5-item scale following Saleh et al. (2024). [d] The meat commitment scale of Piazza et al. (2015) was used.

with respect to ecological concerns, each using values ranging from 1 to 4.[3] We used the meat commitment scale by Piazza et al. (2015), which consists of seven questions and is used to measure the respondent's commitment to meat consumption, using values ranging from 1 (very low) to 7 (very high meat commitment).[4] We measured the respondents' attitudes towards farmers using a 5-item scale with values ranging from 1 (very negative) to 7 (very positive attitude towards farmers) (Saleh et al., 2024).[5]

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[3] The items of the ecological welfare scale of Lindemann and Väänänen (2015) begin with 'It is important that the food I eat on a typical day' and continue with: 'has been produced in a way that animals have not experienced pain', 'has been produced in a way that animals' rights have been respected', 'has been prepared in an environmentally friendly way', 'has been produced in a way which has not shaken the balance of nature' and 'is packaged in an environmentally friendly way'.

[4] The items of the meat commitment scale of Pe'er et al., 2019 are 'I don't want to eat meals without meat', 'When choosing food, I virtually always select the meat option', 'I can't imagine giving up meat', 'I am committed to eating meat', 'The best part of most meals is the meat portion', 'I would never give up eating meat' and 'I cannot imagine substituting meat from a meal'.

[5] The items of the scale of Saleh et al. (2024) are 'The work of farmers is important and valuable to society', 'Family farms are important and must be preserved', 'I am generally positive about farmers', 'Farmers are committed to animal welfare' and 'Farmers are very environmentally conscious'.

3.2. Data

Descriptive statistics of the data used in this study are shown in Table 1. At more than 63 %, the majority of participants had a medium level of education (i.e. vocational baccalaureate or higher technical or vocational education) and approximately 32 % had a university or applied university degree. The place of residence of the participants was relatively evenly distributed from urban to rural. Approximately 16 % of all participants stated that they had work experience in farming by answering positively to one of the two questions 'Yes, currently active as a farmer' or 'No, not today, but I was active at an earlier stage". This high proportion is surprising, considering that, in official statistics, the proportion of farmers in the Swiss population is 1.7 % (FSO, 2023). This could be explained by the fact that in small-scale Swiss agriculture, most farms are family businesses and the support of family members on the farm is common. The answer options may have prompted respondents with an agricultural background in the family to answer this question positively, even if they may have helped out only on their parents' or grandparents' farms.

The scales used to assess personal attitudes and values concerning food, the environment and farmers showed good to very good reliability, with a Cronbach's α = .85 for the ecological welfare scale, a Cronbach's α = .92 for the meat commitment scale and a Cronbach's α = .82 for the scale measuring attitudes towards farmers. The descriptive results in Table 1 showed that Swiss citizens had strong attitudes towards

ecological welfare, a tendency towards meat consumption and a positive attitude towards farmers. The self-assessed political orientation of the sample was very balanced, with a mean value of 52 on a scale from 1 (extremely left) to 100 (extremely right).

With regard to the attitudes towards farmers, Wilcoxon tests showed significant differences between German- and French-speaking regions (p-value: < 0.001), German- and Italian-speaking regions (p-value: 0.032) and French- and Italian-speaking regions (p-value: 0.024). Furthermore, significant differences in meat commitment exist between German- and Italian-speaking (p-value: 0.004) and French- and Italian-speaking regions (p-value: 0.001). This is in line with previous studies showing that diet-related differences exist between Switzerland's language regions (Chatelan et al., 2017; Pestoni et al., 2019). No differences between language regions were observed in ecological welfare attitudes or political orientation.

Pearson's correlations between the variables describing sociodemographic characteristics and personal attitudes are shown in Table 1a and Figure 1a in the appendix. The highest positive correlations were found between meat commitment and political orientation (+0.28) and meat commitment and attitudes towards farmers (+0.23) and between ecological welfare and attitudes towards farmers (+0.22). The strongest negative correlations were found between meat commitment and gender (−0.22, all estimates were significant at a 1 % significance level).

3.3. Data analysis

First, we analyse how important the Swiss population considered the goals of agricultural policy and whether there were significant differences between the language regions. To this end, we summarised the mean values of the Likert scale responses (from 1 = not at all important to 7 = very important) for each of the eight agricultural policy goals, both for the entire sample and for each Swiss language region (German, French and Italian). We tested for significant differences in the weighting of agricultural policy goals across language regions using non-parametric Wilcoxon rank sum tests.[6]

Additionally, we conducted a rank analysis of the eight agricultural policy goals for the whole sample and for the three language regions. To obtain an order of importance for the different policy goals per respondent, we assigned ranks (from 1 to a maximum of 8) to the policy goals following the Likert scale ratings. If more than one value had the same rank, the top rank of that set of values was returned. If, for instance, three policy goals shared the top rank, all were assigned rank 1. For each agricultural policy goal, we then calculated the relative importance index (RII) and ranked the agricultural policy goals according to the RII value:

$$Relative\,Importance\,Index_{APG\,1\,to\,8} = \frac{\sum w}{AN}$$
$$= \frac{1n_1 + 2n_2 + 3n_3 + 4n_4 + 5n_5 + 6n_6 + 7n_7}{7N}$$

with w being the respondent's preference for each agricultural policy goal (i.e. APG 1 to 8, following the answers on the Likert scale from 1 (not at all important) to 7 (very important)). n_1 represents the number of respondents who considered the goal to be not important at all, and n_7 represents the number of respondents who ranked the goal as very important. A is the highest weight (7), and N is the total number of respondents. The RII ranges from 0 to 1, with higher values showing

higher importance.

In a second step, we conducted binary logistic regressions, estimating the probability that a respondent i (n = 1,542) considers policy goal p (1–8) to be important or very important, depending on a set of explanatory variables:

$$\begin{aligned} Prob(y_{ip}) = \beta_{0p} &+ \beta_{1p} culture_i + \beta_{2p} age_i + \beta_{3p} education_i + \beta_{4p} gender_i \\ &+ \beta_{5p} residence_i + \beta_{6p} experience_i + \beta_{7p} political\,orientation_i \\ &+ \beta_{8p} ecology_i + \beta_{9p} farmer\,perception_i + \beta_{10p} meat\,commitment_i \\ &+ \varepsilon_{ip} \end{aligned}$$

$$(1)$$

y_{ip} is a binary dependent variable, taking the value of 1 if a policy goal is considered 'important' or 'very important' (Likert scale value 6 or 7 out of 7) and 0 otherwise (Likert scale values 1–5). The probability of y_{ip} is linked to the explanatory variables through a binary logit function. As a robustness check, we also estimated ordered logistic regressions and multivariate probit regressions (see Section 3.4).

A main focus of our analysis was to test for cultural differences in the weighting of agricultural policy goals. We used language as a proxy for culture under the assumption that language is the basis for social relationships, norms and a common identity and thus reflects cultural differences (Eugster et al., 2011; Fillipini and Wekhof, 2021; Wang et al., 2023). To this end, we considered language as a factor variable, taking the values of 0 (reference) for German, 1 for French and 2 for Italian.

We also controlled for various other variables potentially affecting the weighing of policy goals. Sociodemographic characteristics considered in the regression analysis are *age,* measured in years, and *education,* as a continuous variable, taking values from 1 (no formal degree) to 7 (university degree). We expected education to contribute to a greater awareness of current environmental problems and, thus, the environmental goals of agricultural policy (Moon and Pino, 2018), although some studies have found only a limited role of citizens' environmental attitudes in shaping preferences for agri-environmental measures (Fockaert et al., 2023). *Gender* is mainly associated with different attitudes towards animal welfare (Ammann et al., 2023) and takes the value 1 for female and 0 for male as explanatory variables in our regression. As votes on agriculture-related initiatives often show differences between urban and rural areas, and previous studies have found differences in the perception of agricultural policies of rural and urban dwellers (Tosun et al., 2023), we considered *residence* as a continuous variable, taking values from 1 (very rural) to 5 (very urban). *Experience* takes the value of 1 if the respondents had previous or current work experience as farmers and 0 otherwise. We expected that farmers might perceive the importance of agricultural policy goals differently than the rest of the population.

To assess the correlation between personal attitudes and the weighting of agricultural policy goals, we considered four explanatory variables. *Political orientation* was considered a continuous variable, taking values from 1 (extremely left) to 100 (extremely right). We expected differences in preference depending on political orientation, as previously shown in other studies (Variyam and Jordan, 1991; Variyam et al., 1990). We expected pro-environmental attitudes, captured by the variable *ecology* with values from 1 (low) to 4 (high), to result in a higher perceived importance of agricultural policy goals related to environmental aspects, such as the conservation of biodiversity, as was already shown by other studies (Dunlap and van Liere, 1978). Furthermore, we expected a positive association between the perception of farmers, measured by *farmer perception*, taking values from 1 (very negative) to 7 (very positive), and the importance of agricultural policy goals. Thus, we assumed that if a respondent perceived the work of farmers as caring for the environment and animals, as asked by the items in this scale, then their support for agricultural policy goals financed by tax money would also be higher. Meat consumption is a major driver of climate change, and we expected that highly committed meat eaters would differ from

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[6] We used a two-sample test, also known as the Mann–Whitney test. It tests for differences between two groups (here language regions) on a single, ordinal variable (here policy goal) with no specific distribution assumed. The returned confidence intervals are based on normal approximations and are continuity-corrected, meaning that for computational reasons, our discrete distribution is approximated by a continuous distribution (McKnight and Najab, 2010).

those with lower meat consumption regarding their perceptions of the importance of environmental and animal welfare-related agricultural policy goals. Therefore, we considered *meat commitment* an explanatory variable in our regression analysis, taking values from 1 (very low) to 7 (very high meat commitment). ε describes the error term.

Due to the low correlations between the explanatory variables (see Table 1a and Figure 1a in the appendix), we are not concerned about problems with multicollinearity.

3.4. Robustness checks

We tested the robustness of the results using different approaches. First, we checked the robustness of the estimated parameters that affect the evaluation of agricultural policy goals using hierarchical binary regression. We distinguished between three variable categories that are included or excluded dependent on the model (i.e. sociodemographic characteristics, personal attitudes and culture measured by language region). We estimated four different models. Model 1 considers only sociodemographic variables, Model 2 adds the language region, Model 3 considers sociodemographic characteristics and personal attitudes, and Model 4 is the full model, including all variable categories. By comparing the McKelvey Zavoina-R^2 across models, we checked the extent to which the variable categories contributed to the explanatory power of the model.

Second, as we did not make use of the full Likert scale by using binary logistic regression, we applied ordered logistic regression for the full model (Model 4) on three clusters of answers, namely 'important' (taking the values 6–7 of the Likert scale), 'medium' (3–5) and 'not important' (1–2) (see Table 4a in the appendix).

