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"Weather-related shocks, climate change consciousness and the role of farmers' protests: evidence from the 2021 flood"

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Abstract

Climate change is one of the most urgent challenges the world faces today. Existing research already provided solutions on how to mitigate the effects on the planet, which policymakers try to enforce. However, the most crucial part is to find support for these policies within the population to guarantee an efficient implementation. In my thesis, I examine whether extreme weather events can increase climate consciousness and raise support for these policies. As agriculture and climate have a close relationship, I will analyze Eurobarometer data on the perception of the Common Agricultural Policy. Moreover, I will include farmers' protests to examine how they influence public opinion and the environment. The analysis consists of a literature review and a Difference-in-Differences approach using the extreme flooding in Western- and Central Europe in 2021 as a treatment variable. I found that extreme weather events and farmers' protests harm the support of the Common Agricultural Policy in the short term. However, climate consciousness increased as a result of extreme weather. Thus, the raised awareness of climate change needs to be transferred to the support of policies. This could be achieved by listening to the farmers' demands and by revising environmental policies to be more efficient. Moreover, economic support and education can promote policies and increase public acceptance.

Italian title: Gli shock meteorologici, la coscienza del cambiamento climatico e il ruolo delle proteste degli agricoltori: evidenze dall'alluvione del 2021

Abstract

Il cambiamento climatico è una delle sfide più urgenti che il mondo si trova ad affrontare oggi. Le ricerche esistenti hanno già fornito soluzioni su come mitigare gli effetti sul pianeta, che i politici cercano di applicare. Tuttavia, la parte più cruciale è trovare il sostegno a queste politiche all'interno della popolazione per garantirne un'attuazione efficace. Nella mia tesi, esamino se gli eventi meteorologici estremi possono aumentare la consapevolezza del cambiamento climatico e il sostegno a queste politiche. Poiché agricoltura e clima hanno una stretta realzione, analizzerò i dati dell'Eurobarometer sulla percezione della Politica Agricola Comune. Inoltre, includerò le proteste degli agricoltori per esaminare come queste influenzano l'opinione pubblica e l'ambiente.L'analisi consiste in una rassegna della letteratura esistente in una analisi econometrica, seguendo l'approccio Difference-in-Differences, utilizzando come variabile di trattamento le alluvioni estreme che hanno colpito l'Europa occidentale e centrale nel 2021. L'analisi mostra che gli eventi meteorologici estremi e le proteste degli agricoltori danneggiano il sostegno alla Politica Agricola Comune nel breve periodo. Tuttavia, la consapevolezza del cambiamento climatico è aumentata a sequito di eventi meteorologici estremi. Pertanto, questa maggiore consapevolezza deve essere trasferita a sostegno delle politiche. Ciò potrebbe essere ottenuto ascoltando le richieste degli agricoltori e rivedendo le politiche ambientali per renderle più efficienti. Inoltre, il sostegno economico e l'istruzione possono promuovere le politiche e aumentare l'accettazione pubblica.

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1 Introduction

Climate change is one of the most pressing global challenges today. Not only is it leading to a rise in global temperature and a loss of biodiversity, it is also having a major impact on economic development. In addition, the increase of greenhouse gases (GHG) in the atmosphere and the increasing number of extreme weather events, including floods and droughts, will affect most parts of the population, physically and economically. However, as numerous publications confirm, extreme weather events can raise public awareness of climate change and encourage action to combat it (Konisky et al., 2016; Ogunbode et al., 2020; Osberghaus & Fugger, 2022). To mitigate the effects of climate change, 196 parties signed the Paris Agreement, committing to keep global warming below two degrees Celsius above pre-industrial levels. Under the Paris Agreement, each country decides for itself what measures it will implement to achieve its goal of reducing GHG ("Paris Agreement", 2015). A huge sector that could reduce emissions and contributes majorly to climate change is agriculture. In fact, the European Union (27) has raised temperatures through agriculture and land use by 0.017 degrees Celsius and caused 3.34 billion tons of GHG in 2022 ("CO2 and Greenhouse Gas Emissions Data Explorer", n.d.). The importance of this sector to Europe is reflected not only in its role as a supplier of food but also as a major provider of employment. Its importance is underlined by the fact that about 38 percent of Europe's land area is classified as farmland ("Farms and Farmland in the European Union - Statistics", n.d.-a). Extreme weather events and a changing climate therefore have a significant impact on agriculture, potentially destroying harvests and negatively affecting financial security. Nonetheless, agriculture has a variety of possibilities to counteract climate change, which is why environmental policies enhancing counteractive measures are important. The European Union implemented the Common Agricultural Policy (CAP), which integrated a greening element in 2013 ("Timeline - History of the CAP", n.d.). Public support for environmental policies, like some parts of the CAP, is necessary for them to be effective. Extreme weather events and farmers' protests, which peaked again in 2024 ("On Policies and Protests", 2024), may affect this support. I will try to fill the gap in the existing literature by combining extreme weather events, climate consciousness, the agricultural sector, and farmers' protests all together. There is literature on some of the relationships. For example, there is a big research area just considering extreme weather events and climate consciousness. However, I did not find an analysis combining extreme weather events, the effect on climate change perception, and the support for climate mitigation and adaptation strategies within agricultural policies. Furthermore, including the role of farmers' protests and political orientation is an important addition to existing research.

In particular, I will use a Difference-in-differences (DiD) approach where the extreme flooding in the Ahr-Valley and surrounding areas in July 2021 will be my treatment variable. As my main outcome variable, I chose public opinion concerning the priority importance that should be given to the environment within the CAP. This variable includes all areas of interest the best, as it shows the actual support for the importance of such policies, but does not evaluate the policy performance itself as those are two different topics. However, I will include the attitude toward the performance of greening strategies within the CAP as well as the relationship between agriculture and climate change together with other statements in this field into my analysis. Including a variable about the actual climate change consciousness would have been a nice inclusion, however, because there is a lack in the data, I trust the already existing literature to prove this effect. The flooded areas will be classified using data from the Copernicus Climate Center (Grimaldi et al., 2022; Hersbach et al., 2023). Moreover, I used data from three Eurobarometer waves (2017, 2020, and 2022) ("Eurobarometer 88.4 (2017)", 2022; "Eurobarometer 93.2 (2020)", 2021; "Eurobarometer 97.1 (2022)", 2023) which surveyed public opinion concerning the CAP. Besides the controls for demographic and regional characteristics and political orientation, I will use ACLED protest data ("Armed Conflict Location & Event Data Project (ACLED)", n.d.) to control for farmers' protests.

I assume that the flood in 2021 will raise climate consciousness, heighten the knowledge about the role of agriculture in climate change, and support climate policies such as the greening elements within the CAP. Considering the actual performance of the CAP, the results could be ambiguous. In addition, I expect the effects to be higher for areas that were more severely hit by the flooding compared to areas that experienced it to a lower extent. I assume the farmers' protest to raise awareness of the relationship between agriculture and climate but unlike the flooding to decrease support for agricultural and environmental policies as the demonstrations point out the issues with agricultural policies. If looking at the influence of socio-demographic characteristics, I expect females, higher educated, and younger people to be more climate-conscious and supportive of policies focusing on the environment. The expectations of the behavior of the rural population are a little more complex. I assume people living in rural areas to be more aware of the agricultural sector as they are closer to the farming community. Therefore, I expect them to be less supportive of climate policies. Furthermore, the rural population tends to be poorer, which supports the assumptions. Next, I most certainly assume that left-wing voters will be more climate-conscious, more aware of the relationship between agriculture and climate, and more in favor of implementing sustainable and green policies. Furthermore, it will be interesting to analyze the differences in countries and their specific characteristics.

The motivation for my study is to examine the relationship between extreme weather events, climate consciousness, and the support for climate policies, especially considering the relationship between agriculture and climate. Furthermore, I want to understand the role of farmers' protests, the rural population, and political orientation in this relationship. I will analyze these connections, especially whether the flooding and farmers' protests will affect the support for agricultural policies focusing on mitigation and adaptation strategies to climate change. Moreover, it will be interesting to see whether education influences the outcome variables and if there are differences between countries. All those examinations will help to better understand the drivers of support for climate policies. The analysis will give insights into the problems with climate policies. Moreover, it will show if extreme weather events can increase their support and what else can be done to further raise public acceptance of climate policies. For example, will environmental education, reducing the rural/urban divide, or approaching the protesters help to make the policies greener and more supported? This is crucial as policymakers need the support from the residents to be elected and can then implement the policies. Otherwise, with a missing understanding of climate change and the importance of mitigation strategies, the policies cannot be properly improved to counteract climate change. Thus, the ultimate goal is to understand how climate awareness can be heightened, in particular in the field of agriculture, and most importantly how this could be transferred into climate policies that are supported by the population.

The data I used is restricted to three waves of a Eurobarometer survey and a time frame of 2017 to 2022. Unfortunately, the farmers' protest data is only available from 2020 onwards. Thus, I worked with a limited time frame of a couple of years, which could be improved in further research. Moreover, as the flooding was in 2021 and the last Eurobarometer questionnaire considering the CAP in 2022, I could not conduct an analysis that includes the effects years after the flooding as these effects might decrease with less time proximity. Furthermore, the analysis is restricted to the countries of France, the Netherlands, Belgium, Germany, and Luxembourg. It would be further interesting to analyze the data of countries with different characteristics, different climate regions, and other extreme weather events to see if there are changes in the outcome.

My thesis will start with a literature review covering the following topics. First, I will explore the relationship between extreme weather events and climate perceptions, and then I will introduce the July 2021 flood in the Ahr Valley to illustrate why it is an ideal treatment variable for my analysis. Moreover, I will go a step further and examine whether the heightened perception of climate change due to extreme weather is transferred to an increased Green voter share. Then, I use the literature to depict the relationship between agriculture and climate and the importance of mitigation and adaptation strategies. After having talked about Green voting and the role of agriculture and climate, I will discuss the CAP in detail, its improvements, the added greening element, and some criticism. Furthermore, I examined the divide between the urban and rural populations while laying a focus on agriculture and the environment. In my final literature review Section, I looked at the development of farmers' protests, the role of greening measures, and their demands. I will then describe the data I used for my analysis and describe the reasoning behind the classification of flooded areas. Furthermore, I will take a first look at the dependent and independent variables of my analysis depicting some Descriptive Statistics. Afterward, I will describe the Methodology I used, which is a DiD approach using flooding as a treatment variable, and give a first look at the regressions I will perform. I started the Empirical Analysis part by conducting a stepwise forward and backward inclusion of variables to decide which ones are significant in explaining the effects on the outcome variable. I further included country Fixed Effects (FE) and Clustered Standard Errors. Furthermore, I included a second interaction term for slightly less flooded areas to examine whether there is a difference in effect size between differently flooded areas. Then, I regressed the independent variables on different outcome variables, to get a better picture of all relations. For further robustness checks, I included a Placebo test. I followed up with a Discussion and briefly talked about the Limitations of my analysis. I finished up with a Conclusion of my findings.

2 Climate consciousness and weather-related shocks

Extreme weather events, such as floods, droughts, or heat waves, can have a huge impact on climate concerns, as personal experiences in spatial proximity are crucial for realizing the dimensions and direct effects of climate change on the lives of individuals (Bergquist et al., 2019; Hoffmann et al., 2021; Konisky et al., 2016). Konisky et al. (2016) find that with the projected increasing frequency of extreme weather, the level of concern within the population will rise. The effects of natural disasters go beyond personal matters and have an impact on the economy as a whole. In 2021, the total loss in Gross Domestic Product (GDP) attributable to flood disasters was 0.93 percent of total GDP for Germany and 0.33 percent for Belgium, which is high compared to the decade average for 2020 of 0.19 percent for Germany and 0.08 percent for Belgium so far (Ritchie et al., 2024). Both countries include areas that I use for my analysis as they were particularly affected by the 2021 flood disaster.

In the following, I will describe the flood event and related data that I will use for my analysis. Further, I will discuss the impact of extreme weather events on the share of Green voting through increased climate concern.

2.1 Flood 2021: Overview

In July 2021 several regions in Germany, Belgium, the Netherlands, France, and Luxembourg were hit by heavy rain and resulting floods ("Bericht Zur Hochwasserkatastrophe 2021: Katastrophenhilfe, Wiederaufbau Und Evaluierungsprozesse", 2022). The event was caused by a low-pressure area called Bernd which was accompanied by severe precipitation from July 12 to July 15, 2021 (He et al., 2021, p.1). In numerous regions, more than $150l/m^2$ of precipitation was recorded in 24 hours, which could not be absorbed given poor soil conditions and caused rivers, particularly the Ahr river, to overflow their banks (Junghänel et al., 2021, p.4). In this area, the flooding destroyed the entire possessions of around 17.000 people, and around 42.000 suffered from the consequences ("Bericht Zur Hochwasserkatastrophe 2021: Katastrophenhilfe, Wiederaufbau Und Evaluierungsprozesse", 2022, p.6). Along-side the Ahrvalley one of the most affected regions is the Rhine-Meuse region, including the surroundings of the shared border between Germany, Belgium, and the Netherlands, where heavy flooding led to more than 240 fatalities (Hagenlocher et al., 2023, p.8). Next to the later described meteorological indicators, the high number of deaths and the exceptionally high economic damages are reasons why I classify the Rhine-Meuse region as heavily affected by the flood. In Germany alone, more than 800 people were seriously injured ("Bericht Zur Hochwasserkatastrophe 2021: Katastrophenhilfe, Wiederaufbau Und Evaluierungsprozesse", 2022, p.3) and the damage to the infrastructure itself, including streets and railways tracks, was estimated around 2 billion euros ("Bericht Zur Hochwasserkatastrophe 2021: Katastrophenhilfe, Wiederaufbau Und Evaluierungsprozesse", 2022, p.8).

Extreme weather events, such as the flood in 2021, have a severe impact on the attitudes towards climate change as first-hand experiences and losses demonstrate the magnitude of the consequences resulting from worsening climate. Konisky et al. (2016, p.544) confirm this effect and highlight that it is decreasing with time, meaning the further away the shock the lower the impact on climate consciousness. Moreover, both temporal and geographical distance affect the severity of the shift in belief in climate change, being strongest at a distance of 0.5km (Osberghaus & Fugger, 2022, p.5). Bulut and Samuel (2024, p.3) verify that spatial proximity plays a role in the magnitude of updating climate beliefs, showing this positive relation by examining the beliefs of Luxumenbourgian citizens before and after the extreme flooding in 2021. Thus, a link between severe weather events and changes in climate attitudes, even for the flooding in 2021, can be observed. Additionally, being directly affected has a higher impact on climate change concerns than just being locally affected, e.g. through defective infrastructure, but there is no difference in subjective attribution between those two groups (Ogunbode et al., 2020, p.10). According to these findings, I separated the people affected by the flood into three categories.

