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No evidence of a rural-urban divide in prioritizing agricultural policy goals

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Abstract

Rural-urban divides have been found in various policy fields, but it remains unclear if they exist in agricultural policy. We analyzed the policy preferences of 1542 Swiss respondents, ranging from very rural to very urban. Respondents prioritized different pairs of conflicting goals, that is, two economic goals versus four conflicting agri-environmental goals. We find no evidence of a rural-urban divide in the prioritization of agricultural policy goals. Respondents prioritize economic goals over environmental goals. Efforts to make agriculture more environmentally sustainable do not per se create a rural-urban divide, but policies should focus on reducing trade-offs between economic and environmental goals.

KEYWORDS

compositional effects, conflicting agricultural policy goals, contextual effects, place of residence, zero-one inflated beta regression

JEL CLASSIFICATION

Q18, Q10

Democratic governments must respond to the preferences of their citizens with public policies to ensure their legitimacy (Huber & Bingham Powell, 1994). Political divides can occur if anticipated costs and benefits differ across target groups (Anzia et al., 2022). Rural-urban political

divides, that is, that populations in mainly urban and mainly rural areas reveal sharp differences in political views and voting behavior have been documented in various countries and contexts (Church et al., 2020; Huijsmans et al., 2021; Kelly & Lobao, 2019; Maxwell, 2020; Morrill & Webster, 2015). Agricultural policy can have multiple, conflicting, and often place-based objectives and policy impacts. Hence, the perceptions of citizens in urban and rural areas may differ, which in turn affects their support for agricultural policy and specific policy goals (Mittenzwei et al., 2023; Tosun et al., 2023). For example, the pursuit of environmental goals may result in increased costs for farmers and citizens in rural communities, whereas citizens in urban communities are not directly affected. (Tosun et al., 2023). Testing the existence of a rural-urban divide in perceptions of and support for agricultural policy goals and quantifying its potential magnitude can help tailor and improve policy designs. For example, an improved targeting of policy measures toward the actual societal demand may facilitate policy reforms (Jones et al., 2009; Metz et al., 2021; Swinnen, 2018). Agricultural policy comprises a wide range of possibly contrasting goals, for example, on environmental protection, farm incomes, and food prices. Thus, trade-offs and their valuation by society matter to align the objectives of agricultural policy with the needs of citizens and to define measures to achieve the most important objectives for society (Gómez-Limón & Atance, 2004). We currently lack evidence of whether there is a rural-urban policy divide when it comes to the evaluation of these trade-offs, for example, whether rural populations would put farm incomes over environmental protection and urban populations would not.

In this paper, we assess whether and to what extent differences in citizens' assessments of agricultural policy goals exist between urban and rural populations. Specifically, we elicit Swiss citizens' preferences for nine pairs of conflicting goals, that is, which goal they give higher weights if facing trade-offs. We consider various policy goals that are regularly used by political interest groups as arguments for or against policy changes, specifically the increase of biodiversity, reduction of climate change, reduction of nutrient surpluses, less use of plant protection products, higher farm incomes, and lower food prices. We use an online survey of 1542 respondents from Switzerland, covering three language regions.

Previous literature has revealed rural-urban divides in political assessment and decisions in various policy fields (Church et al., 2020; Huijsmans et al., 2021; Kelly & Lobao, 2019; Maxwell, 2020; Morrill & Webster, 2015). Such a divide may be observed due to composition effects and contextual effects (Maxwell, 2019). Composition effects refer to the heterogeneous distribution of individuals with different characteristics across space, for example, urban populations are often younger and have higher incomes. Thus, differences in policy preferences may be due to differences in these sociodemographic characteristics. Contextual effects refer to specific characteristics of a distinct place regarding its social, cultural, and institutional characteristics shaping individual perceptions, that is, people who live in the same place should have common experiences that develop similar political attitudes. The two effects are closely intertwined and may overlap (Bishop, 2009), for example, economic and demographic developments across space may reinforce each other (Lee et al., 2018). Thus, it often remains an empirical question in each context whether one or the other effect predominates. For instance, looking at attitudes toward immigration, Maxwell (2019) found evidence for compositional effects rather than for contextual effects. Comparing different social and political attitudes across 30 European countries, Kenny and Luca (2021) found differences between urban and rural areas, which could be explained by both composition and contextual effects.

Previous literature suggests that the rural-urban divide may be especially relevant for agricultural policy. For example, European societies have been found to increasingly focus on environmental goals vis-à-vis economic goals related to agriculture: the economic relevance of the agricultural sector has decreased, fewer people work in agriculture, and recreational and leisure purposes for rural land use have become more relevant (Butt, 2013; Cabot et al., 2004; Church et al., 2020; Smithers et al., 2005). In contrast, rural populations are closely linked to farming in economic and social dimensions, not only through employment in the agri-food sector but also because agriculture provides open and attractive landscapes for the tourism sector, which is, for example, the main economic activity in Swiss mountainous regions (Jeangros & Thomet, 2004; Schüpach et al., 2004). According to Church et al. (2020), the urban majority (whose livelihood does not depend on agriculture) may thus impose its values and the resulting political measures on the rural minority. While some studies assessed agricultural policy preferences of different stakeholder groups and found differences between farmers and citizens (Ahtiainen et al., 2015), only a few studies have examined rural-urban divides in the field of agricultural policy. For example, Mittenzwei et al. (2023) analyzed rural-urban perceptions of the effects of climate policy on agricultural and rural areas. They found a rural-urban gradient when it comes to the priorities given to climate policy goals, rural policy, and agricultural policy. More specifically, people living in more central areas were less likely to see a conflict between climate and agricultural policies. People in less central areas were more concerned that climate action would lead to farm closures. Tosun et al. (2023) found that Europeans living in rural areas are more likely to support agricultural policies that support farmers' living standards and less likely to support policies aimed at mitigating environmental degradation and climate change. They also found that people living in urban areas are more likely to call for agricultural policies that ensure a stable food supply and affordable prices. However, an analysis of potential rural-urban divides regarding the prioritization of agricultural policy goals is missing. This is important, however, because although the importance of different policy goals may differ for rural and urban populations, they may not differ in priority when compared directly to another policy goal. The political divide between urban and rural areas may therefore be less pronounced than the current social debate suggests. A better understanding of a potential rural-urban divide in perceptions of and support for agricultural policy goals will help policymakers develop instruments that gain broad acceptance and enable the implementation of much-needed policy reforms to increase the sustainability of agricultural production. Considering the potential rural–urban relationship in the formulation of policy goals is particularly important to overcome polarizing positions and solve collective problems, such as environmental pollution from agricultural production (Church et al., 2020).

Here, we contribute to this literature and fill these gaps. We use an online survey of 1542 respondents from Switzerland in October 2022, and analyze the potential rural-urban divide for different pairs of conflicting agricultural policy goals, thus representing trade-offs between two policy goals. We consider both preferences for and the prioritization of specific goals in our analysis. The design of our survey is based on the agricultural policy goals enshrined in the Swiss Federal Constitution (Art. 104), which are implemented in the applicable agricultural laws and policy measures (Huber et al., 2024). The economic goals considered are (a) higher farm incomes and (b) reduced food prices. As conflicting environmental goals, we consider (a) increased biodiversity, (b) less use of plant protection products, (c) reduced nutrient surpluses, and (d) reduced greenhouse gas emissions. Additionally, we ask for prioritization of the two economic goals (higher farm incomes vs. lower food prices). We assess policy preferences on a slider scale with two poles from 0 to 100, which allows us to collect continuous data on the

prioritization of different pairs of conflicting agricultural policy goals. This is a novelty compared to existing literature because we currently lack evidence of whether there is a rural-urban policy divide when it comes to the evaluation of trade-offs, for example, whether rural populations would favor higher farm incomes over more environmental protection and urban populations would not. Based on self-assessment, we distinguish between five different places of residence, from *very rural* to *very urban*. Using zero-one inflated beta regression models, we control for various sociodemographic characteristics and personal attitudes to test whether and to what extent a rural-urban divide exists between these nine goal conflicts. By accounting for sociodemographic characteristics and personal attitudes, composition effects (e.g., rural populations may simply be older and thus different) and contextual effects (e.g., a rural-urban divide in values and attitudes) can also be analyzed.

We find no evidence for a rural-urban divide in the prioritization of agricultural policy goals. More specifically, the place of residence does in general not affect the preferences of the nine agricultural policy goal conflicts examined. Only for few goal conflicts, people living in very rural areas show different policy preferences compared to people living in other places of residence. With respect to local environmental impacts of agriculture, such as biodiversity loss, our results suggest that policymakers should explain where the benefits of specific policy measures appear. This would support a convergence of preferences for specific agricultural policy goals between regions and thus counteract a polarization of the population. The absence of a general rural-urban divide regarding agricultural policy preferences implies that current policy pushes for more sustainable agriculture are not per se creating further divisions between rural and urban populations. Our analysis for Switzerland is also relevant for other countries that face similar agricultural policy trade-offs and want to counteract the polarization of society.