Third, to consider potential correlations across policy preferences, we simultaneously estimated the outcome for all eight policy goals by applying a multivariate probit model (Chib and Greenberg, 1998; Henningsen, 2022). Instead of eight individual and unrelated equations ("Is policy goal 1 considered important?"), we set up one system of eight equations with all policy goals (1–8) as dependent—and correlated—outcome variables. The explanatory variables remained the same and could take different values for all the dependent variables. This differs from the independent estimation approach regarding the distribution of the error terms: Here, we assumed that they followed a multivariate normal distribution (Stein, 1981). This means that the error terms for each of the eight policy goal outcomes were correlated with

each other and, therefore, were no longer independently estimated for each single equation.

Lastly, we compared the results of the question on the importance of agricultural policy goals with the results of the question on budget allocation for the different policy goals. To do so, we re-run all our analyses, using "budget allocation" instead of "perceived importance" as a dependent variable. The results are reported in the appendix for the descriptive analysis (Table 2a), the binary logit model (Table 5a), the ordered logit model (Table 6a) and the multivariate probit model (Table 7a).

For the binary and ordered logistic regression models, note that estimating eight equations (one for each policy goal) assumes uncorrelated preferences between policy goals. We test the effect of this assumption on the results by estimating a multivariate model as well. However, we present the results of the binary logistic regressions in the main text. The reason for this choice is that the individually estimated regression models make it possible to determine (by comparing the McKelvey Zavoina-R^2) the proportion of the variation in policy preferences that can be attributed to the three different categories of variables separately or together.

4. Results

4.1. Descriptive results

Table 2 shows the mean values of the importance of the different agricultural policy goals as perceived by Swiss citizens—for the entire sample and for each Swiss language region separately. Wilcoxon rank-sum tests were applied to test for significant differences across the three language regions. Relative Importance Indices were calculated for each language region, and the goals were ranked according to the RII for the entire sample and for each language region. Pearson correlations between the preferences for the different agricultural policy goals are shown in Figure 1b in the appendix.

The results presented in Table 2 show that, with an average value of more than 5 out of 7, all policy goals were perceived as important by Swiss citizens and that differences in the importance of policy goals were small, on average, across all respondents. Accordingly, the RII values were also close to each other, all ranging between 0.71 and 0.85. Nevertheless, a clear ranking of the importance of agricultural policy goals was observed, as shown by the ranks based on the RII values (see

Table 2

Importance of agricultural policy goals by Swiss citizens, given as mean values of the Likert scale and ranks, derived from the relative importance indices (RIIs) (N = 1,543).

Agricultural policy goals	Whole sample Mean(SD)	CH-German Mean(SD)	CH-French Mean (SD)	CH-Italian Mean (SD)	Whole sample Rank [RII]	CH-German Rank [RII]	CH-French Rank [RII]	CH-Italian Rank [RII]
Reduce nutrient surpluses (e.g. over-fertilisation)	5.55 [b,c] (1.407)	5.71 (1.330)	5.65 (1.315)	5.30 (1.528)	6 [0.793]	3 [0.815]	5 [0.807]	8 [0.757]
Reduce greenhouse gas emissions	5.56 [a,b] (1.489)	5.36 (1.499)	5.63 (1.403)	5.68 (1.541)	5 [0.794]	7 [0.766]	6 [0.805]	3 [0.812]
Reduce the use of plant protection products	5.58 [a,b,c] (1.452)	5.58 (1.466)	5.79 (1.297)	5.38 (1.552)	4 [0.798]	6 [0.797]	3 [0.827]	5 [0.769]
Promote species richness/biodiversity	5.61 [c] (1.394)	5.63 (1.388)	5.75 (1.236)	5.45 (1.523)	5 [0.801]	5 [0.804]	4 [0.822]	4 [0.779]
Increase animal welfare	5.93 [b,c] (1.322)	5.86 (1.284)	5.97 (1.207)	5.98 (1.456)	1 [0.848]	1 [0.837]	2 [0.852]	1 [0.854]
Increase domestic food production	5.52 [a,b] (1.414)	5.74 (1.307)	5.50 (1.368)	5.33 (1.525)	7 [0.789]	2 [0.821]	7 [0.785]	7 [0.762]
Reduce food prices	5.23 [a,b] (1.532)	4.96 (1.604)	5.38 (1.423)	5.34 (1.529)	8 [0.746]	8 [0.708]	8 [0.768]	6 [0.762]
Ensure adequate income for farmers	5.91 [a,b,c] (1.202)	5.69 (1.136)	6.19 (1.033)	5.84 (1.355)	2 [0.844]	4 [0.813]	1 [0.885]	2 [0.834]

[a] indicates significant differences between CH-German vs. CH-French, [b] indicates significant differences between German vs. CH-Italian, [c] indicates significant differences between CH-French vs. CH-Italian, all measured by Wilcoxon rank sum tests with continuity correction. Importance was measured using a Likert scale from 1 (not at all important) to 7 (very important). The RII varies between 0 and 1, with higher values showing a higher overall importance of the respective goal for Swiss citizens.
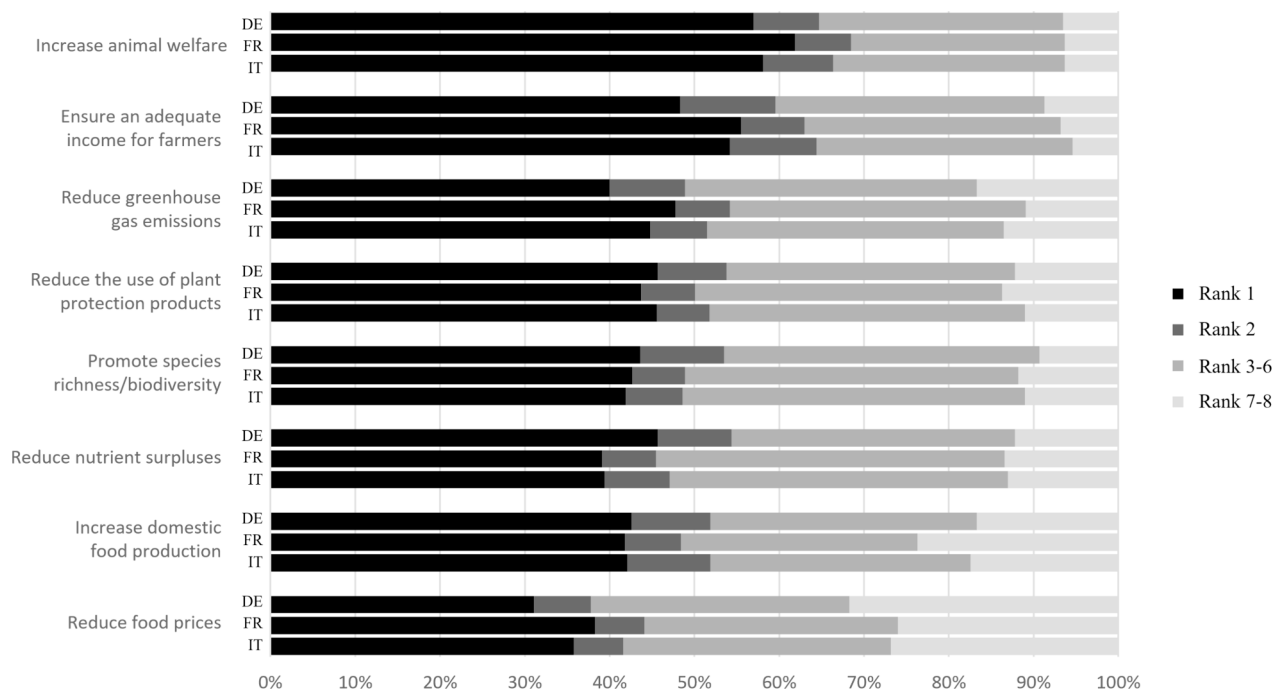
Fig. 1. Ranking of the importance of agricultural policy goals (share of respondents by Swiss language region CH-German, CH-French, CH-Italian) based on Relative Importance Indices (N = 1,542).

Table 2 and Figure 1). This shows that increasing animal welfare was ranked first or second by almost 70 % of all respondents and last by only a minor share of respondents. By contrast, reducing food prices was ranked first and second for only approximately 35 % of all respondents, but 25 % found this goal unimportant (rank 7–8).

We found significant differences between agricultural policy goals across language regions. For instance, although *increasing animal welfare* was the most important agricultural policy goal across all language regions, CH-Italian valued this goal as significantly more important than citizens from the other two language regions. *Ensuring an adequate income for farmers* was valued significantly differently across all language regions, with CH-German showing the lowest and CH-French showing the highest values. *Increasing domestic food production* was significantly more important for CH-German respondents, although the differences in mean values were low. *Reducing food prices* was the least important agricultural policy goal in all language regions, but CH-German respondents found it significantly less important than people in other language regions. With regard to the environmental goals of agricultural policy, significant differences can be observed between the CH-Italian region and the two other language regions for the goal of *reducing nutrient surpluses* (significantly less important for CH-Italian). *Reducing greenhouse gas emissions* was significantly less important for CH-German respondents than for the two other language regions. Concerning *reducing plant protection products,* significant differences existed between all language regions (CH-Italian showing the lowest values and CH-French the highest values). With regard to *promoting species richness/biodiversity*, the CH-Italian region valued this goal with significantly less importance. By contrast, CH-Italian put higher values on *increasing animal welfare* than the other language regions (although the significance level was low, with $p = 0.082$).

Comparing the results of the question on the perceived importance of the different agricultural policy objectives with the results of the question on the allocation of budgetary resources to the same goals, the same differences between the language regions emerged (see Table 2a in the appendix).

4.2. Regression results on factors affecting preferences for agricultural policy goals

Table 3 shows the results of the binary logit regressions predicting the probability that respondents perceive a specific policy goal as important or very important, including all explanatory variables (Model 4). The reported average marginal effects (AME) indicate how much the probability of considering a policy goal "important" or "very important" changes if an independent variable increases by one unit. It is the probability change *on average,* accounting for the joint distribution of all other independent variables. For instance, a French-speaking respondent was, on average, 12.9 % less likely to consider "Increasing domestic food production" (very) important (AME = -0.129***) but 14.9 % (AME = 0.149***) more likely to consider "an adequate income for farmers" a (very) important policy goal, compared to German-speaking respondents, who were the reference group. Similarly, an additional year of age increased the probability that "reducing nutrient surpluses" was considered (very) important by 0.4 % (age = 0.004***), indicating that older respondents tended to rate this policy goal higher than younger ones.

In what follows, we interpret the results of the full Model 4 (Table 3) and compare them with the results of Models 1 (considering only sociodemographic variables), 2 (considering sociodemographic variables and language region) and 3 (considering sociodemographic variables and personal attitudes) (Table 3a–3c in the appendix).

With respect to the language regions, significant differences in the perception of agricultural policy goals remained after controlling for sociodemographic characteristics and personal attitudes. Although the explanatory power added to the models by including language region was small, this result indicates that cultural differences may exist.