Nevertheless, the effect of natural disasters and the perception of climate change need to be examined with a focus on the relation to agriculture. As a result of the flooding, also agricultural areas suffered from extreme damages such as lost harvest and resulting financial burden. Approximately 64.4 percent of the region hit by the flood was used for agricultural purposes (He et al., 2021, p.5). This has not only an effect on farmers' income but also on food security. Thus, extreme weather events can even have a huge impact on the attitude toward climate change if only looked at it from an agricultural perspective. This, in turn, can affect the perception of agricultural policies and a higher acceptance of pro-environmental policies.

In conclusion, this event serves as a good shock variable to examine the effect of severe weather events caused by climate change on the affected populations' climate consciousness and the perception of agricultural policies. As citizens hit by the flood experienced huge economic losses or were even traumatized and harmed physically by it, it can be assumed that their awareness of the deteriorating climate is rising due to these first-hand experiences.

2.2 Green Voting

Another interesting consideration is whether climate disasters, such as the flood in 2021, have an impact not only on climate concerns but also on voting for Green parties. In fact, there is a significant relationship between an increased number of various natural disasters and rising climate consciousness (Bergquist et al., 2019). Consistent with this hypothesis, Hoffmann et al. (2021, p.12) explicitly confirm that variations in levels of climate concern lead to changes in support for Green political parties, as evidenced by a statistically significant 0.253 standard deviation increase in Green party support resulting from an increase in the climate concern variable one year prior to the election. Thus, natural disasters can, disregarding the initial negative effects, have a positive influence on climate change since the rising concern might lead to a higher electoral vote for parties pushing for more severe climate mitigation policies. Policies concerning climate change, like carbon taxation, are a fundamental way to mitigate the extent of global warming and must be carefully designed to achieve the maximum effect with minimum costs.

First-hand experiences might raise support for those policies, even though they might initially be economically harmful. However, individuals who experienced natural catastrophes might become more risk-averse and calculate the risk of the warming climate and the resulting social costs into their utility. On the other hand, there may be no changes in voting behavior due to extreme weather events, as voters are not rational and do not consider long-term consequences (Baccini & Leemann, 2021, p.469).

In the following, I will look at existing literature to analyze the effect of extreme weather events on Green voting.

Hoffmann et al. (2021) use data from the Eurobarometer survey and data from the European Parliament elections for the years 2002 to 2019 and 1990 to 2019, respectively, to examine the impact of environmental extreme weather events on attitudes towards climate change and support for environmentalist Green parties.

In the 2019 European elections, the Greens received 11.7 percent of the votes, indicating a clearly positive trend over the period of data collection, starting from 5.7 percent in 2005 (Hoffmann et al., 2021, p.2). However, the share has fallen slightly since the 2024 elections and provisionally stands at 7.36 percent ("2024 European Election Results", 2024), which could be due to general dissatisfaction and a shift towards right-wing Populist parties in Europe. Hoffmann et al. (2021, p.4) emphasize that climate fears do not necessarily go hand in hand with Green voter turnout and that factors like social, temporal, hypothetical, and spatial distance should be taken into consideration when analyzing electoral results.

Furthermore, using a FE panel model they regressed climate variables on the proportion of environmentally concerned residents and the proportion of Green votes. Generally, temperature anomalies and heat waves (based on temperature) have a higher significant effect on environmental concerns whereas dry spells have a greater effect on the Green vote share. However, all results are positive and significant. For example, an increase in the dry spell variable of one standard deviation increases the Green voter share on average by 0.234 and environmental concern by 0.085 standard deviations (Hoffmann et al., 2021, p.6f). Additionally, they compared the effect of an increase compared to a decrease in temperatures and found that extremely lowered temperatures, including extreme cold, do not have a constant and persistent effect on climate concern and Green voting. Thus, the authors indicate greater importance based on changes in extremely high temperatures (Hoffmann et al., 2021, p.8).

Moreover, Hoffmann et al. (2021, p.7ff) analyzed differences in the size of the impact at regional levels. They separated Europe into three regions according to their climate characteristics:

1.) Dry and hot climate (Mediterranean and Southern parts of Europe)

2.) Mild and moderate climate (predominantly in Western Europe)

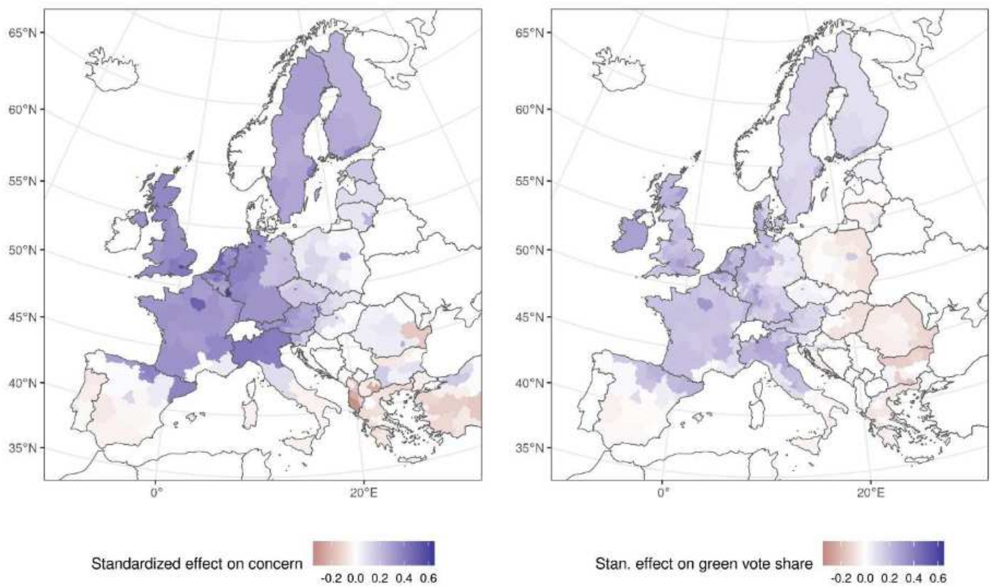
3.) Colder temperatures (predominantly in Central and Northern Europe)

Certainly, there are different results for the three climate zones, as the Mediterranean countries are used to higher temperatures and are therefore better prepared given their existing infrastructure, e.g. air conditioning systems (Hoffmann et al., 2021, p.8). Therefore, the lower effects on climate concern and Green voting are not surprising. For the third category of climate zones (Colder temperatures in Central and Northern Europe) an increase in heat episodes by temperature by one standard deviation is increasing concerns by 0.205 and Green voting by 0.174 standard deviations. The effect is even higher for the second category (Mild and moderate climate predominantly in Western Europe), where the results for the same analysis are increasing by 0.205 and 0.232 standard deviations for climate concerns and Green voting (Hoffmann et al., 2021, p.8).

Additionally, they regressed the effects of a temperature anomaly on GDP, as countries and regions with financial deficits and uncertainties might be prioritizing their economic situation (Hoffmann et al., 2021, p.4). They found that for a decrease in GDP by one standard deviation the effect of temperature anomalies significantly decreases by 0.85 standard deviations for Green voting and by 0.156 standard deviations for climate concerns. Nevertheless, fluctuations in GDP over time do not appear to influence the effect of temperature anomalies on the outcomes. Nonetheless, the effects are lower for regions with worse financial characteristics (Hoffmann et al., 2021, p.9).

Figure 1 shows the share of Green voters and climate concern, accounting for GDP and climate zones, after an increase of a temperature anomaly by one standard deviation.

Figure 1: Impact of a temperature anomaly on climate concern and Green voting



Source: Hoffmann et al. (2021, p.10)

Overall, higher marginal effects can be observed for an anomaly on climate concern than on the Green voter share. Thus, just a portion of the climate concern is transferred to the electoral results. As depicted before, the effect is highest for the temperate climate zones in Western Europe, followed by the cold climate in Central and Northern Europe, and barely noticeable for the Mediterranean regions. Furthermore, the countries that are economically stronger, i.e. have a higher GDP, experience higher responses to climate concerns and Green voting. When nations from comparable colder regions with considerable overall impacts are compared, the significance of GDP becomes evident. For instance, the magnitude of impact for Sweden and

Finland surpasses that of Poland. The countries had a GDP per capita of 114, 108, and 80, respectively, with the EU average set at 100 in the year 2023 ("GDP per Capita, Consumption per Capita and Price Level Indices", n.d.). Moreover, Hoffmann et al. (2021, p.9) highlight that the effect of economic uncertainty can also be observed between urban and rural regions as both, the effect of environmental concern and Green voting, are stronger for cities and agglomerations with a typically higher share of richer individuals. Particularly, the capital cities Paris, London, and Warsaw stand out from the surrounding areas.

Furthermore, different other studies examine similar research questions.
To identify public approval for climate mitigation measures in Switzerland, Baccini and Leemann (2021) use data on weather-related catastrophes and referendum polls. They found that regions that were affected by a disaster were more likely to express a climate-sensitive opinion. This effect is even more pronounced in well-educated regions and polls held in temporal proximity to a major event. For example, the approval for a policy rises by 9.4 percentage points for an event taking place one week before the referendum (Baccini & Leemann, 2021, p.481).

Hoffmann et al. (2021, p.7) confirm the results regarding temporal proximity and the diminishing positive effect on Green votes, depending on the time distance to the extreme weather event. Accordingly, the effect of a heat episode results in a rise of concerns by 0.151 (after 12 months), 0.110 (after 24 months), and 0.070 (after 48 months) standard deviations. The same picture can be seen for Green voting, where the heat episode increases the electoral share by 0.183 (after 12 months), 0.150 (after 24 months), and 0.087 (after 48 months) standard deviations Hoffmann et al. (2021, p.7).

These effects are also observed for other events and different nations. Kronborg et al. (2024) show results for the share of support for the Green Party in Sweden in 2018, following devastating forest fires in the same year. In particular, the forest fires led to an increase of 1.6-1.7 percentage points in the number of voters for affected areas (Kronborg et al., 2024, p.6).

Contrasting results were found by Hilbig and Riaz (2024), who analyzed the Green vote share in Germany from 2017 to 2021, including the period after the extreme flooding in 2021, which will serve as the treatment in my analysis. They find an increase in Green votes on a national rather than a regional level, meaning that the effect is not necessarily higher for the most affected areas (Hilbig & Riaz, n.d., p.30). For example, in the severely affected region of Ahrweiler, there is only a two percentage point increase in support for the Greens attributable to the flooding, which is significant at a 10 percent level (Hilbig & Riaz, n.d., p.22). Considering that this region experienced extreme destruction of homes and critical infrastructure and even 134 fatalities were reported ("Opfer- Und Schadensdaten Zur Flut 2021 in Rheinland-Pfalz", 2022), a higher effect would have been expected. A reasonable explanation is found and verified by Hilbig and Riaz (n.d., p.30), who state that already governing parties are recognized for their disaster response and expenditures after the flood (Hilbig & Riaz, n.d., p.30)

Likewise, Garside and Zhai (2022) examine the effect of the 2021 flood just before the German federal election in September 2021 using a DiD approach and receive a similar result. The authors observe an increase in Green voting of around 0.4-1.6 percentage points, which interestingly is stronger for less affected areas. Moreover, they emphasize that the fundamental increase in the Green vote of 5.9 percentage points compared to the last federal election in 2017 could be due to the flood (Garside & Zhai, 2022, p.4f).

Thus, there are conflicting results about the Green voter turnout and spatial proximity. Garside and Zhai (2022) and Hilbig and Riaz (2024) suggest that the effects are not necessarily higher for directly affected individuals as opposed to people living in the surrounding areas, resulting from voting for incumbent parties that reacted properly in the case of emergency. However, there is evidence for a rise in Green voting in all examined areas. Others (Baccini & Leemann, 2021; Kronborg et al., 2024) found a reasonable increase in Green votes for the directly affected areas. To summarize, extreme weather events, paradoxically, can have a positive impact on overall attitudes toward climate change and can even increase Green voter turnout and, consequently, increase the approval of environmental policies. Furthermore, support for policies like the European CAP discussed in Section 4 is likely to increase as a result of climate change and extreme weather events. Nevertheless, the effect is often only restricted to a short period of time and wears off quickly (Konisky et al., 2016). However, the results concerning the impact of spatial proximity to a directly affected area are ambiguous. Additionally, Hoffmann et al. (2021) find that economic uncertainty plays an important role in climate concerns and subsequently Green voting, as individuals in regions with a lower GDP, might prioritize their financial needs. Finally, regions that are regularly experiencing hot and dry climates show lower effects on Green voting and climate concerns.

3 Agriculture and Climate

There is a relationship between agriculture and climate that exists in both directions. On the one hand, the changing climate impacts this sector's land use and productivity as there are possibilities for adapting to extreme weather conditions and temperature fluctuations. On the other hand, agriculture affects climate change, e.g. through deforestation or the keeping of livestock. Closely linked to that, it is possible to mitigate the effects of climate change through climate-smart agriculture. The importance of agriculture and climate and their interaction in a sustainable life cycle can be seen in the Sustainable Development Goals (SDG) of the UN, especially SDG 2 (Zero Hunger), 13 (Climate Action), and 15 (Life on Land) (Streimikis & Baležentis, 2020, p.1703, p.1708).

Extreme heat or floods can alter harvest, lead to food scarcity, and decrease food quality. Mendelsohn (2008, p.1) highlights the importance of the relationship between agriculture and climate as the agricultural industry is the most economically affected by climate change given its susceptibility and magnitude. Certainly, farmers are concerned about their harvests, and, by extension, their financial security, given the sensitivity of agriculture to weather conditions. Stevanovic et al. (2016, p.6) estimate substantial economic damages of 0.8 percent of worldwide annual GDP in agriculture by 2100, assuming inelastic demand, no advances in trade patterns since 1995 and disregarding the effect of CO_2 on crops. Certainly, the assumptions are very strict and not entirely feasible. Nevertheless, the trend is significant and the results can be used as a call to action. Furthermore, inflation in the food sector and disruptions in Global Supply Chains are likely to happen since climate change harms economic output (Shahzad et al., 2021, p. 14, 216).

Moreover, the effect of climate change is different depending on regional factors. Overall, it is estimated that with rising temperatures the areas that will experience severe consequences through major droughts will increase by 28.6 percentage points and reach 44 percent by the year 2100 (Li et al., 2009, S.1). The African continent, in particular, will face enormous changes in extreme weather, as well as financial disadvantages and a lack of adequate risk prevention and

response programs (Malhi et al., 2021, S.11). This will most likely result in major concerns regarding food security.
In this context, Ray et al. (2019, p.8) examined the impact of global warming on crop cultivation. They found that, especially in Southern and Western Africa, consumable calories decreased, peaking in Zimbabwe with a loss of 7.2 percentage points annually. To put this value in perspective, the global loss is one percentage point for countries that grow the ten most commonly used crops studied in that paper.