The remainder of the paper is structured as follows. Section 1 presents the background of Swiss agricultural policy goals and our conceptual approach to the effect of various factors on policy preferences. In Section 2, we present our empirical approach to data collection, followed by a description of how we analyze our survey data in Section 3. The results of the group comparisons, regression analyses, and robustness checks are presented in Section 4, followed by a discussion (Section 5) and conclusions on the policy implications (Section 6).

BACKGROUND ON THE RURAL-URBAN DIVIDE RELATED TO AGRICULTURAL POLICY

In this section, we provide background information on various agricultural policy goals in Switzerland and the associated trade-offs that we examine in our study. Furthermore, we explain our concept of the relationship between residence in urban and rural areas and preferences for the different agricultural policy goals. Swiss agriculture is a good case study as other European countries share similar policy goals and face similar trade-offs in the goals (Candel, 2022; Schebesta & Candel, 2020). As described in detail by Huber et al. (2024), Swiss agricultural policy and the Common Agricultural Policy of the European Union (EU) share similar roots and objectives, and they have developed in the same direction in terms of decoupling income and price policy. At the same time, Switzerland is also a pioneer in Europe when it comes to setting and implementing environmental and animal welfare standards. Direct democracy, with the possibility of launching popular initiatives and thus influencing agricultural policy, is actively used (Huber & Finger, 2019). Voting results indicate an increasing polarization between different population groups, for example, between the rural and urban

populations, which is often postulated as given by political interest groups. If an urban-rural divide can be observed in Switzerland with regard to agricultural policy objectives, such a political divide between the regions could possibly also be expected in other European countries.

Conflicting policy goals in Swiss agriculture

According to the Swiss Federal Constitution (1999, status as of February 13, 2022) Article 104, the agricultural sector should contribute toward the reliable provision of foodstuffs for the population, the conservation of natural resources, the upkeep of the countryside, and the decentralized population settlement of the country. To reach these overarching goals, different policy measures are in place with the goal to support farm incomes, reduce food prices, and reduce negative environmental effects of agricultural production.

The main instrument to support farm incomes in Switzerland is direct payments, making up about 2.7 billion Swiss Francs per year (approx. 2.8 billion Euros or 3 billion USD). Market protection measures are in place, keeping farm gate prices above EU and world market price levels. Measured by the producer support estimate (OECD 2023b), Swiss farmers received 48.7% of their gross farm receipts from consumers and taxpayers through agricultural policy intervention (subsidies and border protection) in 2021. Additionally, the implicit tax on consumers through market price support (higher prices) was 28.5% in the same year (OECD, 2023b). Furthermore, border protection measures increase domestic producer prices to ensure domestic production (due to higher prices) and farmers in Switzerland receive up to 45.1% higher prices compared to the international market and 3.1% higher prices as compared to farmers in the EU (OECD, 2023a). These ratios show the comparatively large trade-off between the reduction of food prices and the increase in producer prices (i.e., farm incomes). In our survey, we include one goal related to farmers' income and one goal related to food prices for consumers.

Besides the more traditional agricultural policy goals, agri-environmental goals are of increasing importance in Switzerland and in the Swiss constitution (Huber et al., 2024). Agri-environmental policy goals are addressed through various targeted and tailored agri-environmental programs in which farmers can participate voluntarily. These include biodiversity conservation programs (Mack et al., 2020; Wuepper & Huber, 2021), pesticide reduction programs (Mack et al., 2003; Möhring et al., 2023), programs aiming to reduce nutrient surpluses (Mack & Huber, 2017; Mack & Kohler, 2018), and newly introduced programs to reduce greenhouse gas emissions (Rödiger & Home, 2023). For our survey, we formulate an environmental goal for each of the existing agri-environmental policy programs (more biodiversity, less use of plant protection products, reduced nutrient surplus, reduced greenhouse gas emissions).[1] In recent years, the failure to achieve environmental goals has led to a large number of popular initiatives related to agriculture, which have been the subject of much public debate (Huber & Finger, 2019). Societal discussions and political arguments are thereby often centered on the goal conflicts of improving agri-environmental conditions and either threatening farm incomes or increasing food prices to a seemingly unacceptable level. For example, when the Swiss people voted on two popular initiatives proposing stricter pesticide policies in 2021, the political discussion revolved around food security and farmers' livelihoods on the one hand, and drinking water pollution and human health aspects on the other (Finger, 2021). Similarly, to Switzerland, these goals are also reflected in the discussion around the Common Agricultural Policy (cp. Huber et al., 2024).

In this study, we are most interested in prioritizing existing agricultural policy goals when they are presented in direct conflict with each other, which is often the case in politically driven social debates. More precisely, we focus on (a) the conflict between reducing food prices versus more biodiversity conservation, reducing pesticide use, reducing nutrient surpluses, and reducing greenhouse gas emissions, respectively, (b) the conflict between increasing farm incomes versus more biodiversity conservation, decreasing pesticide use, reducing nutrient surpluses, and reducing greenhouse gas emissions, and (c) the conflict between reducing food prices versus increasing farm incomes (see example in Figure 2 and a full list in Figure S1A in the Appendix). With this approach we focus on short- to medium-term conflicts between different policy goals that can be resolved in the long term through policy measures.

Determinants of agricultural policy preferences

Sociodemographic characteristics and personal attitudes can directly influence policy preferences (Tosun et al., 2023). Furthermore, policy preferences can differ between rural and urban populations because of compositional effects, that is, differences in sociodemographic characteristics, and contextual effects, that is, differences in personal characteristics (Maxwell, 2019). The remaining differences in policy preferences between rural and urban populations—that is, when composition and contextual factors are controlled for—can be attributed to the differential effects of policies in rural and urban areas (see Figure 1).

First, also for agricultural policy goals, sociodemographic characteristics and personal attitudes directly influence citizens' preferences (Ammann et al., 2023a; El Benni et al., 2024; Tosun et al., 2023). Sociodemographic characteristics include age (Mostafa, 2013; Tosun et al., 2023), gender (Ammann et al., 2023a; Lazaric et al., 2020; Mostafa, 2013), education (Lazaric et al., 2020; Mittenzwei et al., 2023; Moon & Pino, 2017; Mostafa, 2013; Tosun et al., 2023), and culture (El Benni et al., 2024; Guiso et al., 2006; Litina et al., 2016; Schumacher, 2015; Steg, 2016; Wang et al., 2022). Personal attitudes affecting preferences toward agricultural policy goals include attitudes toward farmers (Saleh et al., 2024), environmental attitudes (Dunlap & van Liere, 1978; El Benni et al., 2024; Moon & Pino, 2017), attitudes toward measures to combat climate change, such as the reduction of meat consumption (Ammann et al., 2023a) and political orientation (Lusk, 2012; Varyam et al., 1990; Varyam &

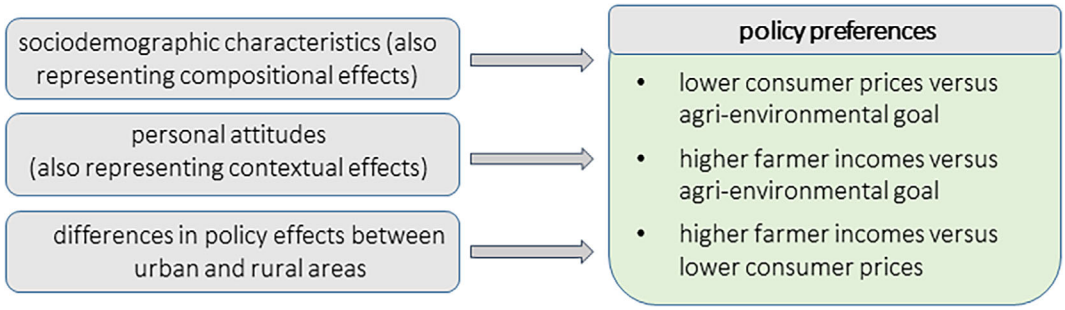

FIGURE 1 Factors affecting citizen's policy preferences. Compositional effects refer to differences in sociodemographic characteristics of the population across space, whereas contextual effects refer to differences in the individual perceptions that are formed by a distinct place.

Jordan, 1991). Furthermore, residents with current or previous occupations related to agriculture may view farming differently (Church et al., 2020) and may thus also prioritize agricultural policy goals differently.

Second, place of residence in urban and rural regions can influence policy preferences when sociodemographic characteristics and personal attitudes differ systematically between urban and rural areas. Thus, population characteristics indirectly influence preference for agricultural policy goals through their spatial relationship, that is, the composition of the population can lead to different preferences across space, with both compositional and contextual effects playing a role here (Maxwell, 2019).