Our results showed that **CH-German** respondents found the goals of *reducing greenhouse gas emissions, reducing food prices* and *ensuring an adequate income for farmers* significantly less important than the CH-French and CH-Italian respondents, with average marginal effects between 6 % and 15 % difference. By contrast, they found the goal of *increasing domestic food production* significantly more important than respondents from the two other language regions (12.9–14.5 %

Table 3
Regression results of a binary logit regression that an agricultural policy goal is considered 'important' or 'very important' (6 or 7 on a 7-item Likert Scale) – Model 4 including all variable categories, N = 1,542.

	Dependent variable (Perceived importance of…) Average marginal effects (sd)							
	Reducing nutrient surpluses	Reducing greenhouse gas emissions	Reducing the use of plant protection products	Promoting species richness / biodiversity	Increasing animal welfare	Increasing domestic food production	Reducing food prices	Ensuring an adequate income for farmers
Age	0.004***	−0.001	0.003***	0.001	−0.001	0.001	0.001	0.001
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Education	0.011	0.008	0.012	0.025***	−0.003	−0.002	−0.022***	−0.010
	(.007)	(.007)	(.007)	(.007)	(.007)	(.008)	(.008)	(.007)
Gender(f)	0.009	0.003	0.002	0.018	0.090***	−0.026	0.055**	0.043*
	(.025)	(.024)	(.025)	(.024)	(.023)	(.025)	(.026)	(.022)
Residence (urban)	0.021**	0.028***	−0.005	0.003	0.009	0.002	0.032***	0.002
	(.010)	(.010)	(.010)	(.010)	(.009)	(.011)	(.011)	(.010)
Farming experience	0.008	−0.001	0.005	−0.030	0.014	0.025	0.086**	0.033
	(.032)	(.032)	(.032)	(.033)	(.029)	(.034)	(.035)	(.030)
Language_French	−0.036	0.067**	0.081***	0.0305	0.022	−0.129***	0.097***	0.149***
	(.029)	(.029)	(.029)	(.029)	(.027)	(.030)	(.031)	(.027)
Language_Italian	−0.130***	0.076***	−0.046	−0.062**	0.044*	−0.145***	0.115***	0.060**
	(.029)	(.0290)	(.030)	(.029)	(.027)	(.030)	(.031)	(.028)
Political orientation (right)	−0.001	−0.003***	−0.001	−0.001**	−0.000	0.002***	0.001	−0.000
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Attitude towards famers	0.014	0.012	−0.013	0.035***	−0.001	0.101***	0.016	0.147***
	(.013)	(.013)	(.0134)	(.013)	(.012)	(.013)	(.014)	(.011)
Ecology	0.236***	0.232***	0.221***	0.275***	0.279***	0.114***	0.098***	0.113***
	(.019)	(.019)	(.0195)	(.018)	(.017)	(.021)	(.022)	(.019)
Meat commitment	−0.016**	−0.039***	−0.031***	−0.014*	−0.027***	0.008	0.038***	−0.008
	(.008)	(.007)	(.007)	(.007)	(.007)	(.008)	(.008)	(.007)
Observations	1,542	1,542	1,542	1,542	1,542	1,542	1,542	1,542
AIC	1893.9	1827.4	1889.6	1829.2	1603.7	1973.8	2055.7	1631.3
McKelvey Zavoina-R^2	0.183	0.233	0.171	0.221	0.278	0.1331	0.081	0.266

Notes: Average marginal effects are shown with standard errors in parentheses. Farming experience includes previous and current work experience in farming. Gender: 0 = male, 1 = female. Language reference = German. Education on a scale from 1 (no formal degree) to 7 (university degree). Place of residence on a scale from 1 (very rural) to 5 (very urban), political orientation from 0 (very left) to 100 (very right).
* Significant at the 10% level.
** Significant at the 5% level.
*** Significant at the 1% level.

difference). **CH-Italian** respondents perceived *reducing nutrient surpluses* to be significantly less important than CH-German respondents (−13.0 %). The significantly lower (higher) preference for *promoting species richness/biodiversity (increasing animal welfare),* as shown in Table 3, is not robust across all models (see Table 4b and Table 7a in the appendix). **CH-French** respondents ranked *reducing plant protection products* as significantly more important than respondents in the other two language regions (+8.1 %).

Personal attitudes are the most important determinants for explaining preferences for agricultural policy goals. With respect to **political orientation**, there was a tendency for right-leaning respondents to perceive environmental goals as less important than left-leaning respondents. Comparing Model 4 (Table 3) with Model 3 (Table 3c in the appendix) and the multivariate probit results (Table 7a in the appendix) revealed robust positive effects of political orientation on *increasing domestic food production* and robust negative effects on *reducing greenhouse gas emissions* and *promoting species richness/biodiversity*. **Ecological attitudes** have a significant positive effect on the perceived importance of all considered agricultural policy goals (i.e. the higher the ecological attitudes, the more important each agricultural policy goal was perceived). Respondents who were highly **committed to meat consumption** perceived environmental and animal welfare-related policy goals as significantly less important than respondents who were less committed to meat consumption. By contrast, they ranked reducing consumer food prices as significantly more important. Meat commitment had no significant effect on the preferences for *increasing domestic food production* and *ensuring an adequate income for farmers*. Respondents with a positive **attitude towards farmers** attribute high importance to *increasing domestic food production* and *ensuring an adequate income for farmers*. As already mentioned, attitudes towards farmers and work experience in farming are correlated and both positively contribute to the 'classical' agricultural policy goals related to consumer prices, farmers' income and food production.

Sociodemographic characteristics only explain preferences for agricultural policy goals to a very limited extent. With increasing **age**, the importance of the different agricultural policy goals increases; however, age is only significant and robust for the goals of *reducing plant protection products* and *reducing nutrient surpluses*. **Education** has a robust and

significant positive effect on the preference for *promoting biodiversity* and a significant negative effect on the preference for *reducing food prices*. **Women** ranked *increasing animal welfare* and *ensuring an adequate income for farmers* as significantly more important than men (average marginal effects + 9.0 % and + 4.3 %). The significant positive effect of gender on *reducing prices* (as shown in Table 3) was not robust across the models (see Tables 3a–3c and 7a in the appendix). We found robust and significant positive effects across all models on the preferences of the **urban population** for *reducing greenhouse gas emissions* and *reducing food prices*. The effect of the **farming experience** was robust and significantly positive regarding the goal of *reducing consumer prices*. As shown by model comparisons (comparison of Table 3 with Tables 3a–3c in the appendix) and Pearson correlations (Table 1a and Figure 1a in the appendix), farming experience and attitudes towards farmers were correlated, and both positively influenced the perceived importance of reducing consumer prices, increasing domestic food production and ensuring an adequate income for farmers.

4.3. Results of the robustness checks

To check the robustness of the results with a special focus on the effect of language region, we estimated models with (a) different specifications (i.e. ordered vs. binary logistic regression models vs. multivariate probit regression models) and (b) different dependent variables (i.e. the perceived importance of different policy goals vs. the preferred budget allocation to the different policy goals). We present the detailed results of the robustness checks in Tables 3a–c (binary logistic regression models explaining the perceived importance of agricultural policy goals with different sets of dependent variables), 4a (ordered logistic regression models explaining the importance of agricultural policy goals), 5a (binary logistic regression model explaining the preferred budget allocation to agricultural policy goals), 6a (ordered logistic regression models explaining the preferred budget allocation to agricultural policy goals), 7a (multivariate probit regression model explaining the importance of agricultural policy goals), and 7b (multivariate probit regression model explaining the preferred budget allocation to agricultural policy goals) of the appendix.

The following differences across language regions were robust across

Table 4
Results of the hierarchical regression models, including different sets of variable categories, N = 1,542.

Model	Test statistics	Reducing nutrient surpluses	Reducing greenhouse gas emissions	Reducing the use of plant protection products	Promoting species richness/ biodiversity	Increasing animal welfare	Increasing domestic food production	Reducing food prices	Ensuring an adequate income for farmers
					Dependent variable (Perceived importance of…)				
M1	AIC	2056.7	2072.0	2046.2	2061.5	1865.9	2110.3	2111.6	1896.3
	R^2	0.046	0.025	0.033	0.026	0.043	0.013	0.026	0.027
M2	AIC	2046.2	2065.0	2038.1	2059.5	1865.3	2095.3	2100.2	1859.9
	R^2	0.058	0.034	0.044	0.031	0.047	0.028	0.039	0.065
	Diff R^2 M1:M2	0.012	0.009	0.010	0.005	0.004	0.015	0.012	0.037
M3	AIC	1910.89	1831.6	1905.5	1836.2	1602.4	1997.1	2067.4	1658.1
	R^2	0.167	0.227	0.154	0.212	0.274	0.111	0.068	0.238
	Diff R^2 M1:M3	0.122	0.202	0.121	0.186	0.231	0.098	0.042	0.211
	Diff R^2 M2:M3	0.110	0.193	0.111	0.181	0.227	0.082	0.030	0.174
M4	AIC	1893.9	1827.4	*1889.6*	1829.2	1603.7	1973.8	2055.7	1631.3
	R^2	0.183	0.233	0.171	0.221	0.278	0.133	0.081	0.266
	Diff R^2 M1:M4	0.138	0.208	0.138	0.194	0.235	0.120	0.054	0.239
	Diff R^2 M2:M4	0.126	0.199	0.128	0.190	0.230	0.105	0.042	0.202
	Diff R^2 M3:M4	0.016	0.007	0.017	0.009	0.004	0.023	0.012	0.028

M1: sociodemographic characteristics; M2: sociodemographic characteristics, language region; M3: sociodemographic characteristics, personal attitudes; M4: sociodemographic characteristics, language region, personal attitudes. The McKelvey Zavoina-R^2 is used for comparing the explained variance in preferences for agricultural policy goals when different variable categories are added to the model.

all regression models: CH-German respondents perceived *reducing greenhouse gas emissions*, *reducing food prices* and *ensuring an adequate income for farmers* as significantly less important than the CH-French and CH-Italian respondents. In contrast, CH-German respondents found *increasing domestic food production* significantly more important than the CH-French and CH-Italian respondents. Furthermore, all analyses suggested that the CH-French respondents perceived *ensuring an adequate income for farmers* as more important than the other two language regions. Further, the CH-French respondents had a significantly higher preference for *reducing plant protection products* than those in the other two language regions.

To determine the importance of the different variable categories (i.e. culture, sociodemographic characteristics and personal attitudes) in explaining citizens' perceptions of the different agricultural policy goals, we compare four binary logistic regression models (Table 4). For all models, the F-statistics were significant, showing that each of the variable categories considered contributed significantly to explaining preferences for the different agricultural policy goals. As shown by the McKelvey Zavoina-R^2, language regions contributed only 0.5 % (*promoting biodiversity*) to 3.7 % (*ensuring an adequate income for farmers*) of the explanatory power of the model. Nevertheless, this result is remarkable because the significant differences in language regions remained, although a number of sociodemographic characteristics and personal attitudes were considered. Cultural differences in the perception of agricultural policy goals cannot be proven but are also not ruled out. Personal attitudes, by contrast, played the most important role in explaining preferences for agricultural policy goals and contributed between 4.2 % (*reducing food prices*) and 23.1 % (*increasing animal welfare*) of the explanatory power of the model. Sociodemographic characteristics contributed only a small extent to the explanation of preferences for different agricultural policy goals, with R^2-values ranging from 1.3 % (*increasing domestic food production*) to 4.6 % (*reducing nutrient surplus*).