Thus, climate has a severe impact on agriculture. A main contributor to changes in agriculture through climate are GHG including Carbon dioxide (CO_2) and Methane (CH_4) (Jeffry et al., 2021, p.1). Higher levels of CO_2 in the atmosphere contribute to an increase in mean sea level, precipitation, and high temperatures, and affect the growth rate of arable plants (Mahato, 2014, p.1). As a result, problems concerning pest contaminations and farmland productivity are arising (Mahato, 2014, p.15). It could be argued that an increase in CO_2 can raise crop productivity by an increase in photosynthesis but heavy rain and higher temperatures will compensate for this effect (Malhi et al., 2021, p.15).

When examining the other direction of the relationship, namely the effect of agriculture on climate, positive and negative effects can be observed. On the one hand, GHG can be stored in soil and crops, which along with different mitigation strategies, help counteract global warming. Nevertheless, deforestation, degradation, pollution, destruction of natural habitat, and wildlife extinctions occur due to agriculture (Streimikis & Baležentis, 2020, p.1702).
Therefore, it is crucial to use this knowledge, review the agricultural production system, and switch to climate-friendly production. Additionally, eating habits can be changed to a diet that

favors less environmentally harmful products, like meat. Possible mitigation strategies include pest control, smart water use, and research in technology, fertilizers, and different types of crops (Mahato, 2014, S.5). Furthermore, Velten et al. (2015, S.7) suggest rethinking the supply chains and focusing on sustainable production and consumption.

In conclusion, mitigation and adaptation strategies are crucial to persevere the climate, ensure food security, and counteract inequality. An effective method for the government or other institutions to assert those measures is to implement policies. Therefore, the European Union introduced the CAP, which I will look at more closely in the next Section, Section 4.

4 Common Agricultural Policy

The Common Agricultural Policy (CAP), a policy that applies to all Member States of the European Union, was established in 1962 to act as a link between the EU, the society, the agricultural sector, and farmers, with the ultimate aim of ensuring the availability of farm products, promoting rural development and protecting the environment ("CAP at a Glance", 2024). As an instrument to achieve the targets of the European Green Deal (EGD) and the Farm to Fork strategy, the CAP tries to safeguard the climate and biodiversity (Marek & Tosun, 2023, p.266). The importance of such a policy becomes evident when considering that agriculture relies on weather conditions. Phenomena such as heavy rainfall and hail can destroy entire harvests, making the agricultural sector extremely vulnerable and insecure. The CAP works through regulations Member States and farmers must comply with and through the use of subsidies to incentivize economic and environmental policies.

The funding of the CAP works through the EU budget, whose share has decreased over the last 40 years by 42 percentage points and amounted to around 23.5 percent in 2020 ("CAP Expenditure", 2024). For the period between 2021 and 2027 386.6 billion Euros are feasible ("The Common Agricultural Policy: An Overview", n.d.).

4.1 Development of the Common Agricultural Policy

At the end of the Second World War, Europe's economy and agricultural sector were destroyed, leading to a critical need to secure food supplies and establish stable markets, which ultimately shaped the direction of the CAP ("Timeline - History of the CAP", n.d.). The primary objectives established in 1962 were economic in nature and involved the implementation of various price and trade policies, such as export subsidies and price adjustments ("Common Agricultural Policy - an Overview", n.d.). As a result, the focus of the CAP was primarily on improving efficiency, ensuring a stable food supply, and meeting market demands, while striving to maintain reasonable prices and improve farmers' earnings (Pe'er et al., 2020).

In subsequent years, the CAP was continually adapted and modified to respond effectively to new challenges, notably integrating environmental concerns in the 1992 MacSharry reforms ("Timeline - History of the CAP", n.d.). Additionally, as a part of the MacSharry reforms direct payments provided to farmers, depending on the acreage of land that is farmed or the number of animals, were introduced ("Timeline - History of the CAP", n.d.). In modern days, the payments are calculated per hectare of land and depend on meeting various regulations, including environmental standards like 'Good Environmental Agricultural Conditions' (GEAC) and, since the newest reform, can be found in the Conditionality requirements (Pe'er et al., 2020, p.306f).

To expand the CAP, in 1999 a second pillar, concerning rural development was added ("Timeline - History of the CAP", n.d.). Thus, the first pillar which concerns the stabilization of the market was supplemented by a pillar that focuses on the preservation of rural areas (Gohin & Zheng, 2020, p.713).

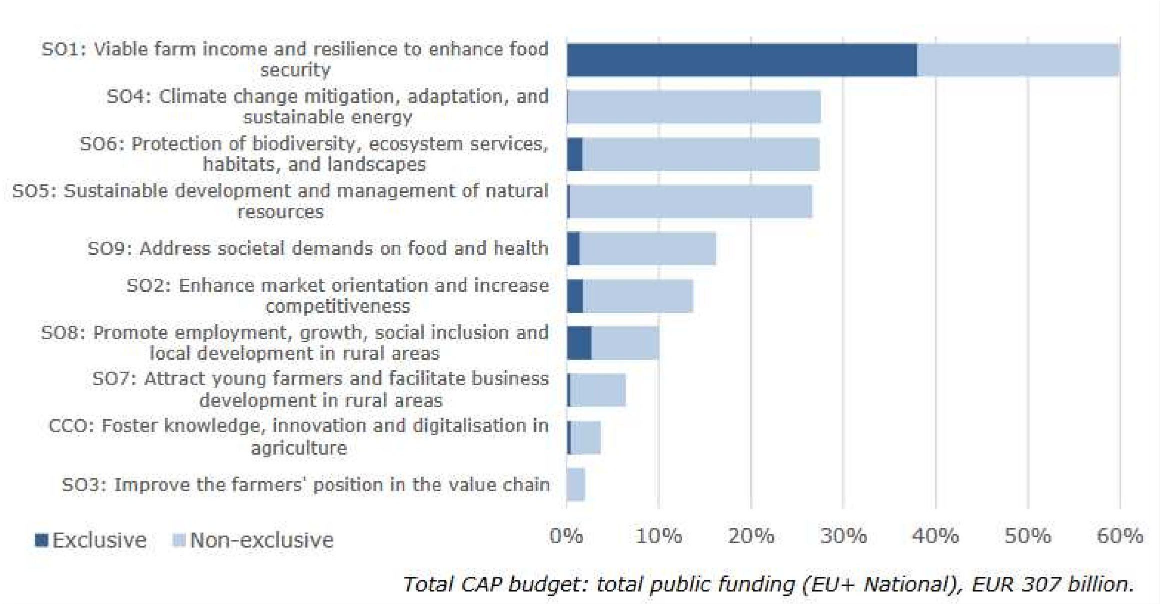
Since 2013 additional goals in the form of supporting young farmers, small farms, and greening measures have been incorporated ("Timeline - History of the CAP", n.d.). In the present day, under Pillar Two, besides rural development, there is a focus on Agri-Environment-Climate Measures (AECM), safeguarding natural reserves under the Natura 2000 program, and encouraging organic farming (Pe'er et al., 2020, p.306f). For example, green direct payments have been introduced to provide monetary support for activities such as crop diversification and the conservation of grassland in order to enhance the environmental benefits of agriculture. (Cuadros-Casanova et al., 2023, p.3)

With the post-2020 reform, a greener and fairer CAP was designed, where each Member State has to implement a Strategic Plan that is developed to hit the EGD targets and that is assessed by the European Commission ("A Greener and Fairer CAP", 2021). Thus, these plans have to consider the environment, biodiversity, climate action, and boost rural development. In addition, the countries must encompass a variety of measures that are tailored to the individual demands of each EU country and ensure concrete results toward the EU's common goals ("CAP Strategic Plans", 2023).

To ensure that all goals of the CAP will be remembered, ten key objectives were formulated including among others, Rural Areas, the Food Value Chain, Fair Income, and Knowledge and Innovation ("The Common Agricultural Policy: An Overview", n.d.). The focus on protecting the environment is highlighted in three of the ten objectives, namely Environmental Care, Climate Change, and Landscapes. Thus, environment and climate change play a crucial role in the new CAP.

Figure 2 shows the percentage in the overall budget for the CAP by specific objective (2023-2027).

Figure 2: CAP budget allocation by specific objective in percent



Source: European Commission. Directorate General for Agriculture and Rural Development. et al. (2023, p.963)

The highest share, with around 60 percent, is allocated to measures relating to the specific objective of Farm income and Food Security. However, environmental protection and climate action together (27 percent each) likewise get close to 60 percent of the CAP budget (European Commission. Directorate General for Agriculture and Rural Development. et al., 2023, p.963)

Thus, when looking at the evolution of the CAP, it becomes clear that since 2013 there has been a noticeable increase in the importance attached to the protection of the environment and the promotion of initiatives to combat climate change.

4.2 Potential for Improvement

Even though the environment, climate action, and the protection of biodiversity are formulated and recognized within the CAP there is still some criticism and room for improvement. As the focus of my analysis lies on the effect of extreme weather events resulting from climate change on climate consciousness and the attitude towards the CAP, I will mainly look at potential advancements concerning climate action. Nevertheless, there are different issues, like the missing independence of farmers and the effects on farm size that could be discussed in more detail. According to Guyomard et al. (2023), even though the new CAP regulations are intended to support environmental protection, they are most likely not effective enough to achieve the objectives formulated by the EGD.

There are multiple problems with the CAP, mostly related to the deficiencies of specific policies. For instance, there is a lack of regulations concerning pesticide reduction (Cuadros-Casanova et al., 2023, p.10). In addition, inadequate thresholds in the area of water and soil protection lead to shortcomings in CAP policies. In particular, there is a need for strategies to address nutrient losses caused by high-intensity farming (Cuadros-Casanova et al., 2023, p.10). Another major shortcoming concerns the reduction of agricultural emissions. Again, there is a lack of developed strategies within the CAP. One of the main contributors to agricultural GHG production is the production of meat and animal products, which should be more restricted in farming strategies (Cuadros-Casanova et al., 2023, p.7). On the contrary, these farms are even heavily subsidized, leading to higher demand for meat and dairy products through decreased consumer prices. Not only does this harm the environment through direct emissions of GHG such as methane, but it also increases the need for soy as an animal feed, which has huge negative impacts such as major deforestation around the world (Kuepper & Stravens, n.d.). Furthermore, a diet consisting of a lower intake of meat and dairy products could lead to an overall increase in health in the society (Cuadros-Casanova et al., 2023, p.10). According to Cuadros-Casanova et al. (2023, p.7), to counteract the effects of animal farming, eco-schemes are a tool to reduce livestock production, which in turn would reduce the ecological footprint.

However, even more strategies could be implemented to achieve the objectives of the EGD. An example is the support for organic farming, which promotes food production using natural processes and substances, thereby reducing pollution by minimizing reliance on artificial materials (Cuadros-Casanova et al., 2023, p.10). Furthermore, tactics to reduce GHG emissions could include the conversion of cultivated land to grassland, using nitrification inhibitors, applying agroforestry techniques, or establishing forestation (Martineau et al., n.d., p.5). Moreover, as the success of the greening strategies depends heavily on how each Member State implements them, there is considerable room for improvement. For example, new requirements may not need to be applied if a reasonable explanation can be provided to demonstrate the effectiveness of existing strategies (Guyomard et al., 2023, p.1329). For example, the GAEC 7 criterion on crop rotation provides significant soil health benefits that can also be demonstrated through the older crop diversification strategy, which might be less effective ("A Greener and Fairer CAP", 2021, p.4). Furthermore, organic farms are already considered to meet the requirements, and additionally, farms with less than 10 hectares are excluded from this criterion (Guyomard et al., 2023, p.1329). In this way, the budget of the CAP can be used for purposes that do not focus on the environment (Cuadros-Casanova et al., 2023, p.10). Therefore, evidence-based interventions should be implemented and evaluated over the long term through monitoring programs. This approach would allow strategies to be readjusted quickly if necessary (Cuadros-Casanova et al., 2023, p.10).

As mentioned before, a significant role in the CAP involves distributing subsidies and payments based on the farm land's size. These payments are determined by the number of hectares a farm covers, encouraging increased production and benefiting larger farms. Large farms are incentivized to invest more and can expect higher profits (Cuadros-Casanova et al., 2023, p.5). The increased competition and market advantage can even lead to smaller farms having to exit the market. This, in turn, results in homogenized cropland and has negative effects on the biodiversity (Cuadros-Casanova et al., 2023, p.5). Not only has the population of bees and other key pollinators vital to ecosystem health and food production been declining, but there has also been a significant increase in the spread of invasive species that threaten native flora and fauna, disrupting sensitive ecological balances and biodiversity (Driscoll et al., 2014; Geppert et al., 2020). Thus, agricultural intensification resulting from farm-size payments harms the ecosystem.

Therefore, the allocation of CAP funding plays a major part in the deficiencies of the focus on the environment and climate. Nevertheless, not only the allocation but also the overall share of the budget is falling short. The EGD aims to ensure that at least 40 percent of the CAP budget is spent on tackling climate change. However, Member States only have the obligation to allocate 25 percent and 30 percent of Pillar 1 and Pillar 2 budgets respectively to climate and environmental measures. This represents 19 percent and 7 percent of the total CAP budget (Cuadros-Casanova et al., 2023, p.7).

In conclusion, despite several revisions of the CAP and a focus on environmental concerns since 2013, there is still room for improvement. This can be addressed through several solutions. Firstly, a redistribution of subsidies that is not dependent on farm size could mitigate biodiversity loss and reduce the bias towards large-scale farming. Improved monitoring would also increase the effectiveness of the strategy's implementation. Secondly, subsidies should not encourage meat and dairy production. Finally, it is essential to allocate a larger fixed budget to climate and environmental objectives.

5 Rural-urban divide

In the following, I will describe the roots and factors contributing to the rural-urban divide in Europe, as well as the implications of this divide, focusing on the political sentiments of rural residents. Finally, I will compare the views on the environment, place attachment, and perceptions of climate change.

The rural-urban divide can be traced back to the origins of agglomerations. In modern times, it was strongly pronounced at the height of the Industrial Revolution, when there was a clear division between the rural population, primarily engaged in agricultural activities, and the emerging urban population, whose lives and aspirations were greatly affected by the shift to industrial and mass production (Kenny & Luca, 2021, p.566). After a short period of recovery, globalization has further affected the division, with differences not only apparent at the political level, but also influenced by educational differences, mass migration, and demographic change (Ford & Jennings, 2020, p.308f). For instance, England is clearly divided between well-educated metropolitan and rural residents who oppose immigration and the European Union (Jennings & Stoker, 2016, p.381). This divide becomes apparent not only in electoral outcomes and expressions of national identity but also in significant events like the Brexit or the Yellow Vest protests in France (Kenny & Luca, 2021, p.566). By using data from the European Social Survey, Kenny and Luca (2021, p.578) confirm that attitudes towards migration and the EU tend to be more conservative for individuals residing in rural areas or areas with low population densities.