Third, the effects of agricultural policies may also differ between rural and urban regions and therefore lead to differences in preferences for or against a particular agricultural policy goal or measure. These effects, that is, the spatially different effects of policy goals or measures, cannot be explained by sociodemographic characteristics or personal attitudes, but are reflected in different policy preferences in rural and urban regions when controlling for these factors (the direct link between the place of residence and political preferences in Figure 1). For instance, for a Spanish region, Gómez-Limón and Atance (2004) found that despite similar socioeconomic characteristics of population clusters, these clusters differed with respect to their preferences for agricultural policy goals. As agricultural policies are increasingly targeted to specific goals and tailored to specific farms (Finger & El Benni, 2021), their effects can also vary spatially. For example, policy measures aiming to reduce pesticide use are not relevant in mountain regions with extensive grassland-based livestock farming, where pesticides are not used to any significant extent but are vital for regions with a high proportion of horticulture and correspondingly high pesticide use (Schmidt et al., 2019). Furthermore, agricultural policies may imply changes in specific ecosystem services, some of them with local character (e.g., cultural ecosystem services, pollution of water) (Huber & Finger, 2020).

EMPIRICAL APPROACH

Survey

In October 2022, data were collected from 1542 Swiss adults via an online survey (Ammann et al., 2024). The participants were recruited by a commercial and certified panel provider (Bilendi AG) using quotas for gender, age (in three age groups), and language region (German, French, and Italian). Due to recruitment difficulties, the age quota for Italian-speaking Switzerland was adjusted and resulted in more respondents in the middle-aged group (see Table 1). Written informed consent was obtained from all participants at the beginning of the survey and participants had the possibility to opt out at any point in the survey without having to give a reason. The survey was approved by the ETH Zurich Ethics Committee (EC 2022-N-174).

Following the background described in Section1.1, we focus on nine different pairs of conflicting goals[2]: (a) increasing farm incomes versus each of the considered agri-environmental goals, (b) lower food prices versus each of the considered agri-environmental goals, and (c) higher farm incomes versus lower food prices. The agri-environmental goals considered here are (i) more biodiversity, (ii) reducing pesticide use, (iii) reducing greenhouse gas emissions, and (iv) reducing nutrient surpluses from agriculture. On an interactive slider scale from 0 (strong preference for goal A) to 100 (strong preference for goal B), we asked the participants

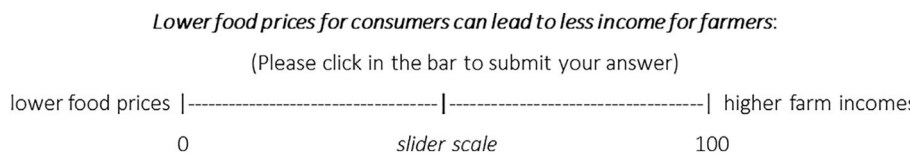

FIGURE 2 Example of a brief description and a question that uses a sliding scale to elicit conflicting goals.

to weigh two goals against each other. Participants were asked for their opinion on four different policy trade-offs related to higher farm incomes versus more biodiversity, less use of plant protection products, less nutrient surpluses, and less greenhouse gas emissions, respectively. Four additional slider-scale questions were used to ask participants for their opinions on policy trade-offs related to lower food prices versus the same agri-environmental goals presented earlier. The ninth goal conflict asked about prioritizing either higher farm incomes or lower food prices. To facilitate the evaluation of goal conflicts for participants with different levels of knowledge of agricultural policy goals and to provide a level playing field for the assessment, a brief description of the goal conflict was provided for each slider-scale question. In Figure 2 we provide one example of such a short description and a question, and a full list of policy goal conflicts including the descriptions can be found in Figure S1A in the Appendix. Note that the red cursor in Figure 2 symbolizes the slider for the sake of presentation; in the survey, the cursor appeared only after participants clicked on the slider to avoid priming of participants. Note that we have pretested the survey design to ensure that participants understand the questions as intended.

Based on the literature described in Section 1.1, the following sociodemographic characteristics were collected from participants: year of birth, gender, education on a scale from 1 to 7 (1 = no or in education to 7 = university degree), and whether the participant has work experience in farming (no = 0, was previously working as farmer or on a farm = 1, is currently working as farmer = 2). To capture cultural differences, we control for the German-, French- and Italian-speaking language regions using dummy variables (El Benni et al., 2024). We follow the approach taken by the European Commission for their Eurobarometer surveys (see Tosun et al., 2023) and use a self-assessment of belonging to a specific urban or rural region. More specifically, two questions are asked about place of residence on a scale from 1 to 5: (a) whether a person is *living in* and (b) whether a person is *born in* very rural (1), rather rural (2), suburban (3), rather urban (4), or very urban (5). We use the similarity of the questions as a check of the robustness of the results. This classification is similar to the terms used by the Swiss Statistical Office (BFS, 2017),[3] for example, to provide public information on voting results, and we therefore expect citizens to have some understanding of this scale.

The following constructs were used to assess the personal attitudes of respondents: their political orientation on a slider scale from 0 (extremely left) to 100 (extremely right). The ecological welfare scale developed by Lindeman and Väänänen (2000), made up of five questions measuring ethical food choice motives with respect to ecological concerns, each using values from 1 to 4. The meat commitment scale by Piazza et al. (2015), which consists of seven questions, is used to measure the respondent's commitment to meat consumption, using values from 1 (very low) to 7 (very high meat commitment). The respondents' attitudes toward farmers using five items that were rated on a scale from 1 (do not agree at all) to 7 (totally agree) (Saleh et al., 2024).

TABLE 1 Description of the sample ($N = 1542$).

	%	Mean (sd)
Gender (women)	51.5	
Age		44.59 (15.14)
18–35	32.9	
36–54	35.7	
55–75	31.4	
Language region		
German	32.8	
French	33.5	
Italian	33.7	
Education[a]		4.52 (1.63)
Low	4.7	
Medium	63.4	
High	31.9	
Place of residence (living in/born in)		
Very rural	9.0/10.7	
Rather rural	29.4/29.5	
Suburban	28.3/25.5	
Rather urban	21.3/20.6	
Very urban	12.0/13.7	
Preferences for lower food prices (values 0 to <50) versus		
...more biodiversity (values 50 to 100)		49.01 (27.51)
...less use of plant protection products (values 50 to 100)		47.13 (27.20)
...less greenhouse gas emissions (values 50 to 100)		45.46 (27.37)
...less nutrient surpluses (values 50 to 100)		51.75 (25.90)
Preference for higher farm incomes (values 0 to <50) versus		
...more biodiversity (values 50 to 100)		50.39 (25.10)
...less use of plant protection products (values 50 to 100)		48.08 (25.75)
...less greenhouse gas emissions (values 50 to 100)		45.77 (26.58)
...less nutrient surpluses (values 50 to 100)		52.07 (24.13)
...lower food prices (values 50 to 100)		52.20 (24.91)
Previous and current work experience in farming (yes)	16.1	
Ecological welfare[b] (values from 1–4; higher values show stronger ecological welfare)		3.32 (0.58)
Attitudes toward farmers[c] (values from 1–7; higher values show more positive perception)		5.64 (0.96)
Meat Commitment[d] (values from 1–7; higher values show higher meat commitment)		3.87 (1.75)
Political orientation (continuous scale: 1 = extremely left to 100 = extremely right)		52.23 (21.83)

Note: Descriptive statistics of sociodemographic characteristics and personal attitudes for people with different places of residence are shown in the appendix Table S1A. It shows that people living in very and rather rural areas are significantly older and have a significant lower education level as compared to people living in suburban to very urban areas. Significant differences between language regions exist, too. No significant differences can be observed for gender and working experience in farming. Hardly any differences in personal attitudes between people with different places of residence can be observed. The results for people with different places of birth show similar results, with even less significant differences (see Table S1B in the appendix).

[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 toward farmers were measured using a five-item scale following Saleh et al. (2024).

[d]The meat commitment scale of Piazza et al. (2015) was used.

Data

In Table 1, the descriptive statistics of the sample are shown. Gender, age, and language region follow the quota, with a slightly higher proportion of the middle age group having to be recruited for the Italian-speaking region due to difficulties finding enough people in the older age group. A majority of 63% of participants have a (vocational) baccalaureate, higher technical, or vocational education (i.e., indicated as medium education level in Table 1) and approximately 32% have a degree from a university or applied science university. Respondents' birthplaces and current places of residence are both relatively evenly distributed from very rural to very urban. Of the respondents, 16% have current or had previous experience working on a farm.

The mean values for the policy goal conflicts are close to 50, that is, a strong polarization toward one or the other objective cannot be determined on average for all responses. On average, across all respondents, the lowest value is placed on reducing greenhouse gas emissions compared to reducing food prices (mean value 45.5) or increasing farm incomes (mean value 45.8).