Although the Pearson correlations between the preferences for the different agricultural policy goals are significantly greater than zero (Figure 1b in the appendix), the results of the joint multivariate probit models are similar (i.e. identical to the second decimal place) in terms of estimated effect size and significance levels of the estimated coefficients compared to the results of the individual binary logistic regression models.

5. Discussion

The aim of this study was twofold. First, we investigated the preferences of the Swiss population for various, partly conflicting agricultural policy goals. Second, we were interested in the extent to which cultural aspects, represented by three different language regions in Switzerland, sociodemographic characteristics and personal attitudes play a role in preferences for various agricultural policy goals.

5.1. Preferences of Swiss citizens for agricultural policy goals and implications for policymakers

On average, over the entire sample, the results showed that all agricultural policy goals were perceived as important by Swiss citizens and that the differences between policy goals were small. The results suggest that the principle of multifunctional agriculture, as introduced in the Swiss Constitution in 1999, is widely accepted by the Swiss population and that no adjustments in the formulation of goals are necessary. The major challenge remains developing policy measures that consider various conflicting goals. Climate change, with its effects on agricultural production and the ongoing loss of biodiversity, further exacerbates the trade-offs between agricultural policy goals. Knowing that the Swiss population attaches similarly high importance to all agricultural policy goals, political discourse should address the trade-offs between all goals and not only selected goals.

Looking at the importance of individual agricultural policy goals, it is clear that *increasing animal welfare* is the most important goal for Swiss citizens (Umbricht and Schaub, 2022). Thus, it seems advisable to keep the issue of animal welfare high on the agricultural policy agenda and to develop it further. Currently, animal welfare direct payment programmes account for a comparatively small share of the total direct payment budget. Thus, the question can be raised as to whether support via animal welfare direct payment programmes should be increased. Following a recent social debate on improving animal welfare, there seems to be a consensus that Swiss legislation is more restrictive than international standards and that animal welfare is therefore better protected than it is abroad (Swissinfo, 2022). The harmonisation of EU animal welfare regulations with the currently higher Swiss standards could result in the Swiss population's preference for high animal welfare being reflected in the adoption of future animal welfare initiatives (i.e. the Swiss population demanding a higher level of animal welfare for animal products produced in Switzerland compared to the EU). *Ensuring an adequate income for farmers* was the second-most important goal of the Swiss population. This result suggests that despite the comparatively high prices for Swiss consumers and the high implicit taxes, producers can still count on a high level of support from the Swiss population. Discussions on the various agricultural initiatives also repeatedly show the high importance of farmers' income for Swiss citizens. For example, proponents of two recently rejected initiatives aimed at reducing the use of pesticides used health reasons as their argument basis, while opponents argued based on the negative effects on the income of farming families (SRF News, 2021). *Reducing food prices* is the least important goal for the Swiss population, although it is still considered quite important (mean Likert value 5.23 out of 7). This result could be due to the fact that the proportion of gross income spent on food is very low, at an average of 6.6 %. Food price inflation is also very low in Switzerland (FSO, 2022), which is due to the high level of border protection, which leads to comparatively high food prices but also to significantly lower fluctuations (Ritzel and von Ow, 2023). In contrast to neighbouring countries, for example, there has hardly been any increase in food prices due to the effects of the war in Ukraine (Ritzel and von Ow, 2023). This is followed by the goal of *increasing domestic food production* (5.52 out of 7). Although the Swiss population perceives the production of food as highly important (Umbricht and Schaub, 2022), a further increase in domestic production, as asked in our study, seems to be less important.

5.2. Factors affecting preferences for agricultural policy goals and implications for policymakers

A novelty of this study is the analysis of possible cultural differences in the perception of agricultural policy goals. Interestingly, even after controlling for a wide range of sociodemographic characteristics and personal attitudes, significant differences in the perceptions of agricultural policy goals persisted between the Swiss language regions used as proxies for cultural differences in this study. Cultural differences were particularly evident in the classic agricultural policy goals, namely, the policy goals of *ensuring an adequate income for farmers*, *reducing food prices* and *increasing domestic food production*. Significant differences existed between all cultures in decreasing order for the income of farmers, which was especially important for the CH-French, followed by the CH-Italian and then the CH-German respondents. In addition, the CH-French region showed significantly higher preferences for the goal of *reducing the use of plant protection products*. CH-German respondents perceived the goal of *domestic food production* as significantly more important than respondents from other parts of the country. By contrast, CH-German respondents perceived *reducing food prices* as much less important than respondents in the two other language regions. Furthermore, although all of the environmental agricultural policy goals considered in this study were perceived as important, *reducing greenhouse gas emissions* was perceived as significantly less important by CH-German respondents, and *reducing plant protection products* was

significantly more important to the CH-French respondents. Our results point to cultural differences in the perceived trade-off between different agricultural policy goals. More precisely, the perceived trade-off between *income for farmers* (which was significantly more important to the CH-Italian and CH-French respondents) and *low food prices* (which was also significantly more important to the CH-Italian and CH-French respondents) was lower in the CH-German language region than in the other two language regions. Accordingly, polarisation between consumers and producers is more likely to occur in political debates across regions. Communication of the possible effects of a change in agricultural policy on farmers' income and consumer prices should be balanced and not widen the perceived gap between producer and consumer benefits or burdens, especially against the background that the Swiss population spends only about 7 % of its income on food. Furthermore, the degree of self-sufficiency, which is currently the subject of much discussion due to the war in Ukraine, can lead to differences of opinion within Switzerland.

Personal attitudes are by far the most important factors that explain preferences for different agricultural policy goals. Our study impressively shows that the higher the ecological attitudes, the more important all agricultural policy goals become. This is a relevant result for policymakers, as it can be assumed that environmental awareness will continue to increase with climate and biodiversity crises, and thus agricultural policy will become even more important for the population in the future. Increasing environmental awareness among the population likely results in greater attention to environmental issues and more far-reaching demands on agriculture and agricultural policy, as the strong increase in agricultural initiatives over time already suggests (Huber and Finger, 2019). Meat commitment and political orientation are two personal attitudes that significantly affect the importance perception of agricultural policy goals, but these effects are much smaller than those of environmental awareness. Committed meat eaters had a significantly higher preference for low consumer prices and a significantly lower preference for ecological and animal welfare-related goals. The same was true for politically right-leaning citizens. This result could indicate an increasing polarisation of opinions on climate-related issues in the food system, as was shown by a study on EU citizens' support for climate-friendly agriculture and dietary options (de Boer and Aiking, 2022). The authors of this study argued that political and ideological polarisation seriously interfere with attempts to promote more climate-friendly production and consumption and that research on cultural identities in relation to climate issues is needed.

Sociodemographic characteristics contributed only to a small extent to explaining preferences for different agricultural policy goals. For example, women showed significantly higher preferences for animal welfare compared to men, which was also true when animal welfare was weighed against economic goals related to consumer prices or farmers' income (Ammann et al., 2023). In line with Caputo and Lusk (2019), we found that women had a higher preference for increasing farmers' income compared to men. Reducing plant protection products and nutrient surpluses was more important to older people, which may be related to a possibly higher political interest in current policy discussions among older people compared to younger people. In addition, current or previous farming experience was positively correlated with a preference for reduced consumer prices, which may reflect the pressure farmers feel on this issue, as well as political discussions about high food prices in Switzerland compared to neighbouring countries. The positive correlation between education and promoting biodiversity could be explained by a greater awareness of current environmental problems (Moon and Pino, 2018), and the negative correlation between education and *reducing* food prices could be explained by the higher wages of educated people (Card, 1999). Differences in the preferences for climate policies between rural and urban areas were also found by Mittenzwei et al. (2023).

5.3. Limitations

A focus of our analysis was testing for cultural differences in the weighing of agricultural policy goals by Swiss citizens. Based on previous literature, we distinguished between the German, French and Italian language regions in our study to depict cultural differences within Switzerland. The effect of language regions remained stable across different model specifications, even when personal attitudes that strongly influence perceptions of agricultural policy goals and sociodemographic characteristics were taken into account. Thus, our results point to cultural differences in citizens' perceptions of agricultural policy goals. Although Switzerland, with its different language regions, lends itself to the study of cultural differences in a society with otherwise equal economic and political conditions, we cannot conclude with certainty that this is due to cultural differences. First, there could still be different economic conditions across language regions. For instance, Lalive and Lehmann (2020) found that in the French- and Italian-speaking parts of Switzerland, the unemployment rate is systematically higher, and labour force participation is lower than in the German-speaking part. However, another study showed that some of the differences in economic outcomes were likely caused by cultural differences and not by different economic conditions across language regions (Eugster et al., 2017). Second, differences in the perception of agricultural policy goals might be the result of regional differences in agricultural structures and the concentration of certain farm types, which can influence awareness of different environmental problems. For instance, in Switzerland, regions with highly intensive animal production are mainly located in the German-speaking region, which has led to several measures to improve water quality in these regions (Herzog et al., 2008; Knoepfel, 1995; Spörri et al., 2023). In the Italian-speaking parts of Switzerland, there is hardly any discussion on over-fertilised lakes, which could lead to *reducing* nutrient surpluses being seen as less important. Third, another factor that could explain the differences in the importance of agri-environmental policy goals between the language regions is where a political initiative originates. Based on our results, however, it is not possible to say whether the approval is due to different political discussions or other reasons not considered in our study.

It should be noted that we decided to focus on the results of the binary logistic regression model in order to allow for a wider range of robustness checks and model comparisons. The results are almost identical to the multivariate model specifications in our case. Future studies should also take into account possible correlations between the dependent variables.

A further limitation of our study is that we assessed the stated and not revealed preferences of Swiss citizens for agricultural policy goals. It is well known that stated preferences can differ substantially from revealed preferences. For example, the high stated preference for increasing animal welfare is not necessarily reflected in the corresponding voting results. Nor is the high preference for more animal welfare necessarily reflected in higher sales of food produced in a particularly animal-friendly way.

Although our sample was drawn by a certified panel provider according to age, gender and language region quotas, we cannot be sure that it is fully representative of the Swiss population. In particular, because the age distribution for the Italian-speaking region could not be met, our sample contains more respondents in the middle age group. Furthermore, the high proportion of participants with previous farming experience is surprising and may be due to the answer options in our survey.