The sense of dissatisfaction in rural areas towards political elites can be explained by the perception of neglect that prevails in these regions (García del Horno et al., n.d., p.3). Often these areas are even considered as they ’don’t matter’ (Rodríguez-Pose, 2018), a sentiment that is deeply rooted in the rural population. This sense of abandonment, generated by political elites, deserves serious consideration as it is a key factor contributing to the widening gap between urban and rural dwellers. As a result, rural residents are more likely to participate in anti-establishment movements (García del Horno et al., n.d., p.2). This may additionally be due to lower levels of support, for example in education and health, compared to metropolitan areas (Mitsch et al., 2021, p.15). Furthermore, growing dissatisfaction with the political landscape in rural areas and the feeling of being overlooked is amplified by missing information resulting from a digital access gap (García del Horno et al., n.d., p.20). Conversely, urban dwellers tend to feel more supported by the government and perceive the policy framework to be designed in line with their preferences (García del Horno et al., n.d., p.2). This difference in perspective exacerbates existing inequalities and serves to widen the gap between urban and rural communities. This is also reflected in political engagement. While the urban population displays their political interest in the form of protests and petitions, the rural population has a higher share of voters (Kenny & Luca, 2021, p.578).

Moreover, rural areas lack the benefits associated with agglomerations and clusters, such as shorter transport chains and communication channels, which in turn limit accessibility. As a result, this lack of benefits leads to lower levels of productivity and ultimately slower economic growth (Bernard, 2019, p.373).

In addition, low wages in the agricultural sector play an important role in the persistence of poverty, particularly in regions characterized by a high degree of segmentation of farm ownership (Bernard, 2019, p.374). It is important to recognize that there are significant differences between European countries. For example, rural poverty is particularly acute in the Central and Eastern European countries (CEECs) that have completed the transition from socialist regimes to democracy. Additionally, a low GDP, a poor quality of life, and a low concentration of inhabitants in rural areas contribute to its poverty (Bernard, 2019, p.369). Furthermore, unlike Eastern Europe where employment in the farming sector is unchanged, a decrease in employment can be observed in Western Europe (Bernard, 2019, p.374). Indeed, Tosun et al. (2024, p.189) found that people living in rural areas have a higher expectation that agricultural policies should focus on maintaining and increasing incomes, well-being, and employment. Moreover, the gap between satisfactions is less pronounced in richer countries (Requena, 2016, p.705).

The feeling of neglect is fuel to the propaganda of populists all over Europe as they benefit from the dissatisfaction and bitterness and additionally misuse the cultural disparities between part of the rural population and migrants (Mamonova & Franquesa, 2020, p.720). Therefore, parties that promote anti-EU policies are favored in rural areas, also by younger residents aged 40-64 migrants (De Dominicis et al., 2022, p.10f). Nevertheless, there is also a sector of populism labeled as Agrarian populism originating from different pro-rural groups, which promote an anti-capitalist and agricultural way of life (Borras Jr., 2018, p.2). However, Agrarian movements caught on more among urban campaigns (Mamonova & Franquesa, 2020, p.723).

As rural residents depend more on their environment, their residents show a stronger sense of place attachment compared to the urban population and are less open to changes (Anton & Lawrence, 2016, p.153). This stronger sense of place attachment translates into a greater willingness to protect natural landscapes (Walker & Ryan, 2008, p.149). However, despite the deep-rooted connection to nature and the place attachment, this feeling does not result in greater awareness of climate change. Specifically, the risks and hazards associated with climate change are less likely to be perceived by rural dwellers than by their urban counterparts (Tenbrink & Willcock, 2023, p.9). A plausible explanation for this disparity could be the limited interaction of urban dwellers with nature and their lack of exposure to the effects of self-regulating ecosystems, which are more prevalent in rural areas (Tenbrink & Willcock, 2023, p.11). However, it is important to note that this generalization applies to all people living in rural areas. The scenario might differ significantly if only farmers are considered as they require a predictable climate for a secure harvest and stable income. A key implication of this finding is that climate policies need to prioritize the education and engagement of rural communities, as they may value environmental protection but may not fully understand the extent of the threat of climate change (Tenbrink & Willcock, 2023, p.12).

Tosun et al. (2024, p.189) use the 2020 Special Eurobarometer to investigate whether there are differences in perceptions of the CAP between rural and urban populations using a multilevel logit model. They found that the urban population prioritizes the protection of the environment through agricultural policies more compared to the rural citizens. Additionally, their results indicate that the urban population places a higher value on the reliability of sufficient and affordable food in the context of agricultural policies.

In conclusion, the different lifestyles of rural and urban populations, as well as differences in culture, education, digital access, and job opportunities, lead to a sense of being overlooked and resentment among the rural population. This in turn leads to a significant political divide, with the rural population more likely to vote for anti-EU parties. In addition, the rural population tends to be poorer, which is particularly pronounced in countries with a more fragmented agricultural sector, including many small farms, as is the case in Eastern Europe. When it comes to awareness of climate change, rural populations are less aware than their urban counterparts. However, the importance placed on the environment and attachment to place is higher among the rural population.

6 Farmers' protest

In this Section, I will briefly give an overview of the historical perspective of the farmer's demonstrations until the recent protest in 2024. Further, I will talk about the farmer's perception of climate change and explain the reasons for the protests while considering the CAP. Furthermore, I will focus on the greening strategies as they are related to climate consciousness and shortly depict other reasons for the protests. Finally, I will describe the data used in my analysis to construct a variable capturing the extent of the protests.

6.1 Historical Overview

Farmer's protests have deep historical roots for example, demonstrations in the UK caused by the Corn Laws (19th century) were used to voice fears regarding the competitiveness of farmers and their disadvantages in negotiations. Furthermore, after the Civil War in the US, the Granger movement was built, which protested against decreased prices for their harvest and restrictive trade patterns by train operators (Matthews, n.d., p.1). Thus, former protests mainly expressed concerns about prices, competition, and regulative measures.

Nowadays, the protests include a highly emotional component (Van Der Ploeg, 2020, p.590), which I will explain in Section 6.3. Furthermore, modern protests include claims about the nature of environmental regulations while balancing the needs of farmers and consumers ("On Policies and Protests", 2024, p.97).

It is crucial not to underestimate the farmers' protests as they can influence the political landscape. For example, the European People's Party opted to present itself as more supportive of farmers which emphasizes an increased backing of far-right parties in rural European regions (Matthews, 2024, p.85). Furthermore, the importance of farmers in the European Union is highlighted by the high number of farms in 2020, which amounts to 9.1 million ("Farms and Farmland in the European Union - Statistics", n.d.-b). Given the high proportion of farmers in the total population and their essential role in providing food, the demands of the protesters should not be neglected.

6.2 Climate Change Consciousness

It is interesting to examine the views of farmers, working in the climate-sensitive agricultural sector, which is highly vulnerable to extreme weather events. Surely, it is a crucial analysis as farmers can contribute majorly to mitigating the effects of climate change on the planet.

Arbuckle et al. (2015) analyzed the perception, the associated risks, and the willingness to participate in measures counteracting climate change among farmers in Iowa. In their sample, the proportion of agricultural workers who see climate change as human-caused and who are more inclined to support policies that reduce GHG emissions is comparatively small. They also found that the majority of farmers are more likely to implement adaptation than mitigation strategies (Arbuckle et al., 2015, p.228f.).

Contrary to these findings, Habtemariam et al. (2016) and Dhanya and Ramachandran (2016) found out that farmers report effects of climate change such as declining precipitation or increased heat for Ethiopia and India, respectively. However, the awareness of rainfall of Indian farmers does not completely match the actual data as farmers are even more conscious about changes in the main cultivation period (Dhanya & Ramachandran, 2016, p.9). The study assessing the perception of Ethiopian farmers found that even if the perceptions are true concerning the current situation the predictions do not match the severeness of climate change models (Habtemariam et al., 2016, p.356).

The experience of climate change among farmers is also acknowledged in Europe as can be seen in the example of farmers' cultivation of crops on the island of Malta (Galdies et al., 2016). Here, 88.3 percent of laborers in the agricultural sector attribute the rise in pest infections to the higher temperatures (Galdies et al., 2016, p.22). Similarly, in Denmark, 55 percent of farmers have expressed their belief in global warming. This change in attitude has led to a greater willingness to adapt to the impacts of climate change and to take action to reduce the adverse effects that may occur in the coming years (Woods et al., 2017, p.116).

6.3 Reasoning of the protests

Firstly, farmers are increasingly receiving no recognition for their work and are declining in social standing as they are being labeled as polluters and environmental destructors as opposed to being perceived as suppliers to the community. Therefore, many farmers reject their responsibility for environmental degradation and take a protective stance, which has resulted in a growing number of demonstrations (Matthews, 2024, p.84). Paradoxically, even though farmers, by the nature of their work and the expertise they have acquired, have the best knowledge on cultivating land, their contribution is often overlooked in policy debates. Surely, they are most aware of their needs and the effectiveness of policies and solutions, and therefore their insights should be valued more (Soubry et al., 2020, p.210). Indeed, farmers designed and implemented many farming methods, considering the use of energy and emissions. Nevertheless, these innovative methods are not considered in the public eye (Van Der Ploeg, 2020, p.602f.). As a result of this resentment the wish to be respected is emerging. Furthermore, farmers state that making a living in their job is an aspect of their personality that they cannot change and therefore they cannot simply stop being a farmer and choose another career path (Bosma & Peeren, 2021, p.4).

As explained in Section 4, as of 2013 a greening element was included and with the latest revision, the CAP aims to be even greener and fairer. Nevertheless, the implementation of the greening element has led to cuts in subsidies and imposed restrictions on diesel and nitrogen use (“Not Just Farmers’ Protests”, 2024, p.93). Farmers often express their resistance to being constrained by these policies (Van Der Ploeg, 2020, p.592). In addition, the high cost of cultivation poses challenges for farmers (“Not Just Farmers’ Protests”, 2024, p.93). Even though the European Commission is open to listening to the interests of the agricultural sector, this will probably not result in major improvements (Matthews, 2024, p.83).

In the Netherlands, recent policies aimed at halving nitrogen emissions and reducing livestock numbers by 33 percent in 2019 have led to protests and the emergence of the BoerBurger Beweging, which represents Dutch farmers (Matthews, 2024, p.83), and the radical Farmers Defence Force, which opposes environmentalism (Bosma & Peeren, 2021, p.2). To combine climate change awareness, motivation for action, and the causes of protests, it is interesting to study how the climate is influenced by the particular emissions that policies aim to control. It is important to bear in mind that the climate impact of nitrogen is relatively small compared to CO_2 and CH_4. Nevertheless, the protests were about both nitrogen and CO_2 emissions (Van Der Ploeg, 2020, p.590).

Likewise, in Germany, heavy protests took place. In 2019, there was a huge debate concerning the use of fertilizers, and nitrogen and their effect on biodiversity (Schaub, 2021, p.784). Mainly smaller agribusinesses protested against raised ecological norms such as labels and a threshold for the use of pesticides and fertilizers ("Bauern-Demos", 2019). Those smaller businesses are, as already explained in Section 4, disadvantaged by the policy and likely to be forced out of the market. To emphasize the significance of small farms in 2020 around 66 percent of agricultural holdings were smaller than 5 hectares (ha) ("Farms and Farmland in the European Union - Statistics", n.d.-b). The debate about fertilizers is highly relevant as they pass into the groundwater and cause major pollutions of freshwater and affect biodiversity (Schaub, 2021, p.783). This conflict was especially active between 2010 and 2020 and was accompanied by growing polarization (Schaub, 2021, p.799). On the contrary, Austria did not experience any protests as they already aligned with the EU ecological benchmarks (Van Der Ploeg, 2020, p.600).
The German conflicts reached a new level in 2023 when politicians decided to reallocate financial resources from agricultural diesel subsidies to climate change measures ("On Policies and Protests", 2024, p.97). The main aspect of the protests is that farmers are striking against the regulations, not against climate change per se. They are mostly concerned about the lack of financial support and freedom to implement adaptation and mitigation measures. In fact, farmers are willing to engage in climate action if the terms are mutually agreed upon and recognized by both parties. Indeed, support for climate and biodiversity policies decreases with higher legal

requirements (Turck et al., 2023, p.247).

In 2024, major protests spread across Europe. The declining reputation of farmers, together with new restrictions on agricultural diesel imposed by European Union bodies, for example, led German farmers to block roads (Matthews, 2024, p.83). Their demands also included improved quality standards for imported goods, or at least transparent labeling of origin, and administrative improvements (Van Der Ploeg, 2020, p.601).

While Italian farmers were frustrated by tax exemptions, Spanish farmers protested against limitations on water use and farmers bordering Ukraine demanded constraints on imports originating from that country (Matthews, 2024, p.83). Farmers are also protesting against (free) trade agreements (Matthews, n.d., p.1), not just with Ukraine, as they will be negatively affected by increased competition from less regulated markets.
Thus, one of the main reasons for the protests includes the financial burden resulting from climate and sustainable policies ("On Policies and Protests", 2024, p.97).

In addition, farmers protest against the income distribution. In particular, even though total revenues increased, the allocation of payments is still unbalanced (Matthews, n.d., p.2). As an example, 74 percent of the direct payments are distributed to the biggest 20 percent of agricultural businesses in Poland in 2017 (Jakubowska-Loren et al., 2019, p.40). Furthermore, Polish farmers are frustrated that Western European countries receive higher payments (Bilewicz et al., 2022, p.902). In addition, the CAP regulations, even though mostly profitable for Polish farmers, result in a growing disparity between urban and rural areas and between smaller and bigger farms pushing family businesses out of the market. Therefore, farmers prefer regulations made by the Polish government instead of the EU (Bilewicz et al., 2022, p.907).

This structural transformation is also observed by others (Turck et al., 2023, p.243) and leads to several growing disputes.

In conclusion, farmers' protests have a long history, with the older protests being mainly about competitiveness, price security, and restrictions. Today's protests are joined by the environmental debate, including the use of nitrogen and diesel subsidies, the role of farmers in society, and the impact of reforms on farm structures.

7 Data

In this Section I will describe the data sets used, the main variables that will be crucial to my analysis, and conclude with some Descriptive Statistics.

7.1 Data Sources

I applied data from the Eurobarometer surveys concerning the attitude towards the CAP, data from the Copernicus Data Center to classify the regions affected by the flooding, and ACLED data to capture the farmers' protests.