The reliability of the scales used to assess personal attitudes of respondents was good to very good with Cronbach's $\alpha = 0.85$ for the ecological welfare scale, a Cronbach's $\alpha = 0.92$ for the meat commitment scale, and a Cronbach's $\alpha = 0.82$ for the scale measuring attitudes toward farmers. Cronbach's alpha is a measure for internal consistency, indicating whether the tested items measure the same general construct and can therefore be summarized as a scale with mean values (Cronbach, 1951). As shown by the mean values, Swiss citizens have strong attitudes toward ecological welfare, a tendency toward meat consumption, and a positive attitude toward farmers. The self-assessed political orientation of the sample is balanced, with a mean value of 52 on a scale from 0 (extremely left) to 100 (extremely right). The data will be made available with the article after publication.

DATA ANALYSIS

As a first step, we visually analyze differences in the policy preferences of respondents from different places of residence, that is, from very rural to very urban. Therefore, we show the distribution of policy preferences for each of the nine conflicting policy goals for the whole sample and for each place of residence separately.

In a second step, we test whether significant differences in policy preferences across places of residences can be observed, that is, whether a rural-urban policy divide exists. We use zero-one inflated beta (ZOIB) regression models that have become more popular in recent years to model data bounded within the interval (0, 1), such as rates and proportions (Liu & Kong, 2015). This model is particularly suited for slider-scale data that are unlikely normally distributed but are often skewed and bounded by, partly excessive, 0 at the lower and 1 at the upper end of the distribution (Vuorre, 2019). The ZOIB model considers the probability density within (0, 1) and the probability mass at 0 and 1, which, in our case, represents a sole preference for one of the two agricultural policy goals. In the ZOIB model, we assume that the dependent variable y_{ij} represents j values on the slider scale out of a total of J values on the slider scale from each respondent i, that is, $y_j = y_{1j}, \ldots, y_{nj}$. When y_{ij} is inflated at both 0 and 1 a piecewise distribution follows (Liu & Kong, 2015; Ng'ombe et al., 2022):

$$f\left(y_{ij}\right)=\begin{cases} p_{ij} & \text{if } y_{ij}=0 \\ \left(1-p_{ij}\right)q_{ij} & \text{if } y_{ij}=1 \\ \left(1-p_{ij}\right)\left(1-q_{ij}\right)\text{Beta}\left(\alpha_{ij1},\alpha_{ij2}\right) & \text{if } y_{ij}\in(0,1) \end{cases} \tag{1}$$

where p_{ij} is the probability of $y_{ij}=0$, and $q_{ij}$is the conditional probability $\Pr\left(y_{ij}=1|y_{ij}\neq 0\right)$, and α_{ij1} and α_{ij2} are the shape parameters of the beta distribution when $y_{ij}\in(0,1)$. The alpha parameters describe the location, spread, and skewness of the beta distribution. The mean of the beta distribution is given by $\mu_{ij}^{(0,1)}=E\left(y_{ij}|y_{ij}\right)\in(0,1)=\alpha_{ij1}\left(\alpha_{ij1}+\alpha_{ij2}\right)^{-1}$. The variance of the beta distribution is a function of its mean and the sum of the two shape parameters $v_{ij}=\alpha_{ij1}+\alpha_{ij2}$, that is,

$$V\left(y_{ij}|y_{ij}\in(0,1)\right)=\mu_{ij}^{(0,1)}\left(1-\mu_{ij}^{(0,1)}\right)\left(\alpha_{ij1}+\alpha_{ij2}+1\right)^{-1}=\mu_{ij}^{(0,1)}\left(1-\mu_{ij}^{(0,1)}\right)\left(v_{ij}+1\right)^{-1} \tag{2}$$

Assuming a logit function is applied to p_{ij}, q_{ij} and $\mu_{ij}^{(0,1)}$, and the log link function is applied to v_{ij}, the full model can be parameterized as follows (Liu & Kong, 2015; Ng'ombe et al., 2022):

$$\text{logit}\left(\mu_{ij}^{(0,1)}\right)=x_{1,ij}\beta_{1j}+I_1(z_{1,i}\gamma_1) \tag{3}$$

$$\log\left(v_{ij}\right)=x_{2,ij}\beta_{2j}+I_2(z_{2,i}\gamma_2) \tag{4}$$

$$\text{logit}\left(p_{ij}\right)=x_{3,ij}\beta_{3j}+I_3(z_{3,i}\gamma_3) \tag{5}$$

$$\text{logit}\left(q_{ij}\right)=x_{4,ij}\beta_{4j}+I_4(z_{4,i}\gamma_4) \tag{6}$$

where the parameters β_{mj} are the linear fixed effects in the link function $m\,(m=1,2,3,4)$ for the Jth response variable, where $j=1,...,J$; $x_{m,ij}$ is the design matrix of the fixed effects, $I_m(z_{m,i}\gamma_m)$ is a dummy and equals $z_{m,i}\gamma_m$ if the link function has a random component, 0 otherwise, $z_{m,i}$ is the design matrix for the random components, $\Upsilon_m\sim N(0,\Sigma_m)$ implies $z_{m,i}\gamma_m\sim\text{indN}\left(0,z_{m,i}^k\Sigma_m z_{m,i}\right)$ for $i=1,...,n$ in link function m. The estimated parameters of μ_{ij} predict the mean value of the beta distribution. The estimated parameters of v_{ij} predict the precision parameter of the beta distribution. The estimated parameters of p_{ij} is the probability of a zero-one inflation, that is, the observation is either 0 or 1. The estimated parameters of q_{ij} predict the proportion of one's in the zero and one observations.

Following Liu and Eugenio (2018), the conditional mean of the policy goal assessment y_{ij} given $z_{m,i}$ is:

$$E\left(y_{ij}\,|\,\gamma_1\gamma_2\gamma_3\gamma_4\right)=\left(1-p_{ij}\right)\left(q_{ij}+\left(1-q_{ij}\right)\mu_{ij}^{(0,1)}\right) \tag{7}$$

Liu and Eugenio (2018) showed that Bayesian methods are better suited to estimate ZOIB models than maximum likelihood methods because of the nonlinearities and possible random

effects involved. Thus, we fit our models using a Bayesian approach based on Markov Chain Monte Carlo (MCMC) methods. With the Bayesian approach we use prior distributions for observed and unobserved data and explicitly estimate posterior distributions of the model parameters that form Bayesian credible intervals (that correspond to confidence intervals used in frequentist inference) (McElreath, 2020). We use the R package brms, which also provides Bayesian credible intervals to quantify parameter uncertainties (Bürkner, 2017).

As we are interested in the effect of place of residence on the prioritization of different agricultural policy goals and given that we use data from slider scales, we estimate all four parameters of the ZOIB model for the variable place of residence. We present predictions and credible intervals of policy preferences across places of residence, that is, estimates of the mean values of the beta distribution, in the main text and present all other estimates in the Appendix.

Two robustness tests are performed. First, we test whether differences in policy preferences across places of residence are stable when controlling for a wide range of sociodemographic characteristics and personal attitudes. We thus account for potential composition, that is, rural-urban differences in the sociodemographic characteristics, and contextual effects, that is, rural-urban differences in the personal attitudes variables, that may partly determine the rural-urban divide in the prioritization of agricultural policy goals. More specifically, we estimate ZOIB models for four different model specifications considering different sets of control variables: (a) Model 1 includes place of residence (baseline model used to test for significant differences in policy preferences across place of residences as described above), (b) Model 2 includes place of residence and a set of sociodemographic characteristics, (c) Model 3 includes place of residence and a set of personal attitude variables, and d) Model 4 is the full model including place of residence, sociodemographic characteristics, and personal attitudes. The models are compared to each other to check whether the effects of place of residence remain the same across models. Model comparison is done using leave-one-out cross-validation implemented in the R package brms (Bürkner, 2017). A second robustness check tests the relevance of the date of birth versus the place of residence, that is, we test whether results are biased by rural-urban migration dynamics. Scales for both options, place of residence and place of birth, include the same five response options (see above). All statistical analyses presented in the methods above, that is, group comparisons and regression analyses, are performed with both variables and compared with each other.

RESULTS

Descriptive results

The visual analyses of policy preferences across places of residence show no rural-urban policy divide, that is, the distribution of responses to the question about prioritization of agricultural policy goals does not differ between places of residence.

Figure 3 shows the distribution of preferences for each policy goal conflict for the different places of residence and for the whole sample.[4] Given the sliding scale of 0 to 100, with values around 50 representing indifference between the two conflicting goals, there is, on average, no clear preference in favor of one or the other policy goal within and between regions. For example, between 42% (very rural) and 54% (rather rural) of the respondents prefer reduced food prices over more biodiversity (compare Figure 3a), that is, about half of the respondents prefer the one goal over the other independent of the place of residence.