It could be interesting for future research to analyse preferences for agricultural policy goals over time. It could be that preferences change based on contemporary political and social discussions or due to changes in the sociodemographic structure of society. Repeated surveys could help to understand how and why agricultural policy preferences change over time.

6. Conclusion

We investigated (a) citizens' perceptions of a wide range of agricultural policy goals and (b) the role of cultural differences in assessing the relevance of different agricultural policy goals using data from an online survey with 1,542 respondents in the German-, French- and Italian-speaking parts of Switzerland. Our findings show that all agricultural policy goals are considered important, with *increasing animal welfare* being the most important goal for the Swiss population. We found differences in the assessment of individual agricultural policy goals between the language regions, suggesting the existence of cultural differences. Cultural differences are particularly evident in the classic agricultural policy goals—that is, *ensuring an adequate income for farmers* is most important to French-speaking followed by Italian- and then German-speaking respondents, and *reducing food prices* is significantly less and *increasing domestic food production* is significantly more important for German-speaking respondents than for the other two language regions. The French-speaking region shows significantly higher preferences for the goal of *reducing the use of plant protection products*, and German-speakers perceive *reducing greenhouse gas emissions* as significantly less important. In line with existing studies, our results also show that personal attitudes have the greatest influence on the perception of agricultural policy goals. Sociodemographic differences, on the other hand, hardly exist.

Our findings have implications for policy. The multifunctional role of agriculture is strongly anchored in the Swiss population's perception of agricultural policy goals. The goals as currently formulated continue to be legitimised by the population and do not need to be adjusted. However, a stronger weighting of animal welfare in the distribution of direct payments would better reflect the preferences of Swiss citizens. Although the large redistribution of public funds from consumers and taxpayers to producers seems to be supported by Swiss citizens, on average, this redistribution finds less support in the Italian- and French-speaking regions, as respondents pay more attention to *reducing food prices* for consumers. Environmental awareness is a very important determinant in the public perception of agricultural policy and will likely increase in the future due to intensifying climate and biodiversity crises. Should the discussion on the achievement of agricultural policy goals intensify further, attention must be paid to likely existing cultural differences in the perception of goals across Swiss language regions to counteract a division of the population. For instance, the German-speaking region ranks *domestic food production* significantly more important and *reducing greenhouse gas emissions* significantly less important than the respondents from the Italian- and French-speaking regions. A national and balanced political discussion should avoid playing individual policy goals against each other. Rather, the effects of a discussed measure to improve the effectiveness of agricultural policy should always include synergies and trade-offs with the entire range of agricultural policy goals.

Our study also has implications for future research. Our study is the first to identify potential cultural differences in the assessment of the perceived importance of agricultural policy goals in otherwise equal economic and legal conditions. Although we were able to control for a range of sociodemographic characteristics and personal attitudes, the question of why these differences exist remains unanswered. Future research should explore possible influencing factors to test whether cultural differences remain. Future studies should explicitly correct for possible economic (i.e. income) effects, which we refrained from doing in order to obtain a sufficiently large sample. Studies could also investigate whether social discussions, for example, on agricultural initiatives, differ between language regions to correct for this possible effect or to derive recommendations on how to ensure balanced societal debates.

CRediT authorship contribution statement

Nadja El Benni: Writing – review & editing, Writing – original draft, Resources, Methodology, Conceptualization. **Judith Irek:** Writing – review & editing, Visualization, Methodology, Formal analysis, Conceptualization. **Robert Finger:** Writing – review & editing, Writing – original draft, Conceptualization. **Gabriele Mack:** Writing – review & editing, Resources, Conceptualization. **Jeanine Ammann:** Writing – review & editing, Project administration, Investigation, Conceptualization.

Appendix

Table 1a

Pearson's correlation between sociodemographic characteristics, personal attitudes, and language regions (N = 1,542).

	1	2	3	4	5	6	7	8	9
1 Gender	1								
2 Education	−0.10[***]	1							
3 Residence	−0.04	0.17[***]	1						
4 Farming experience	−0.15[***]	0.06*	0.01	1					
5 Political orientation	−0.11[***]	−0.02	0.00	0.18[***]	1				
6 Attitude toward farmers[a]	0.06*	−0.03	−0.03	0.12[***]	0.12[***]	1			
7 Ecological welfare[b]	0.12[***]	0.00	0.01	0.02	−0.11[***]	0.22[***]	1		
8 Meat commitment[c]	−0.22[***]	−0.09[***]	−0.04	0.14[***]	0.28[***]	0.23[***]	−0.16[***]	1	
9 Age	−0.04	−0.10[***]	−0.12[***]	−0.08[**]	0.03	0.06*	0.10[***]	−0.02	1

Note. Gender: 0 = man, 1 = woman; place of residence on a scale from 1 (very rural) to 5 (very urban), political orientation from 0 (very left) over 50 (middle) to 100 (very right), [a] Saleh et al. (2024), [b] Lindeman and Väänänen (2000), [c] Piazza et al. (2015).
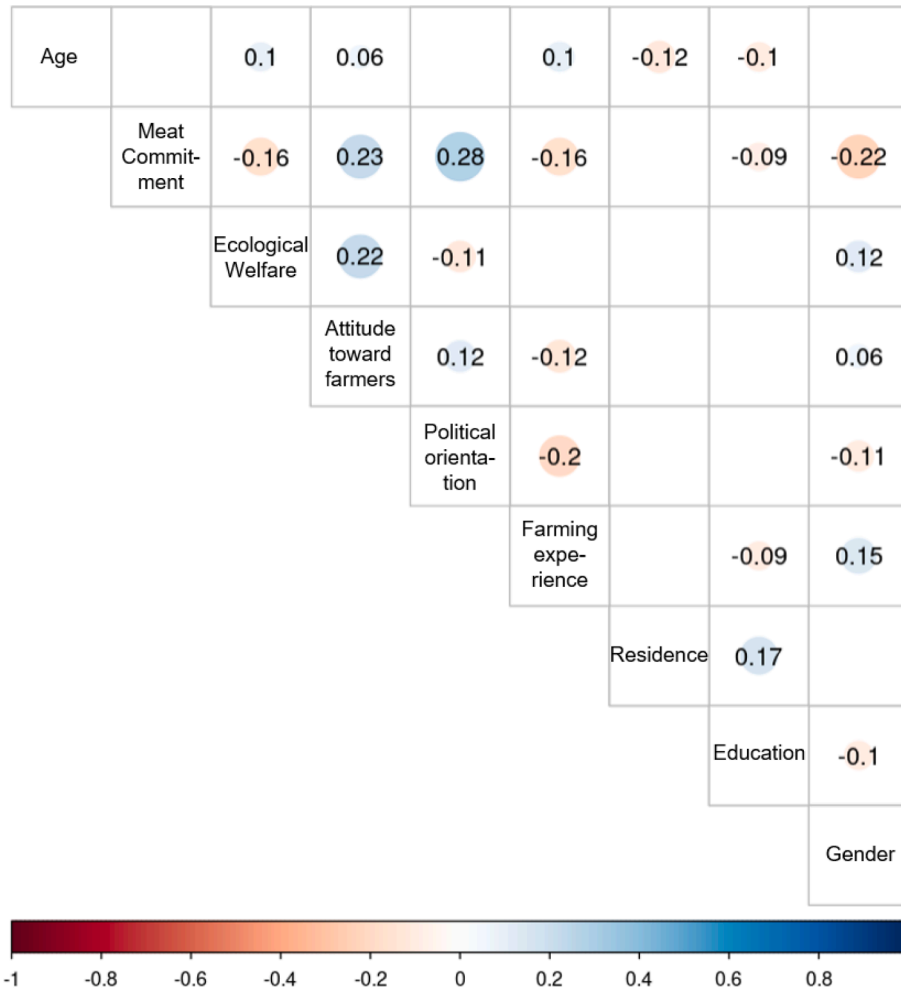
*p < 0.05, **p < 0.01, ***p < 0.001.

Fig. 1a. Pearson's correlation between sociodemographic characteristics, personal attitudes, and language regions (N = 1,542)

Note: Only correlations that are significant on a 95 % confidence interval are shown. The remaining ones are left blank. The size of the dots indicates the strength of the correlation.
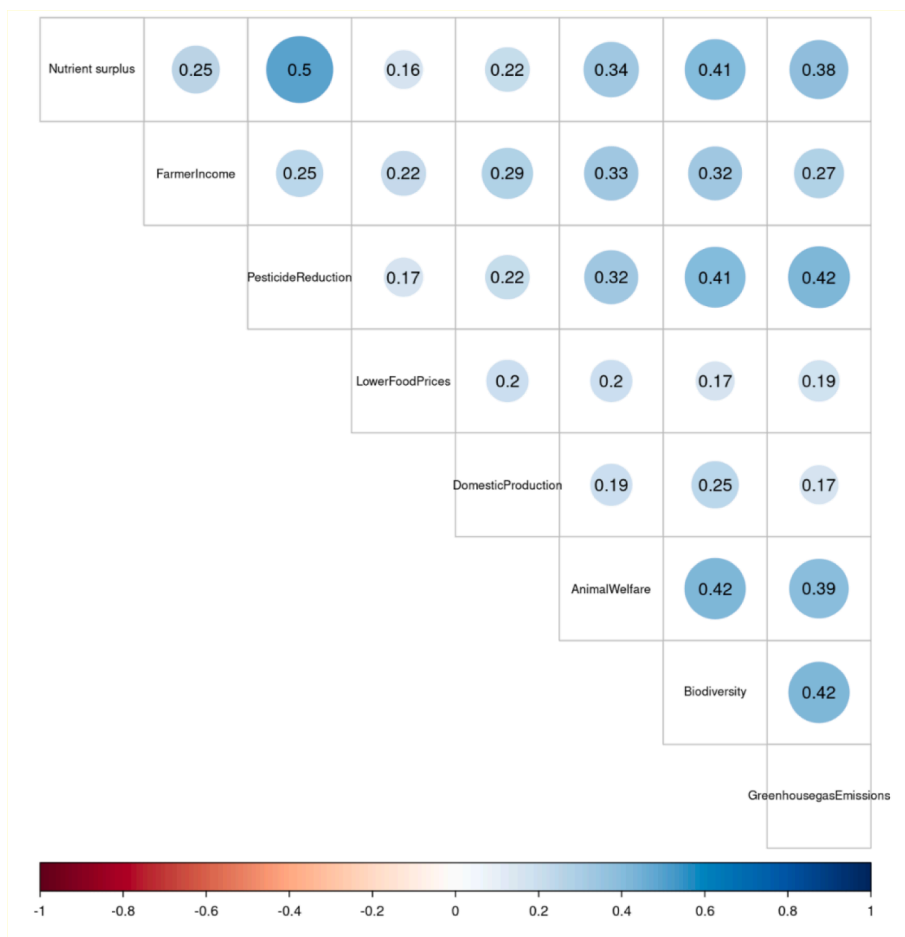
Fig. 1b. Pearson's correlation between preferences for the different policy goals (N = 1,542)

Note: Correlations that are significant on a 95 % confidence interval are shown. The size of the dots indicates the strength of the correlation.