7.1.1 Eurobarometer

I used three waves of the Eurobarometer survey focusing on questions about agriculture and the CAP. The surveys I used were conducted in December 2017, August-September 2020, and February-March 2022 ("Eurobarometer 88.4 (2017)", 2022; "Eurobarometer 93.2 (2020)", 2021; "Eurobarometer 97.1 (2022)", 2023). Thus, I observed two waves before the flooding event in the year 2021 which serves as the treatment in my analysis, and one wave afterward.

Therefore, I work with repeated cross-sections. Emphasis will be placed on analyzing questions related to perceptions of the environment and climate change.
The Eurobarometer was launched by the European Commission in 1974 and captures changes in general perceptions on important topics affecting the European Union, including the questions on agriculture that I will use. Usually, a minimum of 1000 people are surveyed per country, or 500 if the number of citizens does not exceed one million. Furthermore, the respondents have a minimum age of 15. The sample is drawn randomly to ensure that the characteristics are representative by region and demographics ("About Eurobarometer", n.d.).

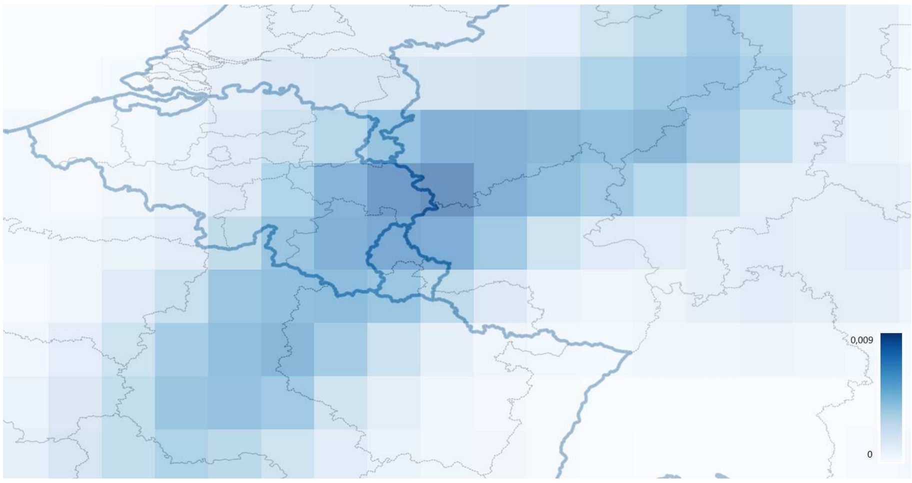
To prepare the datasets to be fit for my analysis, I kept the observations for the countries of Germany, Belgium, Netherlands, France, and Luxembourg as they were in the area of heavy rainfall and flooding, adjusted the variable names, especially concerning the regions, and merged the datasets. Moreover, the Eurobarometer supplies important variables that consider the characteristics of the individuals such as age, education, political orientation, and area of living. I will further describe the variables used in my analysis in Section 7.2.

7.1.2 Copernicus Climate Center

In the following I will look at meteorological data, keeping the economic losses and injured people in mind, and classify the regions into three categories and construct dummy variables: severely affected by the flood ($flood1$), affected to a lesser extent ($flood2$), and those not directly affected ($floodno$).

First, I used ERA5 data on total precipitation from the Copernicus Climate Center (Hersbach et al., 2023). Figure 3 shows the total precipitation in m, which depicts "the accumulated liquid and frozen water, comprising rain and snow, that falls to the Earth's surface.[...] The units of this parameter are depth in meters of water equivalent. It is the depth the water would have if it were spread evenly over the grid box" (Hersbach et al., 2023). I use the ensemble mean value capturing the total precipitation on July 14th from 09:00 am to 12:00 am. I chose this time period as from the 14th of July until the next morning, especially in the highly flooded regions such as Nordrhein-Westfalen, where the rain started to be continuous (Junghänel et al., 2021, p.4). Figure 3 shows the amount of total precipitation, up to 0.009 m per grid box, in different shades of blue, being darker for heavier rain.

Figure 3: Precipitation in m, July 14th

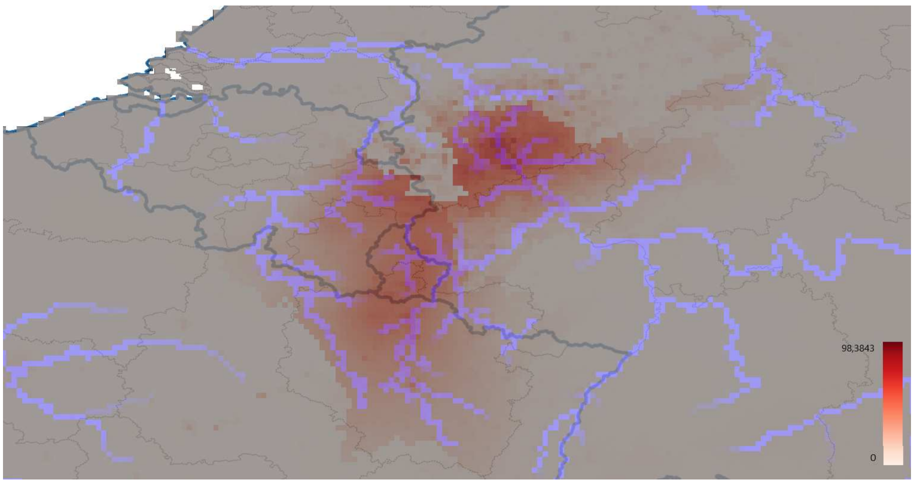


Map created with QGIS and "Free Spatial Data - Country Level" (2017)
Source: Own representation using ERA5 data (Hersbach et al., 2023)

It can be observed that the regions around the German and Belgian border experienced a higher degree of precipitation and therefore are more likely to be heavily affected by the flood. In particular, this is true for the German regions of Nordrhein-Westfalen and Rheinland-Pfalz such as for the Belgian region Wallonie.

In addition to total precipitation, I looked at river discharge in the last 24 hours and the runoff water equivalent (surface plus subsurface) from the Copernicus Climate Center (Grimaldi et al., 2022), which is depicted in Figure 4. Here, the measurement of river discharge is done in m^3s^{-1}, which indicates the volume of water passing through a river every second measured in cubic meters ("River Discharge | Copernicus", n.d.). The runoff water equivalent is measured in kgm^{-2}, which is precisely defined as "the sum of the surface and sub-surface runoff, representing all the water [in kilograms] that would drain away from the grid box [one square meter]". Both values are measured in a period of 24 hours (Grimaldi et al., 2022). The data is also captured for the 14th of July. I consider those values as useful indicators as the volume of river discharge gives an idea about the amount of water and sediments and resulting from that the river gauge. The runoffwater, in shades of orange, shows the amount of water that cannot be absorbed into the soil causing the water level to rise and consequently, river banks to overflow.

Figure 4: River discharge and runoff water equivalent, July 14th



Map created with QGIS and "Free Spatial Data - Country Level" (2017)
Source: Own representation using River discharge and related historical data from the Global Flood Awareness System (Grimaldi et al., 2022)

In Figure 4 one can see that like in Figure 3 the Eifel-region, including the German regions Rheinland-Pfalz, Nordrhein-Westfalen, and the Belgian region Wallonie are depicted with darker pixels meaning that less water could be absorbed. Here, Luxembourg is also strongly depicted, and the adjacent border region of France as well.

Considering the data on total precipitation, river discharge, and the runoff water equivalent I classified the regions that were affected by the 2021 flood. Additionally, I distinguished by regions that were experiencing heavy damage ($flood1$) and regions that were hit by flooding to a lesser extent ($flood2$). This categorization is based on the maps in Figure 3 and Figure 4, which show the amount of precipitation, river discharge, and runoff water equivalent, with darker colors indicating stronger values, meaning that the corresponding region is more affected. My focus for categorizing the flood variables is on precipitation rates, in line with Junghänel et al. (2021), and the use of runoff water equivalent as a complementary variable. Therefore, I looked at the areas indicated by the deepest shade of blue in Figure 3, with approximately 0.009 meters of precipitation evenly distributed across the grid box within the three-hour time frame.

Following this approach, it can be seen that the regions Nordrhein-Westfalen, Rheinland-Pfalz, and Wallonie, were extremely impacted by the flood. Thus, are indicated in the dummy variable $flood1$ with a one.

I considered the Dutch region of Limburg as slightly flooded as even though 455 million euros damage were estimated (Kok et al., 2023, p.8), the economic and physical damage was comparably smaller than in Germany and Belgium (Kok et al., 2023, p.18). Additionally, as slightly affected ($flood2$) I considered the French region Grand Est, the whole country of Luxemburg, and even though not depicted in the maps the German regions of Sachsen and Bayern as according to Junghänel et al. (2021, p.5) there was heavy precipitation between the 5th until the 19th of July in this regions. In addition, the "Bericht Zur Hochwasserkatastrophe 2021: Katastrophenhilfe, Wiederaufbau Und Evaluierungsprozesse" (2022) includes these regions in their final report on the event. The remaining regions are kept as a control group and depicted with a zero in both variables, $flood1$, and $flood2$, and with a one in the variable $floodno$.

7.1.3 ACLED

I used "Armed Conflict Location & Event Data Project (ACLED)" (n.d.) data to analyze the number of farmers' protests in the countries of Germany, the Netherlands, France, and Belgium from January 2020 until the third wave of the Eurobarometer survey (conducted in February/March 2022). For the country of Luxembourg, there were no farmers' protests reported. ACLED is an independent project that gathers conflict data from around the world ("ACLED (Armed Conflict Location and Event Data)", 2024).

From the absolute number of protests, I took the means per region from the period before the flood in 2021 $protest\_before$ and means per region after the flood in July 2021 $protest\_after$. Furthermore, I took a difference of the means for each region $protest\_diff$ to control for the decrease/increase in protests after the flood. Thus, I will check for the extent of the protests as well as for the difference in the amount of protests, which might result from the extreme weather event. I assume that the results will show a decreasing number of protests for the regions mostly affected by the flooding as farmers are more likely to build climate change awareness and are less likely to protest against environmental regulations.

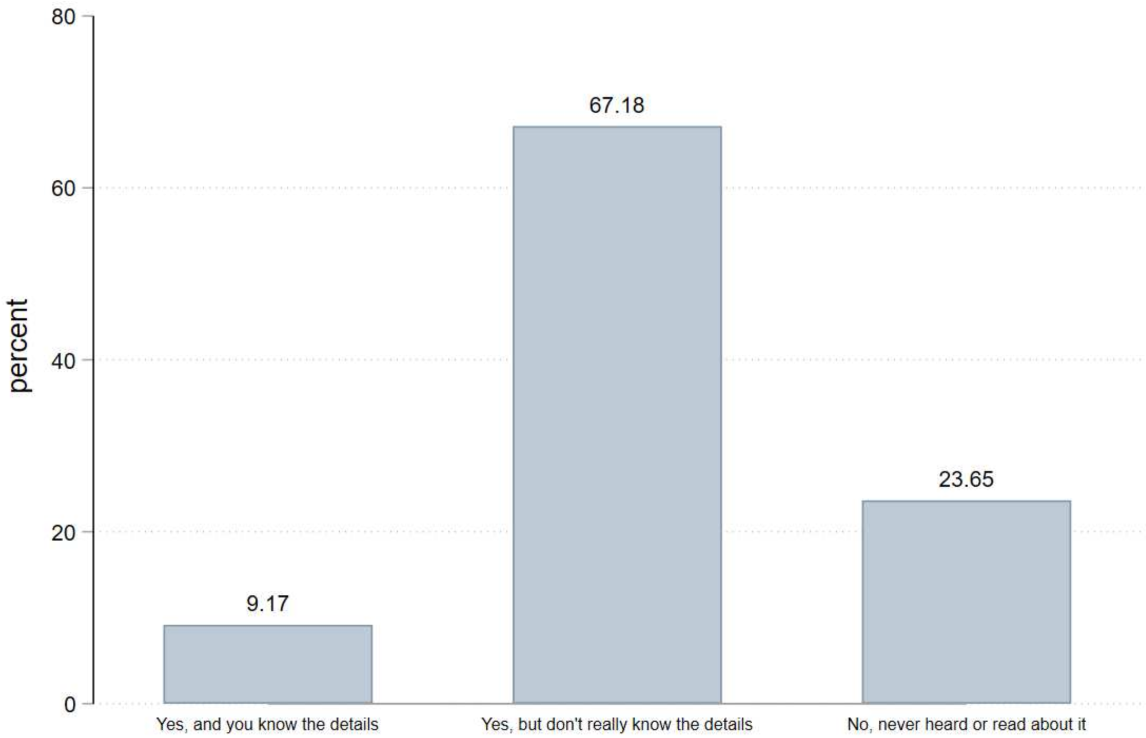
These three variables $protest\_before$, $protest\_after$, and $protest\_diff$ will be included in a regression using the observations from the 2020 and 2022 surveys and will check the effect on the independent variables concerning environmental and agricultural questions of the Eurobarometer.

7.2 Descriptive Analysis

In this Section, I will provide a summary of the variables used in my analysis and some initial Descriptive Statistics to gain insight into the data and give a preliminary sense of what the relationships and outcomes might resemble. In Section 9.1 I will then examine the relationships using regression analysis to explore how the various variables influence each other.

Before describing the variables used in the regression in more detail, I will first look at the survey question asking whether respondents had ever heard of the CAP. The distribution is shown in Figure 5.

Figure 5: Public knowledge about the CAP



Source: Own representation using "Eurobarometer 93.2 (2020)" (2021) and "Eurobarometer 97.1 (2022)" (2023)

According to the data, the majority of respondents had heard of the CAP. However, only 9.17 percent stated that they knew the details of the CAP and 23.65 percent had never heard of it. However, *edu*, *social class*, and being left-wing lowered the mean, indicating a higher familiarity with the CAP. At the same time, the *female* dummy, which is one, shows a higher mean than if it was zero, meaning that the respondent is male. The other variables, including *year*, did not show any significant changes between the different values. These values and further information can be found in Table A.1 in Appendix A. Overall, the respondents have enough information about the CAP to answer the survey effectively. However, it is important to bear in mind that the respondents do not necessarily know the details of the CAP, which means that the results, especially when considering the performance of the CAP, could be biased and reflect their feelings rather than factual knowledge. Nevertheless, this fact could be of interest when considering how to increase support for the CAP.