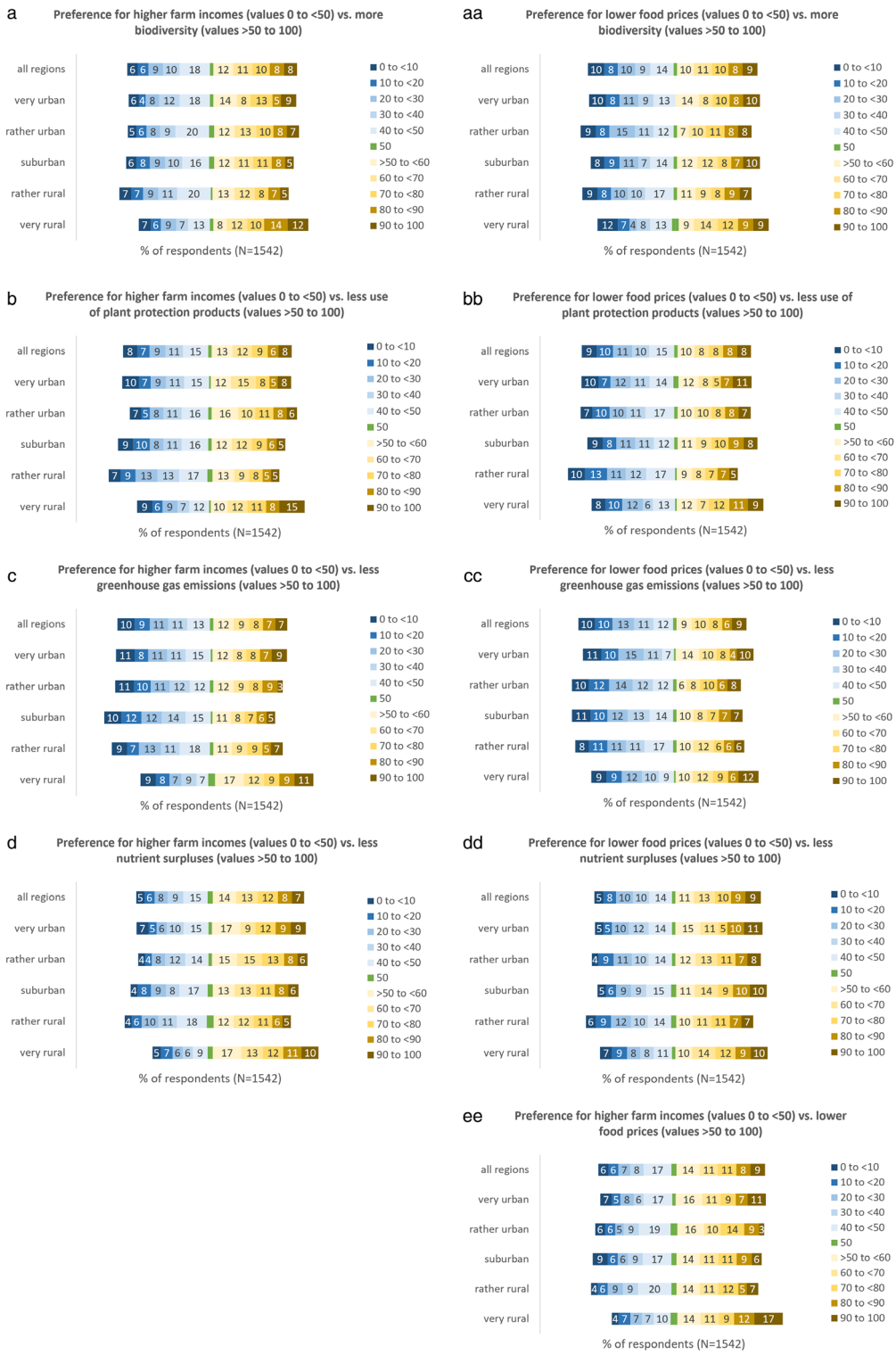

FIGURE 3 Distribution of policy preferences when prioritizing two goals against each other (by place of residence).

Identifying the rural-urban policy divide based on predictions of zero-one inflated beta regressions

Our group comparison results show no evidence for a rural-urban policy divide. Only six out of 90 possible significant differences in policy preferences across places of residences were found using ZOIB regression models.[5] More specifically, no significant differences are observed for goal conflicts related to lower food prices. Few significant differences across places of residence can be observed for two (out of four) goal conflicts related to higher farm incomes and the goal conflict between higher farm incomes and lower food prices.

Figure 4 shows the mean predicted values (black dots) and the lower and upper bounds of the credible intervals of policy preferences across residences for the nine goal conflicts examined. These predictions are derived from the regression model that includes only place of residence as an explanatory variable (i.e., model 1). The purpose of presenting the predicted values is to quantify and visualize the effect of place of residence on policy preferences. Non-overlapping credible intervals show significant differences across places of residence. For the variable of interest, namely place of residence, we present all estimated parameters of the ZOIB regression model in Table S5A of the Appendix, including the point estimates for the nine goal conflicts, the standard error of the parameters, and the bounds of the 95% credible intervals.

The results show that most predicted values are between 40 and 60 (on a scale from 0 to 100). So, on average, across all responses, no strong polarization in favor of one goal or the other can be found. Also, there are very few significant differences in policy preferences across places of residence. Only people living in very rural places of residence differ in some conflicting goals from some of the other places of residence.

Respondents from all places of residence are rather indifferent when they must decide on either an increase in biodiversity or lower food prices (Figure 4a) or higher farm incomes (Figure 4aa) (mean values are very close to 50). One exception is people living in very rural areas who found the increase in biodiversity of higher importance than higher farm incomes (Figure 4aa). However, the only significant differences in policy preferences for this goal conflict are observed between people living in very rural areas and people living in rather rural areas.

When weighing pesticide use reduction against lower food prices (Figure 4b) or higher farm incomes (Figure 4bb), most respondents from all places of residence consider pesticide use reduction less important than the conflicting goal (mean predicted values below 50). One exception is people living in very rural areas who find a reduction in pesticide use as more important than higher farm incomes (mean predicted values above 50) and with this significantly differ in their policy preferences compared to people living in rather rural and suburban places.

When weighing the reduction of greenhouse gas emissions against lower food prices (Figure 4c) or higher farm incomes (Figure 4cc), it shows that respondents from all places of residence consider the reduction of greenhouse gas emissions less important than the economic goals. No significant differences in political preferences are found between places of residence.

In contrast, the reduction of nutrient surpluses is of higher importance for the majority of respondents from all places of residence compared to lower food prices (Figure 4d) or higher farm incomes (Figure 3d). No significant differences in political preferences are found between places of residence.

When weighing the two economic agricultural policy goals against each other, it appears that respondents from very rural and very urban areas find lower food prices more important than higher farm incomes, while respondents living elsewhere are indifferent (Figure 4e).

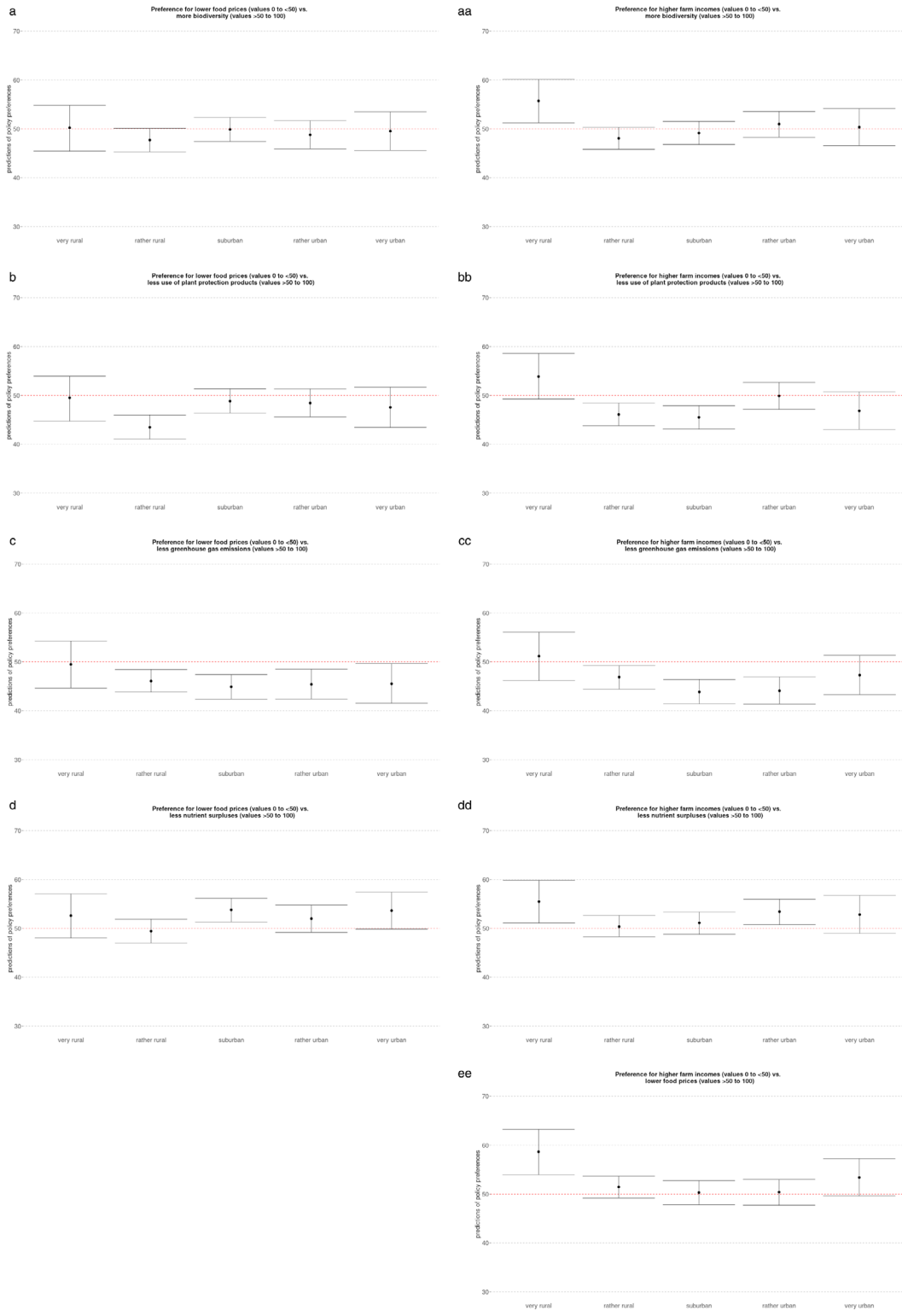

FIGURE 4 Legend on next page.