Table 2a
Budget allocation for agricultural policy goals by Swiss citizens.

Agricultural policy goals	Whole sample	CH-German	CH-French	CH-Italian	Whole sample	CH-German	CH-French	CH-Italian
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Rank [RII]	Rank [RII]	Rank [RII]	Rank [RII]
Reduce nutrient surpluses (e.g. over-fertilisation)	5.42	5.39	5.47	5.39	6	5	6	5
	(1.387)	(1.402)	(1.349)	(1.407)	[0.774]	[0.770]	[0.782]	[0.769]
Reduce greenhouse gas emissions	5.49 [a,b]	5.22	5.58	5.66	3	7	4	3
	(1.476)	(1.498)	(1.392)	(1.497)	[0.784]	[0.746]	[0.798]	[0.808]
Reduce the use of plant protection products	5.49 [b,c]	5.49	5.60	5.29	4	3	3	7
	(1.420)	(1.432)	(1.337)	(1.458)	[0.784]	[0.784]	[0.813]	[0.756]
Promote species richness/biodiversity	5.39 [c]	5.36	5.50	5.30	7	6	5	6
	(1.427)	(1.422)	(1.392)	(1.521)	[0.770]	[0.766]	[0.786]	[0.757]
Increase animal welfare	5.83 [b,c]	5.75	5.86	5.88	1	1	2	1
	(1.345)	(1.306)	(1.227)	(1.483)	[0.833]	[0.821]	[0.837]	[0.840]
Increase domestic food production	5.42 [a,b]	5.53	5.44	5.28	5	2	7	8
	(1.477)	(1.428)	(1.430)	(1.558)	[0.774]	[0.790]	[0.778]	[0.755]
Reduce food prices	5.26 [a,b]	5.02	5.37	5.40	8	8	8	4
	(1.540)	(1.687)	(1.430)	(1.463)	[0.752]	[0.717]	[0.768]	[0.771]
Ensure an adequate income for farmers	5.77 [a,b,c]	5.41	6.12	5.78	2	4	1	2
	(1.305)	(1.323)	(1.075)	(1.397)	[0.824]	[0.772]	[0.873]	[0.825]
No. of observations	1,542	505	517	520	1,542	505	517	520

[a] indicate significant differences between CH-German vs. CH-French, [b] indicate significant differences between German vs. CH-Italian, [c] indicate significant differences between CH-French vs. CH-Italian, all measured by Wilcoxon rank sum tests with continuity correction. Importance is measured using a Likert scale from 1 (not at all important) to 7 (very important). The Relative Importance Indices (RII) varies between 0 and 1, with higher values showing a higher overall importance of the respective goal for Swiss citizens.

Table 3a
Regression results of a binary logit regression that an agricultural policy goal is considered 'important' or 'very important' (6 or 7 on a 7-item Likert Scale) – Model 1 including sociodemographic characteristics.

	Dependent variable (Perceived importance of…) Average marginal effects (SD)							
	Reducing nutrient surpluses (e.g. over-fertilisation)	Reducing greenhouse gas emissions	Reducing the use of plant protection products	Promoting species richness/ biodiversity	Increasing animal welfare	Increasing domestic food production	Reducing food prices	Ensuring an adequate income for farmers
Age	0.006***	0.000	0.005***	0.003***	0.001	0.002***	0.001	0.002**
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Education	0.014	0.017**	0.020**	0.030***	0.002	−0.009	−0.024***	−0.006
	(.008)	(.008)	(.008)	(.008)	(.007)	(.008)	(.008)	(.007)
Gender(f)	0.064**	0.087***	0.063(.0251)	0.086***	0.160***	−0.008	0.041 (.026)	0.102***
	(.025)	(.025)		(.025)	(.024)	(.026)		(.024)
Residence (urban)	0.019v(.011)	0.039***	0.001	0.005	0.017 (.010)	−0.007	0.038***	0.008
		(.011)	(.010)	(.011)		(.011)	(.011)	(.010)
Farming experience	0.023v(.034)	−0.029	0.009	−0.009	0.023	0.088***	0.131***	0.094***
		(.035)	(.034)	(.034)	(.031)	(.034)	(.034)	(.029)
Observations	1,542	1,542	1,542	1,542	1,542	1,542	1,542	1,542
AIC	2056.7	2072.0	2046.2	2061.5	1865.9	2110.3	2111.6	1896.3
McKelvey Zavoina-R²	0.046	0.025	0.033	0.026	0.043	0.013	0.026	0.027

Notes: Average marginal effects are shown with standard errors in parentheses. Farming experience includes previous and current work experience in farming. Gender: 0 = male, 1 = female. Education on a scale from 1 (no formal degree) to 7 (university degree). Place of residence on a scale from 1 (very rural) to 5 (very urban).

   * Significant at the 10 % level.
   ** Significant at the 5 % level.
   *** Significant at the 1 % level.

Table 3b
Regression results of a binary logit regression that an agricultural policy goal is considered 'important' or 'very important' (6 or 7 on a 7-item Likert Scale) – Model 2 including sociodemographic characteristics and language region.

	Dependent variable (Perceived importance of…) Average marginal effects (SD)							
	Reducing nutrient surpluses (e.g. over-fertilisation)	Reducing greenhouse gas emissions	Reducing the use of plant protection products	Promoting species richness/ biodiversity	Increasing animal welfare	Increasing domestic food production	Reducing food prices	Ensuring an adequate income for farmers
Age	0.006***	0.000	0.004***	0.002***	0.001	0.002**	0.001	0.002**
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Education	0.015	0.015*	0.018**	0.029***	0.002	−0.006	−0.027***	−0.011
	(.008)	(.008)	(.008)	(.008)	(.007)	(.008)	(.008)	(.007)
Gender(f)	0.065***	0.085***	0.062**	0.085***	0.160***	−0.006	0.039	0.098***
	(.025)	(.025)	(.025)	(.025)	(.024)	(.026)	(.026)	(.030)
Residence (urban)	0.024**	0.033***	−0.000	0.006	0.014	−0.001	0.031***	−0.000
	(.011)	(.011)	(.011)	(.011)	(.010)	(.011)	(.011)	(.010)
Farming experience	0.020	−0.029	−0.001	−0.015	0.026	0.091***	0.127***	0.081***
	(.034)	(.035)	(.034)	(.034)	(.031)	(.034)	(.034)	(.030)
Language_French	−0.038	0.067**	0.071**	0.034	0.011	−0.106***	0.104*** v	0.186***
	(.031)	(.031)	(.029)	(.031)	(.029)	(.031)	(.031)	(.029)
Language_Italian	−0.115***	0.102***	−0.032	−0.041	0.058**	−0.129***	0.110***	0.097***
	(.031)	(.031)	(.031)	(.031)	(.029)	(.031)	(.031)	(.030)
Observations	1,542	1,542	1,542	1,542	1,542	1,542	1,542	1,542
AIC	2046.2	2065	2038.1	2059.5	1865.3	2095.3	2100.2	1859.93
McKelvey Zavoina-R²	0.058	0.034	0.044	0.031	0.047	0.028	0.039	0.065

Notes: Average marginal effects are shown with standard errors in parentheses. Farming experience includes previous and current work experience in farming. Gender: 0 = male, 1 = female. Language reference = German. Education on a scale from 1 (no formal degree) to 7 (university degree). Place of residence on a scale from 1 (very rural) to 5 (very urban).

   * Significant at the 10 % level.
   ** Significant at the 5 % level.
   *** Significant at the 1 % level.

Table 3c

Regression results of a binary logit regression that an agricultural policy goal is considered 'important' or 'very important' (6 or 7 on a 7-item Likert Scale) – Model 3 including sociodemographic characteristics and personal characteristics.

	Dependent variable (Perceived importance of…) Average marginal effects (SD)							
	Reducing nutrient surpluses (e.g. over-fertilisation)	Reducing greenhouse gas emissions	Reducing the use of plant protection products	Promoting species richness/ biodiversity	Increasing animal welfare	Increasing domestic food production	Reducing food prices	Ensuring an adequate income for farmers
Age	0.005***	−0.001	0.004***	0. 001	−0.001	0. 001	0. 001	0. 001
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Education	0.010	0.010	0.015*	0.063***	−0.002	−0.006	−0.019**	−0.006
	(.007)	(.007)	(.007)	(.007)	(.007)	(.008)	(.008)	(.007)
Gender(f)	0.011	0.002	0.005	0.020	0.089***	−0.026	0.054**	0.046**
	(.025)	(.024)	(.025)	(.024)	(.023)	(.026)	(.026)	(.023)
Residence (urban)	0.015	0.033***	−0.004	0.002	0.011	0.007	0.039***	0.009
	(.010)	(.010)	(.010)	(.010)	(.009)	(.011)	(.011)	(.010)
Farming experience	0.013	−0.001	0.016	−0.024	0.014	0.021	0.089**	0.044
	(.033)	(.032)	(.032)	(.033)	(.029)	(.035)	(.035)	(.030)
Political orientation (right)	−0.001	−0.003***	−0.001	−0.001**	−0.000	0.002***	0.001	−0.000
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Attitude towards Famers	0.010	0.017	−0.011	0.035***	0.001	0.093***	0.022	0.154***
	(.013)	(.013)	(.013)	(.013)	(.012)	(.013)	(.014)	(.011)
Ecology	0.238***	0.231***	0.218***	0.274***	0.277***	0.117***	0.096***	0.107***
	(.019)	(.0191)	(.020)	(.018)	(.017)	(.022)	(.023)	(.019)
Meat Commitment	−0.013*	−0.040***	−0.029***	−0.012	−0.028***	0.0102	0.036***	−0.008
	(.008)	(.007)	(.007)	(.007)	(.007)	(.008)	(.008)	(.007)
Observations	1,542	1,542	1,542	1,542	1,542	1,542	1,542	1,542
AIC	1910.89	1831.6	1905.5	1836.2	1602.4	1997.1	2067.4	1658.1
McKelvey Zavoina-R^2	0.167	0.227	0.154	0.212	0.274	0.111	0.068	0.238

Notes: Average marginal effects are shown with standard errors in parentheses. Farming experience includes previous and current work experience in farming. Gender: 0 = male, 1 = female. Education on a scale from 1 (no formal degree) to 7 (university degree). Place of residence on a scale from 1 (very rural) to 5 (very urban) and political orientation from 0 (very left) to 100 (very right).

  * Significant at the 10 % level.
  ** Significant at the 5 % level.
  *** Significant at the 1 % level.

Table 4a

Results of the ordered logit regression that an agricultural policy goal is considered high (3), medium (2), or low (1) importance.