7.2.1 Dependent variables

The variables that will be explained by my analysis are all taken from the Eurobarometer surveys presented in Section 7.1.1. I have looked at all variables that deal with issues related to climate change and the environment. The variables, with the exception of *qa*10_6, *qa*4_6 and *qa*6_1 which are dummy variables asking whether an answer containing the term "climate change" was given, capture responses ranging from one "very important" to four "not at all important" or similar framings. I set the values containing "don't know" as missing, as they cannot be properly classified and would cause problems in the regression analysis, distorting the results.
To decide which variables to use in my main regression and which to include in Appendix D to check the consistency of the results, I conducted a correlation analysis with all the dependent variables. The resulting correlation matrix is shown in Table 1. Before doing so, I decided to use the variable *qa*7_5, which asks whether the CAP should put importance on the CAP priority to fight climate change, as my main dependent variable. This framing fits my research question best and should therefore yield the most promising results. Indeed, focusing on the importance of the environment as a priority best reflects perceptions and current awareness of climate change, as opposed to, for example, questions about the performance of the CAP.

Table 1: Correlation of dependent variables

	qa4_6	qa5_6	qa6_1	qa7_5	qa8_5	qa10_6	qa18_6	qa19_1	qa19_2	qa19_3
qa4_6	1.000									
qa5_6	-0.019	1.000								
qa6_1	0.261	-0.019	1.000							
qa7_5	-0.325	0.169	-0.260	1.000						
qa8_5	-0.074	0.528	-0.059	0.278	1.000					
qa10_6	0.115	-0.117	0.164	-0.144	-0.129	1.000				
qa18_6	0.006	0.060	0.069	0.042	0.055	0.022	1.000			
qa19_1	-0.082	0.039	-0.153	0.157	0.053	-0.060	-0.078	1.000		
qa19_2	-0.210	0.021	-0.219	0.326	0.069	-0.080	-0.027	0.444	1.000	
qa19_3	0.119	0.201	0.120	-0.054	0.190	-0.010	0.127	-0.138	-0.195	1.000

Source: Own calculation using “Eurobarometer 88.4 (2017)” (2022), “Eurobarometer 93.2 (2020)” (2021) and “Eurobarometer 97.1 (2022)” (2023)

The next step was to look at the correlation matrix and put all variables correlated with the main variable *qa*7_5 higher than the threshold of 0.2 into Appendix D. I further looked at whether any other variables were highly correlated with each other and decided to include either *qa*5_6 or *qa*19_3 in the Appendix as the correlation of these two variables is at a value of 0.201. I kept the variable *qa*5_6 as there are more observations, including the wave of 2017. Considering the other variables, my analysis focuses more on the CAP and agricultural policies than agriculture in general. Moreover, I already included the variable *qa*19_1 to check on the attitude towards the statement that agriculture is a cause of climate change.

For a better overview of the dependent variables of my main analysis and the additional control variables in Appendix D, Table 2 shows the variable names and their labels.

Table 2: Dependent variables

Variable	Description
Main Analysis	
Variable	Description
*qa*7_5	CAP priority importance: help tackle climate change
*qa*5_6	CAP performance: protecting the environment and tackling climate change
*qa*10_6	CAP budget reasons: environment/climate change rural areas
*qa*18_6	Rural area appraisal: environment and landscape
*q*19*a*_1	Agriculture: cause of climate change
Appendix	
Variable	Description
*qa*4_6	CAP priorities: protecting the environment and tackling climate change
*qa*6_1	Farmers' responsibility: environment protection and tackling climate change
*qa*8_5	CAP contributes to helping tackle climate change
*qa*19_2	Agriculture: need to fight climate change
*qa*19_3	Agriculture: already fighting climate change

Source: Own representation

The variables *qa*18_6, *qa*19_1, *qa*19_2 and *qa*19_3 were only collected in the 2020 and 2022 waves of the survey and are used in a separate regression with observations from these two years, excluding those from 2017. The same applies to the main variable in my analysis, the variable *qa*7_5. So, the observations for 2017 will be used as a control for the remaining variables.

In the following analysis, I will conduct preliminary Descriptive analyses, including tests for parallel pre-trends, as this is essential for an effective DiD approach. To attribute the change in outcomes to the treatment, both the control and treatment groups must be comparable and have similar characteristics and trends prior to the implementation of the treatment. This is particularly true as I cannot assess whether pre-trends follow the same pattern over a long period resulting from a lack of data.

First, I will introduce the main characteristics of the outcome variables represented in the Summary Statistics shown in Table 3.

Table 3: Summary Statistics of dependent variables

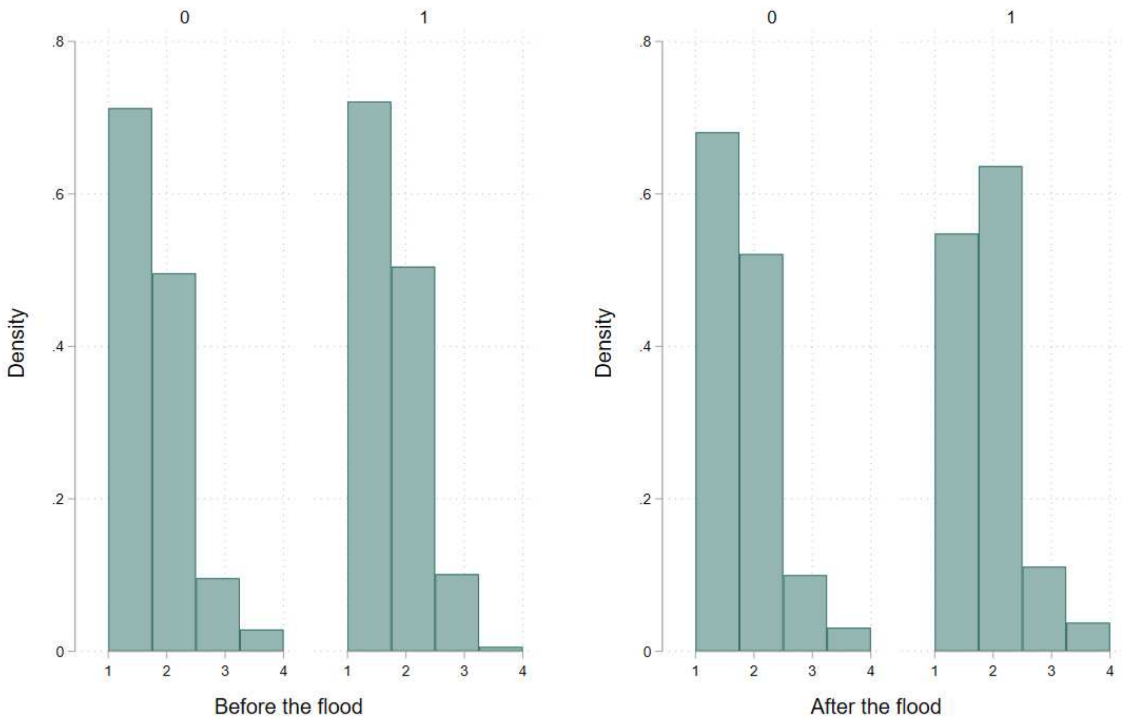
	mean	sd	min	p50	max
qa7_5	1.601	0.720	1.000	1.000	4.000
qa5_6	2.258	0.941	1.000	2.000	4.000
qa10_6	0.234	0.424	0.000	0.000	1.000
qa18_6	1.895	0.662	1.000	2.000	4.000
qa19_1	2.712	0.886	1.000	3.000	4.000

Source: Own calculation

Thus, as mentioned above, all variables except $qa10\_6$, which is a dummy variable, range from one to four, where the variable one means that the respondent fully agrees with the statements. Thus, at first glance, it is interesting that there is much more support for the importance of environmental policies ($qa7\_5$) than for the actual performance statement ($qa5\_6$), where the standard deviation is also higher at 0.941. Both variables have a bigger mean than median value, implying that the distributions are right-skewed and have outliers towards the upper end of the tail. Moreover, it is striking that the statement that agriculture causes climate change has the least support, with a median of 4 and a mean of 2.712.

In Figure 6, I have plotted the distribution of responses to the variable $qa7\_5$, with one reflecting the view that the CAP should prioritize the importance of tackling climate change. I separated the sample into pre-flood and post-flood outcomes using the years 2020 and 2022 respectively. I further split the sample into treatment and control groups, where treatment is indicated by $flood1$, which equals one if respondents experienced extreme flooding in their local area, and zero otherwise.

Figure 6: Distribution of perceived importance of climate priorities within the CAP



Distributions are separated by time and treatment and control group
Source: Own representation using “Eurobarometer 93.2 (2020)” (2021) and “Eurobarometer 97.1 (2022)” (2023)

It is easy to see that in the year 2020, before the flood, the responses have more or less the same distribution, indicating common pre-trends. However, when looking at the post-flood distributions, the distributions no longer show a similar pattern. In particular, the distribution for those affected by the flooding now gives less importance to climate change measures within the CAP, as the distribution is shifted slightly to the right, with the highest mass at 2. In contrast, the shape of the distribution for the control group is the same, with only a slight shift towards less importance. For the other variables, the pre-trends give similar results when looking at the distributions of the control and treatment groups before the flooding in 2021. Small variations can be neglected as the range of responses is relatively small. Additional Figures can be found in Appendix B.

The results can be further assessed by looking at the means and the differences in the means, which are shown in Table 4:

Table 4: Means and differences in means in importance of CAP climate priorities

year	flood1 = 0	flood1 = 1	Percentage Change in Mean
2020	1.581	1.544	-2.340
2022	1.611	1.729	7.325
Percentage Change in Mean	1.898	11.982	

Source: Own calculation using "Eurobarometer 93.2 (2020)" (2021) and "Eurobarometer 97.1 (2022)" (2023)

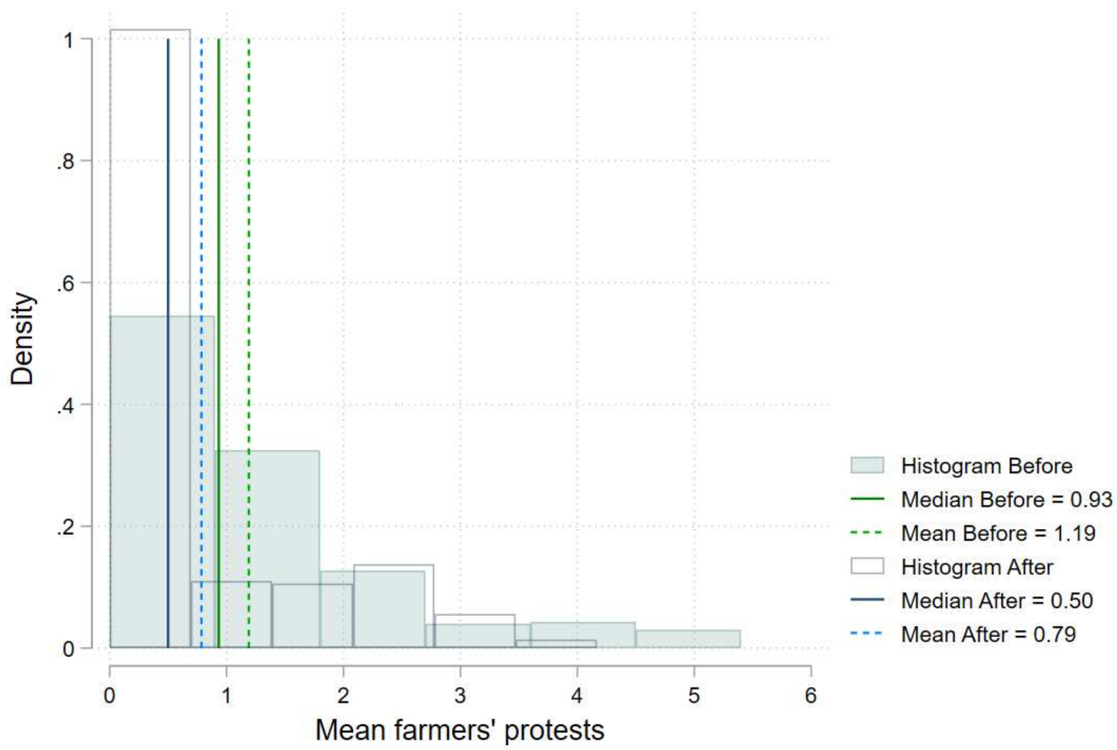
Table 4 shows the means of the perception of the variable $qa7\_5$, which assesses whether tackling climate change should be a priority for the CAP, for the years 2020 and 2022, together with the level of flood impact, where the dummy variable $flood1$ either takes on the value one or zero. It is promising for the analysis that the percentage point change in support over the years is 11.982 for those affected by the flood and 1.898 otherwise. Thus, the variation in support for the outcome variable considering climate action within the CAP is more than ten percentage points higher for flood victims. Comparing the treatment and control groups, the impact of the flood can also be analyzed. In 2020, before the flood, the percentage change in the mean was 2.34 percentage points lower for those affected by the flood, while in 2022, after the flood, the mean was 1.611 for those not significantly affected and 1.729 for those affected. Thus, the treatment group placed less emphasis on environmental protection after the flood than the control group, while their perspectives were roughly similar before the flood. Whether the decrease in support for climate change can be attributed to the treatment or to other factors will be examined in the regression analysis in Section 9.1.

7.2.2 Independent variables

As mentioned before I will include the dummy variables $flood1$, $flood2$, and $floodno$ in my analysis to indicate if and to what extent a region was hit by a flood. Further, I constructed the dummy variables $year\_before$ and $year\_after$ to state if the observations happened before the flooding in 2021 or afterward. Moreover, the variables $protest\_before$, $protest\_after$, and $protest\_diff$ serve to control for the farmer's protests.

Figure 7 depicts the distributions of the mean of the number of farmers' protests before and after the treatment. In addition, I included vertical lines for the median and mean in green color for the values before the flooding and blue indicating the period after.