The policy preference for lower food prices is significantly higher among people living in very rural areas as compared to people living in rural, suburban or urban regions.

Robustness checks

We conduct two robustness checks to investigate the stability of our findings and assess underlying mechanisms.

A first robustness check was conducted to check whether the rural-urban policy divide remains the same, if we control for personal attitudes (representing contextual effects across space) and sociodemographic characteristics (representing compositional effects across space). More precisely, we compared four different ZOIB models: (a) Model 1 includes place of residence (baseline model used to test for significant differences in policy preferences across place of residences with results presented in Section 4.2), (b) Model 2 includes place of residence and a set of sociodemographic characteristics, (c) Model 3 includes place of residence and a set of personal attitude variables, and (d) Model 4 is the full model including place of residence, sociodemographic characteristics, and personal attitudes. It shows that across all nine goal conflicts, the significance and direction of parameter estimates are robust across model specifications (see Table S2A,B in the Appendix). The results of the group comparisons are confirmed. There is no evidence of a rural-urban divide when weighing agricultural policy goals. The model comparisons (Table S3A in the Appendix) also show that (a) the full model is always the preferred model, that is, the model with the highest predictive accuracy, (b) the model considering only the respondents´ place of residence is always the model with the lowest predictive accuracy, and (c) personal attitudes contribute more to the predictive accuracy than sociodemographic variables.

In Table 2, we show the estimated parameters of the full model, that is, the model including place of residence, sociodemographic characteristics, and personal attitudes. We present point estimates of the groups' mean (i.e., place of residence) and credible intervals in Table 2 and all other estimates in Table S5B in the Appendix, including the point estimates for the nine goal conflicts, the standard error of the parameters, and the bounds of the 95% credible intervals. Significant parameter estimates are marked in bold. Negative (positive) parameters indicate that the respective variable negatively (positively) influences the preference for lower food prices or higher farm incomes compared to agri-environmental goals.

FIGURE 4 Quantification and visualization of the estimated effect of place of residence on policy preferences using predicted values of the zero-one inflated beta regressions. Results presented in graphs a-d) show the predicted values for the valuation of goal conflicts between food prices and the agri-environmental goals, that is, the predicted slider-scale values. Predictions are based on regression estimates presented in Table S5A of the Appendix. Lower values show stronger preferences for lower food prices. Values below 50 show that lower food prices are prioritized against the other goal and vice versa. Results in graphs aa-dd) show the predicted values for the valuation of goal conflicts between farm incomes and the agri-environmental goals, that is, the predicted slider-scale values. Lower values show higher preferences for higher farm incomes than for the improvement in the agri-environmental goal. Values below 50 show that higher farm incomes are prioritized against the other goal and vice versa. Dots represent the mean predicted values. Crossbars represent the min. respective max. of the predicted slider scale values.

TABLE 2 The effect of place of residence, sociodemographic characteristics, and personal attitudes on the prioritization of agricultural policy goals ($N = 1542$).

	Parameter (point) estimates for the nine goal conflicts (standard error of the parameter) [lower/upper bound of the 95% credible interval]								
	Lower food prices versus				**Higher farm incomes versus**				
	More biodiversity	**Less use of plant protection products**	**Less greenhouse gas emissions**	**Less nutrient surpluses**	**More biodiversity**	**Less use of plant protection products**	**Less greenhouse gas emissions**	**Less nutrient surpluses**	**Higher farm incomes versus lower food prices**
Very rural	0.17	0.41	0.17	0.33	**−0.85**	**−0.74**	**−1.24**	**−0.75**	**−1.07**
	(0.26)	(0.25)	(0.25)	(0.24)	(0.23)	(0.25)	(0.24)	(0.23)	(0.25)
	[−0.33/0.69]	[−0.09/0.89]	[−0.33/0.65]	[−0.14/0.80]	[−1.30/−0.39]	[−1.22/−0.25]	[−1.70/−0.75]	[−1.20/−0.30]	[−1.55/−0.58]
Rather rural	−0.12	−0.17	−0.05	−0.08	**−0.31**	**−0.25**	−0.04	−0.18	**−0.25**
	(0.10)	(0.10)	(0.10)	(0.09)	(0.09)	(0.10)	(0.10)	(0.09)	(0.10)
	[−0.32/0.08]	[−0.37/0.03]	[−0.24/0.14]	[−0.26/0.10]	[−0.50/−0.13]	[−0.45/−0.06]	[−0.24/0.16]	[−0.36/0.00]	[−0.45/−0.06]
Suburban	0.01	0.05	−0.05	0.06	**−0.29**	**−0.27**	−0.12	**−0.20**	**−0.25**
	(0.10)	(0.10)	(0.10)	(0.09)	(0.10)	(0.10)	(0.10)	(0.09)	(0.10)
	[−0.19/0.21]	[−0.16/0.25]	[−0.25/0.15]	[−0.12/0.25]	[−0.48/−0.11]	[−0.47/−0.07]	[−0.32/0.07]	[−0.38/−0.01]	[−0.46/−0.06]
Rather urban	−0.01	0.06	−0.01	−0.01	**−0.21**	−0.13	−0.08	−0.12	**−0.32**
	(0.11)	(0.11)	(0.11)	(0.10)	(0.10)	(0.11)	(0.10)	(0.10)	(0.11)
	[−0.23/0.20]	[−0.15/0.27]	[−0.21/0.21]	[−0.20/0.19]	[−0.41/−0.01]	[−0.33/0.07]	[−0.29/0.12]	[−0.31/0.07]	[−0.52/−0.11]
Very urban	−0.00	0.00	−0.03	0.05	**−0.24**	**−0.24**	−0.08	−0.14	−0.17
	(0.12)	(0.12)	(0.12)	(0.11)	(0.11)	(0.12)	(0.12)	(0.11)	(0.12)
	[−0.24/0.23]	[−0.23/0.23]	[−0.26/0.20]	[−0.17/0.27]	[−0.45/−0.02]	[−0.47/−0.01]	[−0.31/0.16]	[−0.35/0.08]	[−0.40/0.06]
Age	−0.00	**−0.01**	0.00	**−0.00**	**−0.00**	**−0.01**	0.00	**−0.01**	−0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	[−0.01/0.00]	[−0.01/−0.00]	[−0.00/0.01]	[−0.01/−0.00]	[−0.01/−0.00]	[−0.01/−0.00]	[−0.00/0.00]	[−0.01/−0.00]	[−0.00/0.00]
Education	**−0.06**	**−0.07**	**−0.05**	**−0.07**	**−0.05**	**−0.03**	−0.03	−0.01	0.02
	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)	(0.01)	(0.02)
	[−0.09/−0.02]	[−0.10/−0.04]	[−0.09/−0.02]	[−0.10/−0.04]	[−0.08/−0.02]	[−0.06/−0.00]	[−0.06/0.00]	[−0.04/0.02]	[−0.01/0.05]

TABLE 2 (Continued)