	Dependent variable (Perceived importance of…) Average marginal effects(SD) [t-value]							
	Reducing nutrient surpluses (e.g. over-fertilisation)	Reducing greenhouse gas emissions	Reducing the use of plant protection products	Promoting species richness/ biodiversity	Increasing animal welfare	Increasing domestic food production	Reducing food prices	Ensuring an adequate income for farmers
Age	0.019***(0.004)	−0.005 (0.004)	0.014***(0.004)	0.004 (0.004)	−0.003 (0.004)	0.004 (0.004)	0.004 (0.003)	0.003 (0.004)
	[5.118]	[-1.386]	[3.849]	[1.085]	[-0.695]	[1.084]	[1.145]	[0.685]
Education	0.060* (0.035)	0.041 (0.035)	0.058* (0.035)	0.130***(0.036)	0.001 (0.038)	0.002 (0.034)	−0.080**(0.032)	−0.053 (0.038)
	[1.736]	[1.170]	[1.664]	[3.649]	[0.029]	[0.065]	[-2.488]	[-1.381]
Gender(f)	0.070 (0.115)	0.025 (0.116)	−0.009 (0.115)	0.107 (0.116)	0.514***(0.127)	−0.098 (0.112)	0.254** (0.107)	0.226* (0.126)
	[0.609]	[0.216]	[-0.082]	[0.919]	[4.051]	[-0.874]	[2.366]	[1.795]
Residence (urban)	0.103**(0.049)	0.149***(0.049)	−0.015 (0.049)	0.020 (0.050)	0.031 (0.054)	−0.001 (0.047)	0.146***(0.046)	0.019 (0.054)
	[2.113]	[3.019]	[-0.300]	[0.412]	[0.580]	[-0.030]	[3.193]	[0.361]
Farming experience	0.011 (0.153)	−0.090 (0.154)	−0.033 (0.153)	−0.184 (0.155)	−0.040 (0.168)	0.025 (0.155)	0.263*(0.147)	0.069 (0.179)
	[0.072]	[-0.583]	[-0.217]	[-1.191]	[-0.238]	[0.160]	[1.785]	[0.385]
CH-French	−0.186 (0.139)	0.296**(0.136)	0.399***(0.139)	0.146 (0.140)	0.149 (0.149)	−0.565***(0.136)	0.430***(0.128)	0.814***(0.154)
	[-1.341]	[2.175]	[2.860]	[1.040]	[1.001]	[-4.170]	[3.366]	[5.274]
CH-Italian	−0.670***(0.137)	0.304**(0.138)	−0.216 (0.135)	−0.338**(0.138)	0.203 (0.153)	−0.661***(0.135)	0.474***(0.129)	0.271* (0.145)
	[-4.879]	[2.202]	[-1.606]	[-2.448]	[1.325]	[-4.882]	[3.683]	[1.863]
Political orientation	−0.005*(0.003)	−0.018***(0.003)	−0.005*(0.003)	−0.008***(0.003)	−0.002 (0.003)	0.008***(0.003)	0.003 (0.002)	0.002 (0.003)
	[-1.837]	[-6.463]	[-1.750]	[-2.868]	[-0.514]	[3.245]	[1.255]	[-0.549]
Attitude tow. farmers	0.057 (0.061)	0.053 (0.063)	−0.056 (0.063)	0.158**(0.062)	0.010 (0.068)	0.470***(0.061)	0.081 (0.058)	0.816***(0.069)
	[0.927]	[0.849]	[-0.892]	[2.556]	[0.147]	[7.677]	[1.386]	[11.846]
Ecology attitude	1.065***(0.101)	1.152***(0.103)	1.049***(0.101)	1.294***(0.104)	1.531***(0.113)	0.458***(0.097)	0.355***(0.093)	0.635***(0.109)
	[10.530]	[11.192]	[10.365]	[12.459]	[13.551]	[4.716]	[3.798]	[5.840]
Meat commitment	−0.071**(0.035)	−0.178***(0.036)	−0.145***(0.035)	−0.065*(0.036)	−0.152***(0.040)	0.042 (0.034)	0.159***(0.033)	−0.039 (0.040)
	[-2.006]	[-4.950]	[-4.113]	[-1.809]	[-3.816]	[1.222]	[4.800]	[-0.994]

(continued on next page)

Table 4a (*continued*)

	Dependent variable (Perceived importance of…) Average marginal effects(SD) [t-value]							
	Reducing nutrient surpluses (e.g. over-fertilisation)	Reducing greenhouse gas emissions	Reducing the use of plant protection products	Promoting species richness/ biodiversity	Increasing animal welfare	Increasing domestic food production	Reducing food prices	Ensuring an adequate income for farmers
1|2 (intercept)	0.782 (0.519) [1.508]	−0.384 (0.516) [-0.743]	−0.249 (0.514) [-0.484]	1.522***(0.525) [2.898]	0.618 (0.568) [1.089]	0.918*(0.514) [1.787]	0.178 (0.490) [0.363]	2.206***(0.592) [3.723]
2|3 (intercept)	4.152***(0.520) [7.986]	2.670***(0.518) [5.159]	2.801***(0.512) [5.469]	4.861***(0.532) [9.141]	3.814***(0.567) [6.730]	4.216***(0.514) [8.206]	3.248***(0.491) [6.611]	5.947***(0.588) [10.110]
Observations	1,542	1,542	1,542	1,542	1,542	1,542	1,542	1,542

Note: The dependent variable is a factor describing the importance of the respective policy goal, taking the values of 1 = 'not important' (Likert value 1–2), 2 = 'medium important' (Likert value 3–5), or 3 = 'important' (Likert value 6–7). 1|2 represents the intercept from 'low' to 'medium' importance. 2|3 represents the intercept from 'medium' to 'high' importance. Average marginal effects are shown with standard errors and t-values in parentheses.

Table 5a
A results of a binary logit regression that 'very much' or 'much' of the agricultural policy budget is allocated to a certain goal (6 or 7 on a 7-item likert scale).

	Dependent variable (Amount of budget allocated to…)Average marginal effects (SD)							
	Reducing nutrient surpluses (e.g. over-fertilisation)	Reducing greenhouse gas emissions	Reducing the use of plant protection products	Promoting species richness/ biodiversity	Increasing animal welfare	Increasing domestic food production	Reducing food prices	Ensuring an adequate income for farmers
Age	0.005*** (.001)	−0.000 (.001)	0.003*** (.001)	0.003*** (.001)	−0.001 (.001)	0.002** (.001)	0.002* (.001)	0.001* (.001)
Education	0.002 (.008)	0.007 (.007)	−0.001 (.008)	0.008 (.008)	−0.011 (.007)	−0.007 (.008)	−0.033*** (.008)	−0.002 (.007)
Gender(f)	0.026 (.025)	−0.001 (.024)	−0.040 (.025)	−0.013 (.025)	0.080*** (.023)	0.026 (.025)	0.071*** (.026)	0.075*** (.023)
Residence (urban)	0.022** (.011)	0.018* (.010)	−0.013 (.011)	0.026** (.011)	0.013 (.010)	0.016 (.011)	0.029*** (.011)	0.006 (.010)
Farming experience	0.037 (.033)	0.003 (.032)	−0.005 (.033)	0.051 (.033)	−0.028 (.031)	0.028 (.034)	0.080** (.035)	0.027 (.031)
Language_French	−0.000 (.030)	0.082*** (.029)	0.070** (.029)	0.031 (.030)	0.027 (.027)	−0.061** (.030)	0.068** (.031)	0.213*** (.027)
Language_Italian	−0.014*** (.030)	0.107*** (.029)	−0.076** (.030)	−0.019 (.030)	0.035 (.027)	−0.094*** (.030)	0.097*** (.031)	0.103*** (.028)
Political orientation (right)	−0.001*(.001)	−0.002***(.001)	0.000 (.001)	−0.001 (.001)	0.001 (.001)	0.002***(.001)	0.001**(.001)	−0.000 (.001)
Attitude towards famers	0.031** (.014)	0.039*** (.013)	0.021 (.013)	0.038*** (.013)	0.019 (.012)	0.103*** (.013)	0.023* (.014)	0.161*** (.011)
Ecology	0.220*** (.020)	0.271*** (.019)	0.232*** (.020)	0.272*** (.019)	0.278*** (.017)	0.123*** (.021)	0.068*** (.022)	0.105*** (.019)
Meat commitment	−0.015** (.008)	−0.027*** (.007)	−0.038*** (.007)	−0.012 (.008)	−0.030*** (.007)	0.022*** (.008)	0.038*** (.008)	−0.009 (.007)
Observations	1,542	1,542	1,542	1,542	1,542	1,542	1,542	1,542
AIC	1951.8	1837.5	1900.6	1912.8	1689.3	1969.8	2056.9	1663.9
McKelvey Zavoina-R^2	0.162	0. 240	0.191	0.195	0.258	0.145	0.083	0.305

Notes: Average marginal effects are shown with standard errors in parentheses. Farming experience includes previous and current work experience in farming. Gender: 0 = male, 1 = female. Language reference = German. Place of residence on a scale from 1 (very rural) to 5 (very urban) and political orientation from 0 (very left) to 100 (very right).
    * Significant at the 10 % level.
    ** Significant at the 5 % level.
    *** Significant at the 1 % level.

Table 6a
Results of the ordered logit regression that 'high', 'medium' or 'low' volumes of agricultural budget should be allocated to an agricultural policy goal.

	Dependent variable (Amount of budget allocated to…)Average marginal effects (SD)							
	Reducing nutrient surpluses (e.g. over-fertilization)	Reducing greenhouse gas emissions	Reducing the use of plant protection products	Promoting species richness/ biodiversity	Increasing animal welfare	Increasing domestic food production	Reducing food prices	Ensuring an adequate

Table 6a (*continued*)