Figure 7: Distribution of farmers' protests before and after the treatment

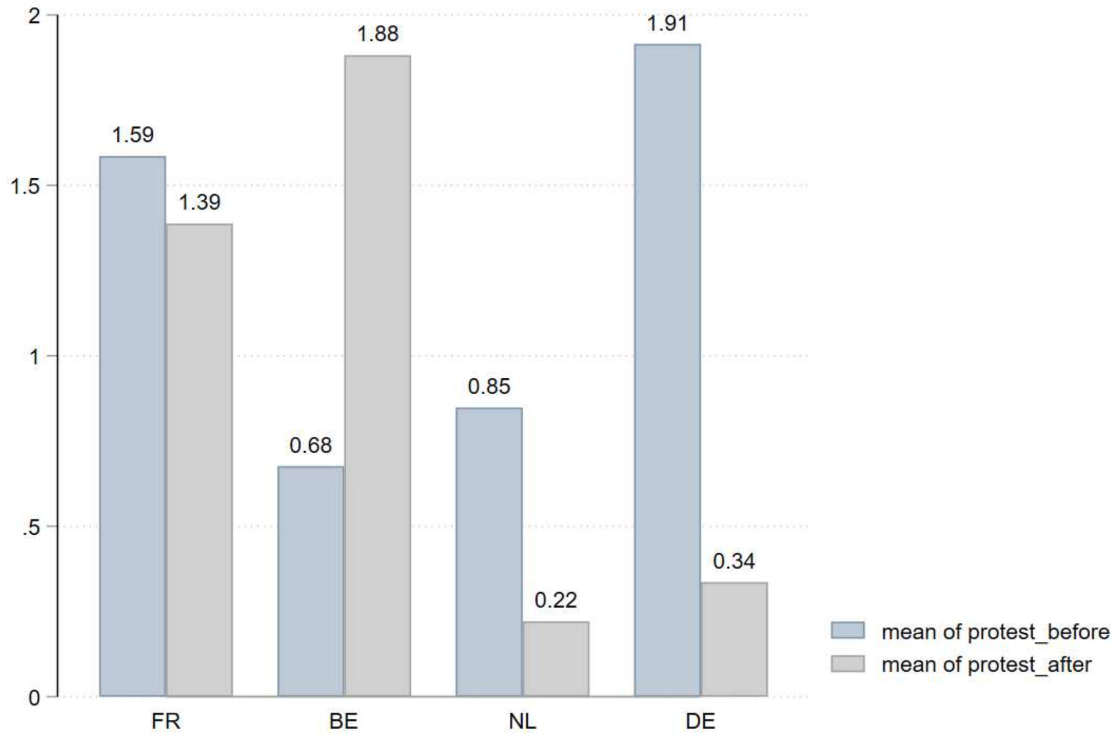


Source: Own representation using "Eurobarometer 88.4 (2017)" (2022), "Eurobarometer 93.2 (2020)" (2021), "Eurobarometer 97.1 (2022)" (2023) and "Armed Conflict Location & Event Data Project (ACLED)" (n.d.)

In Figure 7 it is interesting to note that the histograms for both variables are right-skewed, meaning that the medians (solid lines) are smaller than the means (dashed lines). This suggests that there are some extreme outliers to the right in both distributions. Furthermore, compared to the distribution of the monthly means after the flood, the means before the treatment have a higher mass on the right. In addition, there are some observations where the monthly mean of the protests is above five. Compared to the distribution before the flooding, the distribution of *protest_after* shows an even higher mass for values between zero and one demonstration. Moreover, both the mean and the median decreased for the observations after the treatment. Thus, the results show that there are fewer documented protests after the flooding.

This result is confirmed by looking at Figure 8, which shows the mean of the monthly regional protest averages before and after the floods by country.

Figure 8: Mean of protests before and after the treatment, by country



Source: Own representation using "Eurobarometer 88.4 (2017)" (2022), "Eurobarometer 93.2 (2020)" (2021), "Eurobarometer 97.1 (2022)" (2023) and "Armed Conflict Location & Event Data Project (ACLED)" (n.d.)

In Figure 8, surprisingly, the mean for the country Belgium increased strongly, reaching a value of 1.88 protests per region per month after the treatment, while the number of protests decreased for France, the Netherlands, and Germany. The smallest difference is observed for France, where the number of protests decreases by only 0.2 protests per month. By comparison, protests in Germany decreased by 1.57 per month and region.

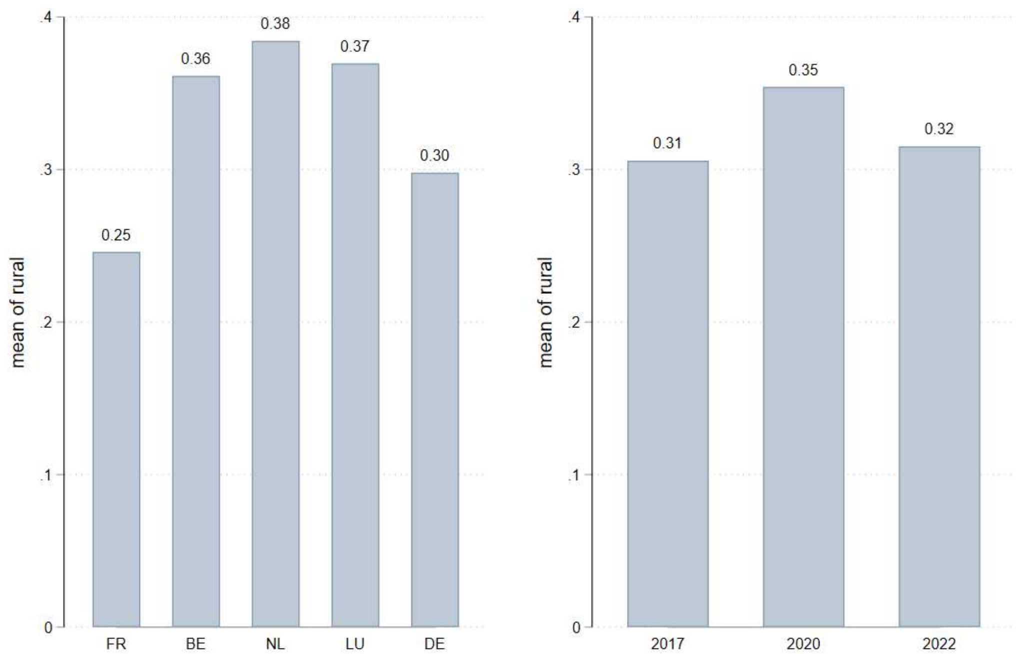
Figure 7 and Figure 8 both show a decreasing trend in the number of protests after the flooding in 2021, which could be explained by a higher awareness and willingness to adapt to climate change and a higher understanding of environmental policies such as the CAP. Therefore, the number of protests against these policies may have decreased.

As done before, evaluating the data on a country-by-country basis and seeing the differences between them provides valuable insights and shows that it is important to control for regional and country effects in my further analysis.

Furthermore, I created the dummy variable *rural* from the Eurobarometer data and classified responses as rural if the respondent lived in a "rural area or village" and marked it with a one. If the answer was "small/medium town" or "large town", I coded it as zero.

Figure 9 shows the proportion of people living in a rural area by country and year.

Figure 9: Fraction of rural population, by country and year



Source: Own representation using “Eurobarometer 88.4 (2017)” (2022), “Eurobarometer 93.2 (2020)” (2021) and “Eurobarometer 97.1 (2022)” (2023)

The results show that the rural-urban population ratio for Belgium, the Netherlands, and Luxembourg is around 0.35 to 0.40, while the ratio for France is significantly lower at only 0.25. Germany lies in the middle with 30 percent rural population. Thus, this supports the hypothesis that there could be differences in the results of the DiD analysis by country.

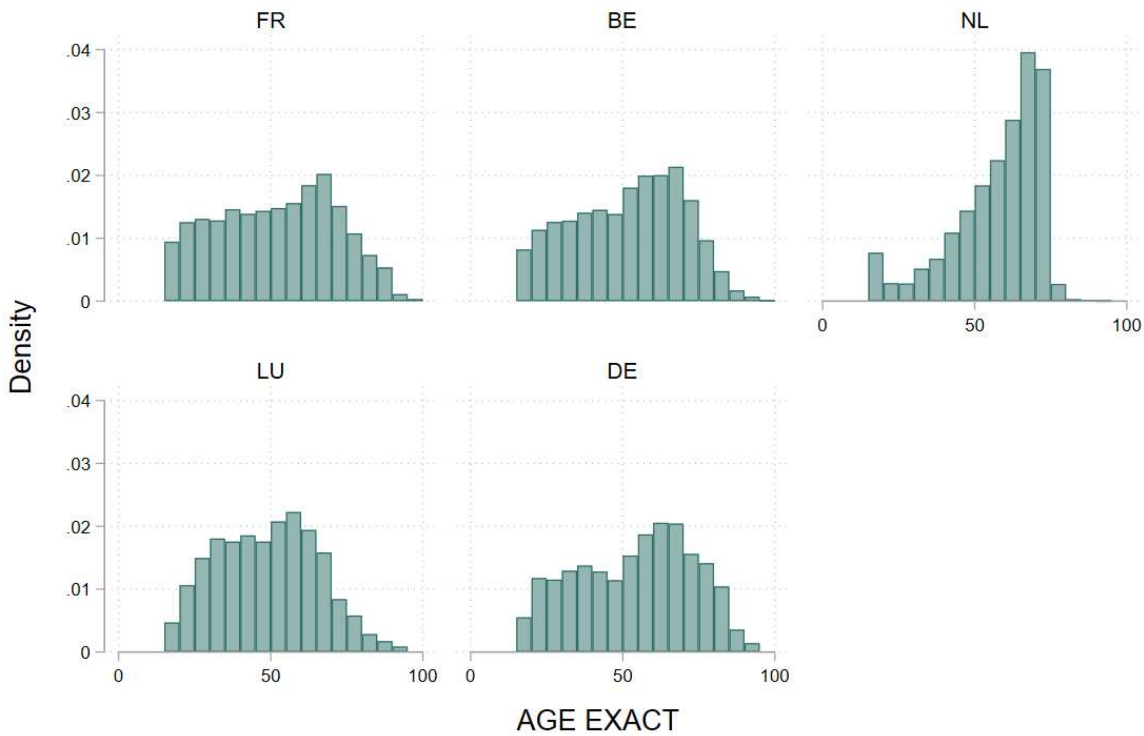
The Descriptive analysis by year shows a slightly higher rural population in 2020, which could be related to the COVID-19 pandemic.

Similarly, the variable $female$ was constructed into a dummy variable with one indicating a person who identifies as female and zero for males. For the sake of simplicity, I chose to disregard the responses for "None of the above/non-binary..." as the number of respondents was small and therefore will not influence the results.

I have also constructed a figure similar to Figure 9, now including the proportion of women in the observations, which can be found in Appendix C Figure C.1 since there are no significant changes across countries and years. The results range from 0.49 to 0.55 and 0.49 to 0.52 respectively. The proportion of women is slightly higher in France and Luxembourg and decreases over the years.

I will further control for demographic characteristics by including age as an independent variable in my analysis. Figure 10 shows the distribution of exact age by country.

Figure 10: Distribution of age, by country



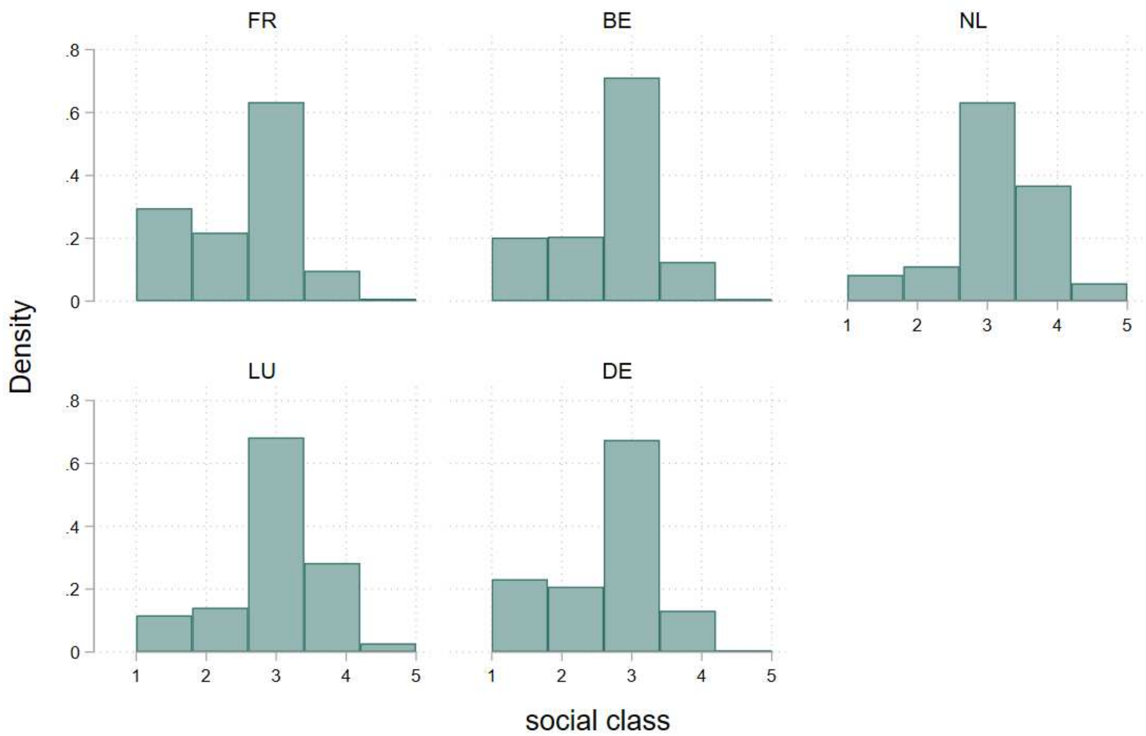
Source: Own representation using "Eurobarometer 88.4 (2017)" (2022), "Eurobarometer 93.2 (2020)" (2021) and "Eurobarometer 97.1 (2022)" (2023)

Here the age distribution shows mostly unsurprising patterns, with a slightly higher mass around the age of 65, reflecting the demographic change in Central and Western European countries. However, the Netherlands has an extremely high distributional mass, with a mean of 57 years and a median of 61 years. Thus, the histogram is heavily skewed to the left, with very few observations for residents aged over 75 years. The demographic change can also be seen by looking at the mean age per year, which increases from 54 in 2017 to 56 in 2022. More information can be found in Figure C.2 in Appendix C.

To control for age, I added the variable *agegroup* to my analysis, which indicates the generation into which a person was born. I used the common referencing standard of the Italian National Statistics Institute ("Classificazione delle generazioni", 2016) to convert the age of respondents into generations. By doing so, I have combined the Boomer 1 and Boomer 2 generations into one category. Using generations to classify age is very useful because people born at the same time experienced the same political and social events and norms, and therefore tend to have similar views on life.

Next, I constructed the variables *social class* and *edu* representing the respondent's income level and the highest level of education, respectively. For social class, I used the existing classification from the Eurobarometer. The distribution is shown in Figure 11.