	Parameter (point) estimates for the nine goal conflicts (standard error of the parameter) [lower/upper bound of the 95% credible interval]								
	Lower food prices versus				Higher farm incomes versus				
	More biodiversity	Less use of plant protection products	Less greenhouse gas emissions	Less nutrient surpluses	More biodiversity	Less use of plant protection products	Less greenhouse gas emissions	Less nutrient surpluses	Higher farm incomes versus lower food prices
Female	0.06	**0.13**	0.02	0.10	**0.14**	**0.14**	0.07	0.06	0.04
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
	[−0.05/0.16]	[0.03/0.24]	[−0.08/0.13]	[−0.00/0.20]	[0.05/0.24]	[0.04/0.24]	[−0.04/0.17]	[−0.04/0.15]	[−0.06/0.14]
Experience yes	0.10	**0.21**	**0.22**	**0.16**	**0.14**	**0.24**	**0.29**	**0.20**	**0.17**
	(0.08)	(0.08)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
	[−0.05/0.24]	[0.06/0.36]	[0.08/0.35]	[0.02/0.30]	[0.01/0.27]	[0.11/0.38]	[0.16/0.43]	[0.06/0.33]	[0.03/0.31]
Language FR	0.09	**0.23**	**−0.14**	**0.21**	**0.27**	**0.18**	0.01	**0.31**	0.05
	(0.07)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
	[−0.04/0.22]	[0.11/0.36]	[−0.26/−0.02	[0.09/0.33]	[0.16/0.39]	[0.06/0.30]	[−0.12/0.13]	[0.20/0.43]	[−0.06/0.17]
Language IT	0.10	0.04	−0.03	0.06	**0.32**	**0.27**	**0.22**	**0.31**	**0.26**
	(0.07)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
	[−0.03/0.23]	[−0.08/0.17]	[−0.15/0.09	[−0.06/0.19]	[0.20/0.44]	[0.15/0.39]	[0.10/0.34]	[0.20/0.42]	[0.13/0.38]
Political	**0.01**	**0.00**	**0.01**	**0.01**	**0.00**	**0.00**	**0.01**	0.00	−0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
	[0.00/0.01]	[0.00/0.01]	[0.00/0.01]	[0.00/0.01]	[0.00/0.01]	[0.00/0.01]	[0.00/0.01]	[−0.00/0.00]	[−0.00/0.00]
Farm attitude	**0.06**	0.04	0.04	0.01	**0.29**	**0.27**	**0.28**	**0.26**	**0.23**
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
	[0.00/0.12]	[−0.01/0.10]	[−0.02/0.10]	[−0.05/0.06]	[0.23/0.34]	[0.22/0.33]	[0.22/0.33]	[0.21/0.31]	[0.17/0.29]
Eco welfare	**−0.29**	**−0.31**	**−0.34**	**−0.19**	**−0.27**	**−0.28**	**−0.33**	**−0.21**	0.04
	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)
	[−0.38/−0.20]	[−0.40/−0.22]	[−0.43/−0.25]	[−0.28/−0.10]	[−0.36/−0.18]	[−0.36/−0.19]	[−0.42/−0.24]	[−0.29/−0.13]	[−0.05/0.13]

(Continues)

TABLE 2 (Continued)

	Parameter (point) estimates for the nine goal conflicts (standard error of the parameter) [lower/upper bound of the 95% credible interval]								
	Lower food prices versus				Higher farm incomes versus				
	More biodiversity	Less use of plant protection products	Less greenhouse gas emissions	Less nutrient surpluses	More biodiversity	Less use of plant protection products	Less greenhouse gas emissions	Less nutrient surpluses	Higher farm incomes versus lower food prices
Meat com	**0.10**	**0.10**	**0.12**	**0.10**	**0.06**	**0.06**	**0.07**	**0.04**	**−0.07**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)
	[0.07/0.13]	[0.07/0.14]	[0.09/0.15]	[0.07/0.13]	[0.03/0.09]	[0.03/0.09]	[0.04/0.10]	[0.02/0.07]	[−0.10/−0.04]

Note: The estimated parameters for the people living in very rural to very urban areas are the logit-transformed means of policy preferences. If the credible interval of the estimated parameter for the people living in very rural areas does not include zero, the preferences of the people living in very rural areas differ significantly for the two conflicting policy goals. If the credible interval of the estimated parameters for the people living in rather rural to very urban areas does not include zero, the policy preferences of the people from the respective place of residence significantly differ from the people living in very rural areas at the 95% level (i.e., indicating the extent to which the parameters differ for the people living in rather rural to very urban areas versus the people living in very rural areas). For all other estimated parameters, if the credible intervals do not span zero, the parameter significantly affects policy preferences. Significant parameter estimates are marked in bold. Negative (positive) parameters indicate that the respective variable negatively (positively) influences the preference for lower food prices or higher farm incomes compared to agri-environmental goals.

Again, the results show that the place of residence does not explain any of the differences in policy preferences when lower food prices are assessed against an agri-environmental goal. When higher farm incomes are assessed against an agri-environmental goal, only people in very rural areas significantly differ in their policy preferences. This is also true when higher farm incomes are assessed against lower food prices. People living in very rural areas give significantly lower priority to higher farm incomes than to increasing biodiversity or reducing pesticide use than people living in other areas. Furthermore, people living in very rural areas put more importance on lower food prices as compared to higher farm incomes.

Furthermore, the results show that increasing education levels decreases the importance of lower food prices in favor of agri-environmental goals. This likely also reflects income effects with a higher educated person receiving higher wages (Card, 1999) and thus find lower food prices less important than people with a lower education and likely lower income levels. Persons with experience in agriculture valuate lower food prices and higher farm incomes as more important than their respective agri-environmental goal compared to persons without working experience in agriculture. This result may reflect differences in agricultural policy preferences between farmers and citizens that were found in previous studies (Ahtiainen et al., 2015). Women show in tendency a preference for lower food prices and higher farm incomes when they assess these goals in comparison to agri-environmental goals. Differences between language regions can also be observed. Respondents from the French- and Italian-speaking parts of Switzerland put higher weights on higher farm incomes than on agri-environmental goals as compared to the German-speaking respondents.

Personal attitudes significantly affect the prioritization of agricultural policy goals. The more right-wing the political orientation, the higher the meat commitment. The more positive the attitudes toward farmers, the more importance is given to lower food prices and higher farm incomes. In contrast, the higher the ecological attitudes, the more important agri-environmental goals become when compared to lower food prices and higher farm incomes.

A second robustness check tests whether results are biased by rural-urban migration dynamics by changing the variable *place of residence* to *birthplace*. Results show that when people's place of birth rather than residence is analyzed, hardly any rural-urban divide in political preferences is observed, with one exception. People born in very rural areas prefer lower food prices to higher farm incomes. Thus, the political divide between people with different places of birth is even less pronounced than that between people with different places of residence. Table S4A in the Appendix shows the ZOIB results of the full model that including place of birth (instead of place of residence) as a robustness check.

As for the model comparisons for place of residence, the model comparisons for birthplace (Table S3B in the Appendix) show that (a) the full model is always the preferred model, that is, the model with the highest predictive accuracy, (b) the model considering only the place of residence (or place of birth) is always the model with the lowest predictive accuracy, and (c) personal attitudes contribute more to the predictive accuracy than sociodemographic variables.

DISCUSSION

Our results do not suggest a strong polarization in the Swiss population when agricultural policy objectives are presented as conflicting goals. This is the case both across the total population and across or within places of residence in which people are living. Regardless of the

respondents' place of residence (or place of birth), lower food prices and higher farm incomes are, for instance, prioritized over the reduction of greenhouse gas emissions and pesticide use. The reduction of nutrient surpluses is seen as more important than either lower food prices or higher farm incomes by most of the respondents, irrespective of their place of residence. On average, however, preferences for one or the other agricultural policy goals are not notably strong, but both goals seem to be important in each case, as the values near 50 suggest. This contrasts with the recurring social and political discussions suggesting a rural-urban divide in preferences toward agricultural policy goals (Hermann et al., 2023). One possible explanation is that it is not so much the actual agricultural policy goals that are at the forefront of the social debates on, for example, one or another agricultural policy initiative, but rather other (perhaps less rational) arguments that determine people's perceptions of a rural-urban divide that does not actually exist. Our results suggest that policy efforts to make agriculture more environmentally sustainable do not per se lead to a rural-urban divide, but that a stronger focus should be placed on reducing trade-offs between the economic and environmental dimensions, for example, by providing a larger share of direct payments conditional on environmental performance or paying directly for environmental outcomes. In fact, the politically and socially debated trade-offs between different agricultural policy goals are often short to medium term and can be addressed by targeted policy measures that reduce these trade-offs. For example, an effective subsidy that compensates farmers for lost profits due to reduced pesticide use can offset negative income effects in the long run. Future research should therefore focus not only on the analysis of conflicting goals, but also on measures to deal with these conflicts and the extent to which these measures would be accepted by the population.

Another key result from our study is that people living in very rural areas put more importance on the agri-environmental goals than on higher farm incomes (even though higher farm incomes are on average still more important than the improvement of agri-environmental goals) as compared to people living in the other regions. This is especially true for the conservation of biodiversity and the reduction of pesticide use but not, for example, for the reduction of greenhouse gas emissions. One possible explanation is that these goals and related measures directly and positively affect the well-being of people living in very rural areas (Jones et al., 2017), such as clean drinking water from local sources, less health risk of local residents when pesticide use (in neighboring fields) is reduced, and the directly visible changes associated with biodiversity decline. Since the (land) share of agriculture is highest in very rural areas, the effects of agricultural policy are most likely to be felt there. In contrast, urban residents may hardly notice local changes in very rural areas, for example, in biodiversity, as they only spend time there occasionally, if at all, in their leisure time. Although some authors argue that rural communities are the most vulnerable to climate change (Austin et al., 2020) and that climate change affects rural economic activities with higher shares of agriculture and forestry than urban economic activities (Mueller & Tickamyer, 2020), this vulnerability is not reflected in the agricultural policy preferences of Swiss citizens living in very rural areas. This might be, in contrast to pesticide use and biodiversity, because the impact of climate gases is of a non-local nature, that is, reducing climate gases does not add immediate local value and can therefore be considered a lower priority than the other agri-environmental goals also for people living in very rural areas.