	Dependent variable (Amount of budget allocated to…)Average marginal effects (SD)							
	Reducing nutrient surpluses (e.g. over-fertilization)	Reducing greenhouse gas emissions	Reducing the use of plant protection products	Promoting species richness/ biodiversity	Increasing animal welfare	Increasing domestic food production	Reducing food prices	Ensuring an adequate income for farmers
								income for farmers
Age	0.022***	−0.003	0.016***	0.012***	−0.004	0.006*	0.007**	0.007*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)	(0.004)
	[5.878]	[-0.855]	[4.396]	[3.412]	[-0.904]	[1.745]	[2.048]	[1.818]
Education	0.008	0.034	0.012	0.041	−0.052	−0.031	−0.127***	−0.006
	(0.034)	(0.035)	(0.034)	(0.034)	(0.037)	(0.033)	(0.032)	(0.038)
	[0.230]	[0.982]	[0.345]	[1.185]	[-1.410]	[-0.914]	[-3.916]	[-0.156]
Gender(f)	0.111	0.022	−0.199*	−0.043	0.444***	0.053	0.328***	0.416***
	(0.112)	(0.115)	(0.115)	(0.113)	(0.123)	(0.111)	(0.108)	(0.123)
	[0.989]	[0.192]	[-1.736]	[-0.382]	[3.617]	[0.477]	[3.041]	[3.376]
Residence (urban)	0.117**	0.110**	−0.040	0.139***	0.084	0.065	0.134***	0.044
	(0.048)	(0.049)	(0.048)	(0.048)	(0.052)	(0.047)	(0.046)	(0.052)
	[2.464]	[2.248]	[-0.931]	[2.897]	[1.611]	[1.369]	[2.933]	[0.833]
Farming experience	0.109	−0.068	−0.110	0.164	−0.160	0.100	0.284*	0.091
	(0.151)	(0.155)	(0.153)	(0.154)	(0.161)	(0.152)	(0.148)	(0.173)
	[0.723]	[-0.439]	[-0.722]	[1.061]	[-0.998]	[0.656]	[1.922]	[0.526]
CH-French	0.002	0.371***	0.299**	0.133	0.170	−0.255*	0.367***	1.132***
	(0.134)	(0.136)	(0.138)	(0.135)	(0.146)	(0.133)	(0.128)	(0.152)
	[0.013]	[2.740]	[0.135]	[0.988]	[1.167]	[-1.917]	[2.864]	[7.462]
CH-Italian	−0.050	0.482***	−0.350***	−0.125	0.143	−0.436***	0.482***	0.452***
	(0.134)	(0.137)	(0.135)	(0.134)	(0.148)	(0.133)	(0.129)	(0.142)
	[-0.376]	[3.508]	[-2.598]	[-0.931]	[0.969]	[-3.282]	[3.734]	[3.192]
Political orientation	−0.005**	−0.012***	−0.001	−0.004*	0.002	0.009***	0.004	−0.001
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)
	[-2.053]	[-4.411]	[-0.392]	[-1.707]	[0.778]	[3.259]	[1.585]	[-0.424]
Attitude tow. farmers	0.110*	0.151**	0.095	0.168***	0.072	0.461***	0.121**	0.907***
	(0.060)	(0.062)	(0.062)	(0.060)	(0.065)	(0.060)	(0.059)	(0.070)
	[1.826]	[2.425]	[1.533]	[2.776]	[1.106]	[7.628]	[2.067]	[13.039]
Ecology attitude	1.005***	1.342***	1.084***	1.269***	1.471***	0.514***	0.249***	0.507***
	(0.100)	(0.104)	(0.102)	(0.103)	(0.111)	(0.094)	(0.094)	(0.106)
	[10.055]	[12.909]	[10.609]	[12.348]	[13.294]	[5.309]	[2.662]	[4.767]
Meat commitment	−0.056	−0.126***	−0.181***	−0.049	−0.163***	0.096***	0.160***	−0.051
	(0.034)	(0.036)	(0.035)	(0.035)	(0.039)	(0.034)	(0.033)	(0.039)
	[-1.645]	[-3.534]	[-5.118]	[-1.410]	[-4.216]	[2.802]	[4.800]	[-1.328]
1|2 (intercept)	1.278	1.292**	0.176	2.277***	0.706	1.983***	0.006	3.418***
	(0.511)	(0.514)	(0.515)	(0.515)	(0.552)	(0.510)	(0.492)	(0.573)
	[2.501]	[2.515]	[0.342]	[4.418]	[1.280]	[3.891]	[0.013]	[5.965]
2|3 (intercept)	4.741	4.527***	3.626***	5.813***	4.134***	5.060***	3.015	6.995***
	(0.517)	(0.524)	(0.514)	(0.528)	(0.550)	(0.517)	(0.493)	(0.586)
	[9.171]	[8.645]	[7.049]	[10.998]	[7.516]	[9.795]	[6.119]	[11.941]
Observations	1,542	1,542	1,542	1,542	1,542	1,542	1,542	1,542

Note: The dependent variable is a factor describing the importance of the respective policy goal, taking the values of 1 = 'not important' (Likert value 1–2), 2 = 'medium important' (Likert value 3–5), or 3 = 'important' (Likert value 6–7). 1|2 represents the intercept from 'low' to 'medium' importance. 2|3 represents the intercept from 'medium' to 'high' importance. Average marginal effects are shown with standard errors and t-values in parentheses.

Table 7a
Results of a multivariate probit regression that an agricultural policy goal is considered 'important' or 'very important' (6 or 7 on a 7-item Likert Scale) – including sociodemographic characteristics and personal characteristics.

	Dependent variable (Perceived importance of…)Average marginal effects (SD)							
	Reducing nutrient surpluses (e.g. over-fertilization)	Reducing greenhouse gas emissions	Reducing the use of plant protection products	Promoting species richness/ biodiversity	Increasing animal welfare	Increasing domestic food production	Reducing food prices	Ensuring an adequate income for farmers
Age	0.004***	−0.001	0.003***	0.001	−0.001	0.001	0.001	0.001
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Education	0.011	0.006	0.011	0.026***	−0.006	−0.001	−0.022***	−0.010
	(.008)	(.008)	(.008)	(.008)	(.007)	(.008)	(.008)	(.007)
Gender(f)	0.006	−0.002	−0.002	0.011	0.087***	−0.027	0.054**	0.048**
	(.026)	(.025)	(.026)	(.024)	(.023)	(.026)	(.027)	(.023)

Table 7a (*continued*)

	Dependent variable (Perceived importance of…)Average marginal effects (SD)							
	Reducing nutrient surpluses (e.g. over-fertilization)	Reducing greenhouse gas emissions	Reducing the use of plant protection products	Promoting species richness/ biodiversity	Increasing animal welfare	Increasing domestic food production	Reducing food prices	Ensuring an adequate income for farmers
Residence (urban)	0.022**	0.030***	−0.004	0.005	0.009	0.003	0.034***	0.005
	(.011)	(.011)	(.011)	(.011)	(.009)	(.011)	(.011)	(.010)
Farming experience	0.007	−0.000	0.008	−0.032	0.015	0.025	0.088**	0.033
	(.035)	(.034)	(.033)	(.034)	(.029)	(.035)	(.035)	(.029)
CH-French	−0.046	0.063**	0.075**	0.020	0.015	−0.130***	0.095***	0.140***
	(.031)	(.029)	(.031)	(.034)	(.027)	(.031)	(.032)	(.026)
CH-Italian	−0.139***	0.070**	−0.053*	−0.077**	0.039	−0.150***	0.112***	0.052***
	(.031)	(.030)	(.031)	(.030)	(.027)	(.031)	(.032)	(.026)
Political orientation	−0.001	−0.003***	−0.001	−0.001**	0.000	0.002***	0.001	−0.000
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Attitude tow. farmers	0.013	0.011	−0.017	0.035**	−0.005	0.101***	0.016	0.147***
	(.014)	(.014)	(.014)	(.014)	(.013)	(.014)	(.014)	(.011)
Ecology attitude	0.236***	0.228***	0.220***	0.274***	0.282***	0.115***	0.097***	0.114***
	(.012)	(.019)	(.021)	(.020)	(.017)	(.022)	(.023)	(.018)
Meat commitment	−0.015	−0.039***	−0.031***	−0.012	−0.027***	0.009	0.038***	−0.006
	(.008)	(.008)	(.008)	(.008)	(.007)	(.008)	(.008)	(.007)
Observations	1,542	1,542	1,542	1,542	1,542	1,542	1,542	1,542

Notes: Average marginal effects are shown with standard errors in parentheses. Farming experience includes previous and current work experience as a farmer. Gender: 0 = male, 1 = female. Language reference = German. Education on a scale from 1 (no formal degree) to 7 (university degree). Place of residence on a scale from 1 (very rural) to 5 (very urban), political orientation from 0 (very left) to 100 (very right).

* Significant at the 10 % level.

** Significant at the 5 % level.

*** Significant at the 1 % level.

Estimation performed with R Package mvProbit (Henningsen, 2022).

Table 7b

Results of a multivariate probit regression that 'very much' or 'much' of the agricultural policy budget is allocated to a certain goal (6 or 7 on a 7-item Likert Scale).

	Dependent variable (Amount of budget allocated to…)Average marginal effects (SD)							
	Reducing nutrient surpluses (e.g. over-fertilization)	Reducing greenhouse gas emissions	Reducing the use of plant protection products	Promoting species richness/ biodiversity	Increasing animal welfare	Increasing domestic food production	Reducing food prices	Ensuring an adequate income for farmers
Age	0.005***	−0.000	0.004***	0.003***	−0.001	0.002*	0.001	0.002**
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Education	0.003	0.006	−0.001	0.008	−0.012*	−0.005	−0.032***	−0.002
	(.008)	(.008)	(.008)	(.008)	(.007)	(.008)	(.008)	(.007)
Gender(f)	0.029	−0.001	−0.044*	−0.013	0.082***	0.025	0.071***	0.081***
	(.026)	(.025)	(.026)	(.026)	(.024)	(.026)	(.027)	(.024)
Residence (urban)	0.023**	0.019	−0.015	0.026**	0.017	0.017	0.030***	0.009
	(.011)	(.011)	(.011)	(.011)	(.010)	(.011)	(.011)	(.010)
Farming experience	0.029	0.000	−0.014	0.043	−0.030	0.027	0.080**v	0.034
	(.035)	(.034)	(.034)	(.034)	(.032)	(.032)	(.036)	(.031)
CH-French	−0.005	0.076***	0.065**	0.024	0.021	−0.062**	0.064*	0.196***
	(.032)	(.029)	(.031)	(.031)	(.027)	(.031)	(.033)	(.026)
CH-Italian	−0.143	0.099***	−0.076**	−0.026	0.037	−0.093***	0.095***	0.099***
	(.032)	(.030)	(.031)	(.031)	(.028)	(.032)	(.032)	(.026)
Political orientation	−0.001*	−0.002***	0.000	−0.001	0.001	0.002***	0.001*	−0.000
	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
Attitude tow. farmers	0.034**	0.040***	0.020	0.041***	0.018	0.104***	0.025*	0.161***
	(.014)	(.014)	(.014)	(.014)	(.013)	(.013)	(.014)	(.011)
Ecology attitude	0.217***	0.267***	0.220***	0.265***	0.280***	0.125***	0.065***	0.109***
	(.021)	(.019)	(.021)	(.019)	(.017)	(.021)	(.023)	(.019)
Meat commitment	−0.015*	−0.027***	−0.031***	−0.012	−0.030***	0.023***	0.038***	−0.007
	(.008)	(.008)	(.008)	(.008)	(.007)	(.008)	(.008)	(.008)
Observations	1,542	1,542	1,542	1,542	1,542	1,542	1,542	1,542

Notes: Average marginal effects are shown with standard errors in parentheses. Farming experience includes previous and current work experience as a farmer. Gender: 0 = male, 1 = female. Language reference = German. Education on a scale from 1 (no formal degree) to 7 (university degree). Place of residence on a scale from 1 (very rural) to 5 (very urban), political orientation from 0 (very left) to 100 (very right).

* Significant at the 10 % level.

** Significant at the 5 % level.

*** Significant at the 1 % level.

Estimation performed with R Package mvProbit (Henningsen, 2022).

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