Residents of very rural areas (as opposed to residents of more rural to very urban areas) clearly prioritize lower food prices over higher farm incomes, which is in contrast to people living in other places of residence. We cannot prove whether this reflects different economic conditions across regions because we did not ask respondents about their income to ensure the

highest possible response rate (respondents do not like to answer questions about their income). However, we assume that educational attainment also reflects income effects (Card, 1999) and that, therefore, income effects are at least partially captured by our analysis.

Our results contrast somewhat with those of Tosun et al. (2023). The authors found that Europeans living in rural areas are more likely to support agricultural policies that promote farmers' living standards and less likely to support policies aimed at combating environmental degradation and climate change. Tosun et al. (2023) further found that people living in urban areas are more likely to call for agricultural policies that ensure reasonable prices. Although most of the population in Switzerland also considers farm income goals to be more important than agri-environmental goals of agricultural policy, there are people, especially in very rural regions, who attach more importance to the agri-environmental policy goals of biodiversity conservation and the reduction of pesticide use.

Much more than a rural-urban divide, our results point to the importance of personal attitudes in explaining agricultural policy preferences. In particular, ecological attitudes contribute to the prioritization of agri-environmental goals, which is in line with the literature (Dunlap & van Liere, 1978; Moon & Pino, 2017). Thus, ecological attitudes are not only of great importance when agricultural policy preferences are asked on a Likert scale but also when agricultural policy goals are presented as conflicting goals. Future research could conduct in-depth qualitative studies to better understand further motives behind the assessments of conflicting agricultural policy goals.

Our results also show that sociodemographic characteristics also play a role in prioritizing agricultural policy goals. More specifically, we found that age and education play important roles in political preferences. However, unlike, for example, Salka (2001), who found that place of residence is much less important once demographic variables are taken into account, this cannot be found in our case. While sociodemographic characteristics were found to directly affect agricultural policy preferences, the effect of place of residence was hardly identified in our study.

However, it may be that the situation will change over time due to increased out-migration from very rural areas, creating a rural-urban divide in agricultural policy preferences in the future. For instance, Bishop (2009) has shown that composition effects can be amplified by demographic sorting along spatial lines, with younger, better educated, and more socially liberal individuals self-selecting into large urban areas with more economic opportunities. Such sorting can cause smaller towns and rural areas to stagnate or shrink economically, which in turn affects personal attitudes, such as individuals' political attitudes (Lee et al., 2018). Compositional effects, that is, differences in sociodemographic characteristics between rural and urban regions, and contextual effects, that is, differences in personal attitudes across space, could therefore lead to a rural-urban divide in agricultural policy preferences in Switzerland in the future.

The way in which policy preferences are assessed in a survey has an impact on the results. For example, El Benni et al. (2024) showed that (the same) individuals, when asked about their policy preferences on a Likert scale, indicated lower food prices as the least important agricultural policy goal. However, when agricultural policy goals are presented in direct conflict and must be weighed against each other, the same individuals show a preference for lower food prices relative to some agri-environmental policy goals. One hypothesis that can be derived from this result and could be analyzed in future research is that the survey of agricultural policy preferences in the form of conflicting goals to be prioritized is more likely to represent actual consumer buying behavior (with consumers preferring low food prices), while the rating of

agricultural policy goals on a Likert scale represents political (voter) behavior. Also, methods considering the relative importance of different agricultural policy goals, for example, Analytic Hierarchy Process (Saaty, 1980), could be used to assess policy preferences of different population groups. Such methods would allow to analyze more than one goal conflict and were used by existing studies (Ahtiainen et al., 2015).

Future research could use quantitative indicators to assess respondents' place of residence, following for example Mittenzwei et al. (2023), who used a centrality index provided by the Norwegian Statistical Office. Such an index is not available for the analysis presented here, but we have used self-assessment data following similar studies conducted in the European Union (Tosun et al., 2023). As subjective self-assessments of belonging to a rural or urban population group overlap with both geographical contexts and individual judgments (Dymitrow & Stenseke, 2016), we assume that the urban-rural political divide can be assessed using this scale.

CONCLUSION

Based on an online survey of a sample of 1542 respondents from three language regions of Switzerland in October 2022, we did not find any evidence of a rural-urban divide in the prioritization of agricultural policy goals. Descriptive analyses, group comparisons, and multiple regression analysis using ZOIB regression models show only six out of 90 possible significant differences in policy preferences across places of residence.

In total, we analyzed the prioritization of nine goal conflicts of respondents from five self-assessed places of residence, from *very rural* to *very urban*. The economic goals considered are (a) higher farm incomes and (b) lower food prices. As conflicting environmental goals, we consider (a) more biodiversity, (b) less use of plant protection products, (c) less nutrient surpluses, and (d) less greenhouse gas emissions. We also ask for prioritization of the two economic goals (increasing farm incomes and reducing food prices).

Regardless of the respondents' place of residence, lower food prices and higher farm incomes are prioritized over reducing greenhouse gas emissions or pesticide use but are considered less important than reducing nutrient surpluses. When it comes to prioritizing an economic goal over biodiversity conservation, responses are balanced and show no clear preference for one or the other. On average, preferences for one or the other agricultural policy goals are not considerably strong.

Place of residence does not explain any of the differences in policy preferences when lower food prices are assessed against the improvement of an agri-environmental goal. When people must prioritize improving one of the agri-environmental goals and higher farm incomes, residents of very rural areas find increasing biodiversity and reducing pesticide use significantly more important than respondents from other regions. Residents in very rural areas also gave more weight to reducing food prices than to increasing farm incomes when presented as a goal conflict.

Our results have implications for policymakers. The absence of a general rural-urban divide regarding agricultural policy preferences implies that current policy pushes for more sustainable and animal welfare-friendly agriculture are not per se creating further divisions between rural and urban populations. Our findings suggest that policymakers should clarify where the benefits of specific policies appear. We find, for example, especially high support for biodiversity conservation and pesticide reduction in very rural areas where the local benefits of these

policies occur. In contrast, this is not the case for policies with benefits that can be less easy and immediately localized, for example, regarding climate change mitigation. Policymakers should thus clarify the benefits for all rural and urban populations. This will increase support for these policies. Our findings that lower food prices and higher farm incomes are prioritized over the reduction of greenhouse gas emissions or pesticide use imply that future policy reforms shall reduce trade-offs with these dimensions, as these are key for citizens. This could be achieved by making a larger share of direct payments conditional on environmental performance (i.e., increasing funding for agri-environmental programs) or by paying directly for environmental results (i.e., increasing the share of result-based payments).

Our analysis has implications for future research. Our study could be expanded to other countries, for example, using a replication setup (Finger et al., 2023). Although Swiss agricultural policy goals are like those in Europe at large, only such replication warrants high external validity. Future research could also combine the evidence provided here, based on preferences elicited in surveys, with evidence from voting behavior and real-world shopping decisions. In addition, our study could be completed with qualitative research to better understand the motives behind the assessments of conflicting agricultural policy goals. Such information would also help to develop measures to reduce trade-offs and gain public acceptance. Finally, the identified preferences for specific policy goals could be used to spatially weigh outcomes of future policy changes in space, that is, to quantify preference-weighted welfare implications for urban and rural populations.

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CONFLICT OF INTEREST STATEMENT

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

ENDNOTES

[1] How citizens weigh the importance of animal welfare as an agricultural policy goal and how important they consider it in comparison to competing policy goals is analyzed by Ammann et al. (2024).

[2] The results presented here were part of a larger study (see El Benni et al. (2024) on the perceived importance of different agricultural policy goals (assessed on a Likert scale) and determining characteristics of respondents with a specific focus on cultural differences and Ammann et al. (2023a) on the prioritization of agricultural policy goals related to animal welfare). The original survey data is available online and freely accessible (Ammann et al., 2023b; Ammann et al., 2024).

[3] The breakdown of municipalities used by the Swiss Statistical Office is based on the so-called Urban/Rural Typology 2012, which separates two urban areas, that is, core cities and other urban municipalities, an intermediary settlement type with both urban and rural characteristics, and rural areas (BFS, 2017).

[4] The numbers and proportions of zero and one observations are shown in Table S6 in the Appendix.

[5] Note that 6 out of 90 is a conservative value. We did not correct for multiple hypothesis testing. But as we test for a rural-urban dive in nine goal conflicts, we would find even fewer significant differences if doing so.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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