Figure 11: Distribution of social class (self-assessed), by country



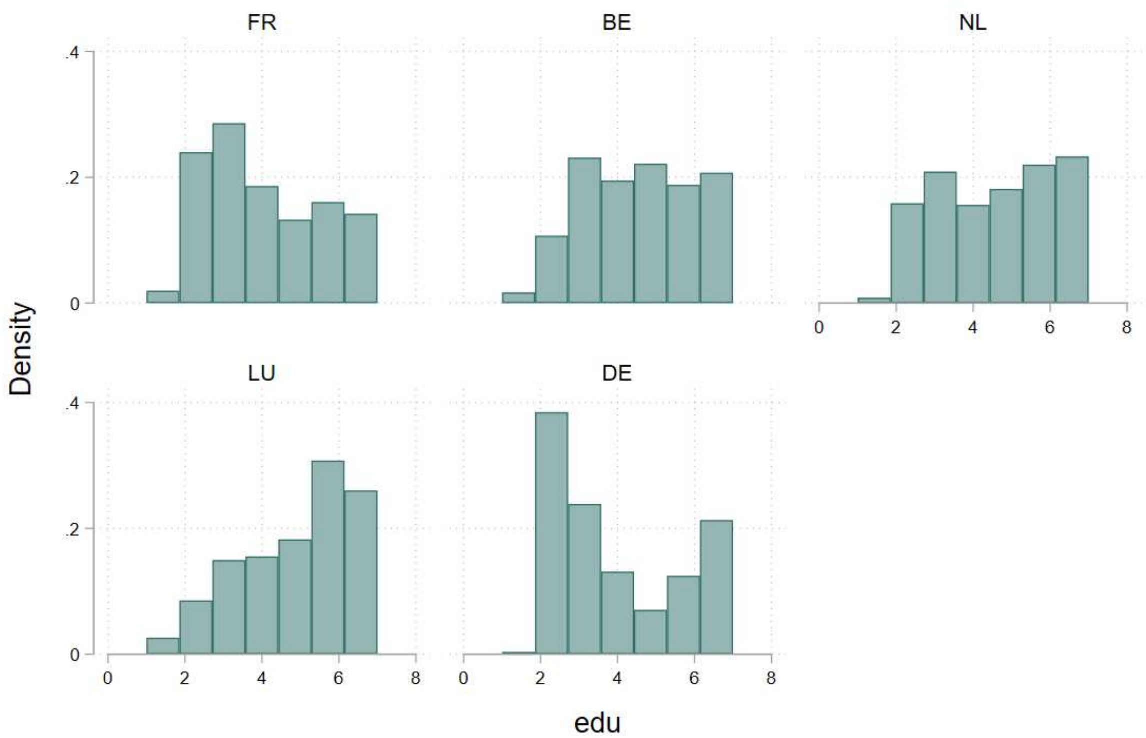
Source: Own representation using "Eurobarometer 88.4 (2017)" (2022), "Eurobarometer 93.2 (2020)" (2021) and "Eurobarometer 97.1 (2022)" (2023)

All countries show a distribution with the mass in the third category right in the middle, but there are differences in skewness and means. For France, Belgium, and Germany the distribution is right-skewed, whereas for Luxembourg and the Netherlands, the mass is at the upper end, indicating a higher proportion of the population self-classifying into the top two social classes.

The mean is lowest in France (2.44) and highest in the Netherlands (3.16). Differences in perceptions of climate change could therefore be due to differences in social class, and this distribution varies from country to country, which is why I will consider country FE in some of the regressions in Section 9.

Furthermore, in order to construct a variable representing the level of education, I followed the recommendations of Schneider (2022) to transform years of study into the ISCED classification of education levels. As I only had the answers on the age at which the respondents left school, I subtracted five years, which is the most common age at which people start school in Europe at ISCED level one ("Compulsory Education in Europe 2022/2023", n.d.). In Figure 12 I have plotted the variable *edu* by country.

Figure 12: Distribution of education, by country

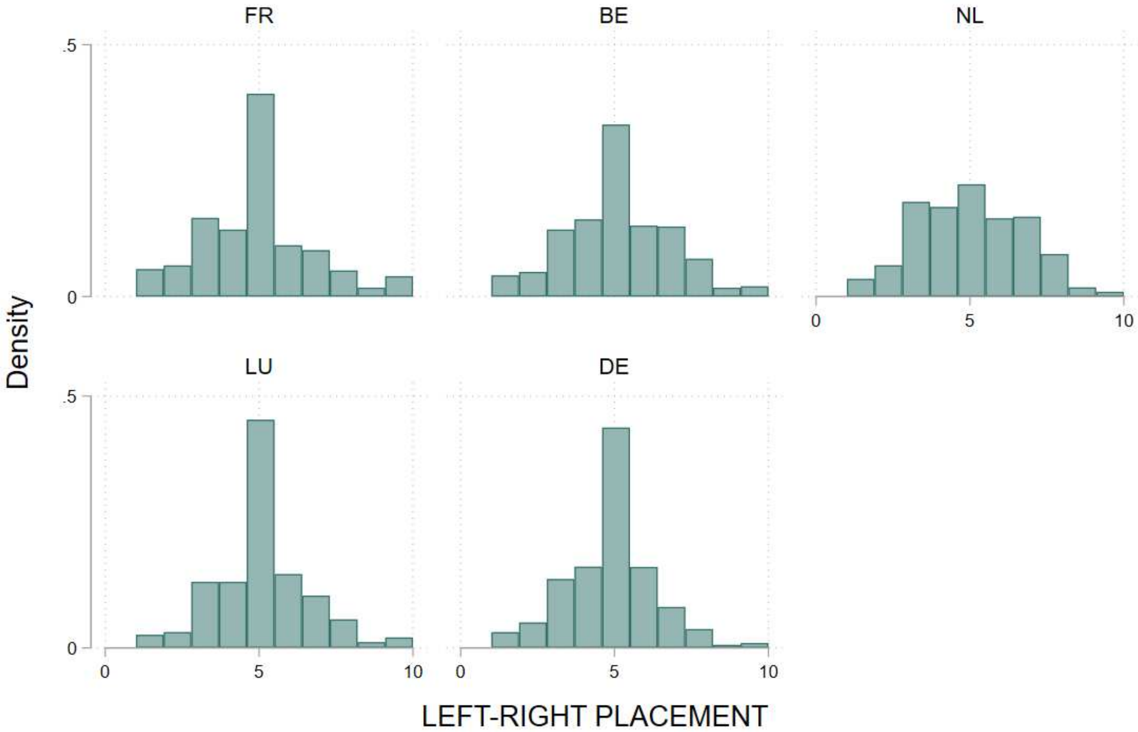


Source: Own representation using "Eurobarometer 88.4 (2017)" (2022), "Eurobarometer 93.2 (2020)" (2021) and "Eurobarometer 97.1 (2022)" (2023)

The biggest differences can be seen in Germany, where 950 people were affected by $flood1$, i.e. 45.46 percent of the people identified with a one in the variable $flood1$ have a high probability mass of low education with a mean of 3.949 and a median of three on a scale of one to seven. In contrast, the distribution of education in Luxembourg is heavily skewed to the left. Here the mean is 5.011 and the median is five. This means that overall education is higher in Luxembourg. As mentioned before, I have coded the whole country of Luxembourg with a one in $flood2$, meaning that they were slightly affected by the effects of the flooded areas. This will be important in the regression analysis, as I will look closer at the difference in the effect of heavily and lightly affected areas. Therefore, the effect of education will be of particular interest here. The same applies to the distribution of social class, which is also more left-leaning in Luxembourg. The distributions for France, Belgium, and the Netherlands are not reasonably balanced, with France having a slightly higher proportion of less educated people.

To control for political orientation, I divided the responses from a scale of one to ten into three categories, capturing values 1-3 as "left-wing", 4-7 as "center" and 7-10 as "right-wing", and labeled the variable $leftright$. In Figure 13, for completeness, I have looked at the whole scale of self-assessment on the left-right scale of political support by country.

Figure 13: Distribution of political orientation, by country



Source: Own representation using "Eurobarometer 88.4 (2017)" (2022), "Eurobarometer 93.2 (2020)" (2021) and "Eurobarometer 97.1 (2022)" (2023)

It is interesting to note that the mass of all countries peaks in the center and that the distribution for the Netherlands is flatter than for the other countries. Furthermore, France seems more left-leaning, while Luxembourg has a slightly higher mass on the right. Moreover, there have been no changes over the years, which can be seen in Table C.3 in Appendix C.

Moreover, the variables *country* and *region* serve as regional indicators and control for regional effects. All the differences between countries and regions shown before indicate that it is crucial to consider regional effects. The region variable is adapted from the Eurobarometer data to the ACLED data, as the regions for France and Belgium were given in a larger sub-region, making it possible to combine the region variable with the farmers' protest variables.

Just like for the dependent variables, I also conducted Summary Statistics for the independent variables, which will serve as a recap and are depicted in Table 5.

Table 5: Summary Statistics: independent variables

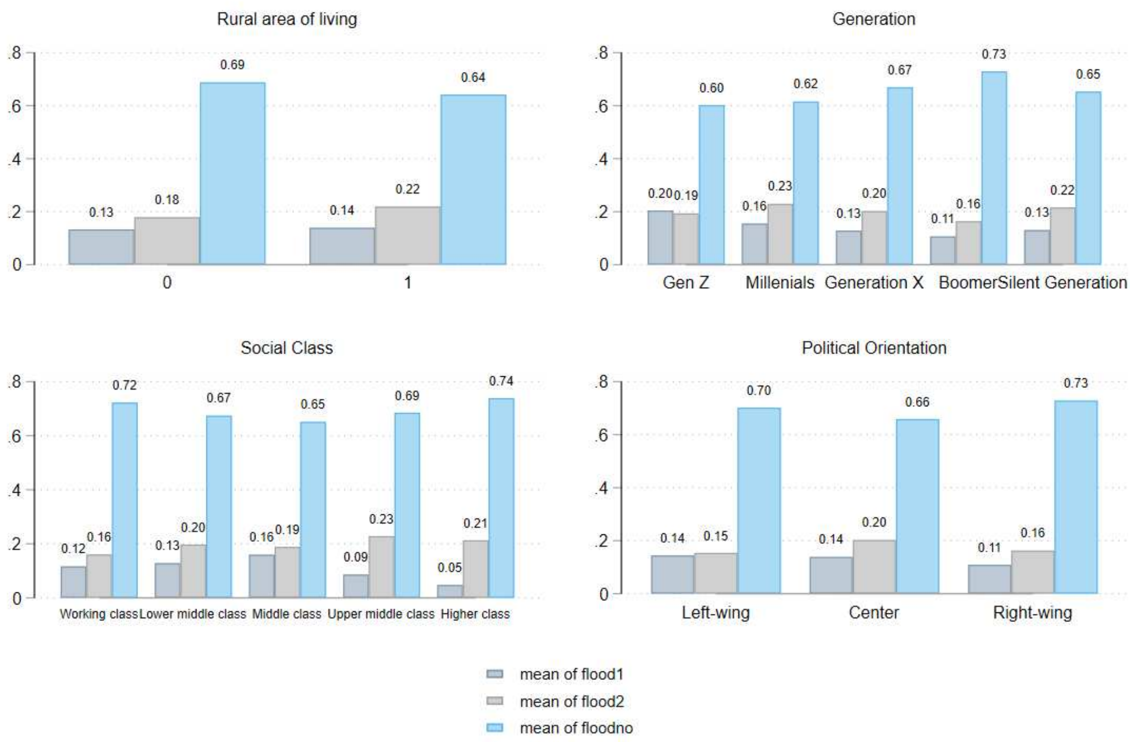
	mean	sd	min	p50	max
flood1	0.135	0.342	0.000	0.000	1.000
flood2	0.192	0.394	0.000	0.000	1.000
floodno	0.673	0.469	0.000	1.000	1.000
rural	0.325	0.468	0.000	0.000	1.000
protest_diff	-0.317	1.361	-5.067	0.000	3.233
protest_before	1.191	1.180	0.000	0.933	5.400
protest_after	0.785	0.926	0.000	0.500	4.167
female	0.509	0.500	0.000	1.000	1.000
edu	4.354	1.814	1.000	4.000	7.000
social class	2.721	0.951	1.000	3.000	5.000
agegroup	3.049	1.144	1.000	3.000	5.000
leftright	1.866	0.529	1.000	2.000	3.000

Source: Own calculation

Again, the summary shows that the variables for the different degrees of flooding, *rural*, and *female* are dummy variables, whereas *agegroup*, *edu*, *social class*, and *leftright* are categorical variables and the variables for farmers' protests are numerical. It can be summarized that the majority of 67.3 percent are not affected by the floods at all, while 13.5 percent are severely affected and 19.2 percent are slightly affected. It is also noticeable that the number of protests before the floods in 2021 was 1.191 and afterward, it decreased to 0.785 per month and region. Furthermore, the range of differences in protests before and after the floods is wide, going from a decrease of about five protests per month to an increase of 3.233 protests per month. In general, the mean indicates a decrease in protests after the flood. In addition, the standard deviation for this variable is high at 1.361. It is also noticeable that the variable *agegroup* is close to a normal distribution, with the mean and median both having a rounded value of three. Moreover, all demographic variables are mostly balanced, with medians right in the center and a mean close to it. The variable *leftright* showing political orientation reveals the mean to be slightly left-wing with a value of 1.866 on a range from one to three and a median of two.

Finally, to get a first idea of the characteristics of the people affected by the floods, and to see if any particular group of people were more affected, I have constructed graphs in Figure 14 that show whether people living in rural areas, belonging to a particular generation or social class, or having a different political orientation are more affected. This might give some idea of the results of the regression analysis.

Figure 14: Fraction of rural, agegroup, social class and leftright, by treatment



Source: Own representation using "Eurobarometer 88.4 (2017)" (2022), "Eurobarometer 93.2 (2020)" (2021) and "Eurobarometer 97.1 (2022)" (2023)

Figure 14 shows that there were five percentage points more observations for people living in rural areas affected by flooding. However, the difference is mainly due to the variable $flood2$, which indicates a lower level of flood impact.

In addition to living in a rural area, being part of Gen Z makes it more likely to live in an area that experienced severe flooding. In particular, only 60 percent of Gen Z did not experience any flooding. On the contrary, only 11 percent of the Boomer generation were affected by heavy flooding classified with $flood1$ and 73 percent were living in areas not affected by the flooding at all. This makes them the least affected generation.

Furthermore, the middle class was most affected by severe flooding. Here, only 65 percent experienced no flooding and 16 percent experienced heavy rainfall and the resulting flooding. The upper middle class and the higher class were barely affected by flooding, with only nine percent and five percent respectively for the variable $flood1$. Almost three out of four upper-class observations were unaffected. Similarly, 72 percent of the working class did not live in an area affected by the floods. Nevertheless, 12 percent experienced severe consequences.

Looking at the variable for political orientation, it can be seen that people who self-assessed as being in the center experienced the least amount of flooding. However, both the center and the left were affected by $flood1$ with 14 percent, while the right-wing supporters only show a figure of 11 percent and 16 percent for areas affected to a lesser extent. In this context, it is interesting to note that 16.76 percent of people living in rural areas support left-wing parties, while this figure is almost 24 percent for people who live outside rural areas. As people in rural areas were more likely to be affected by the flood, people who vote for right-wing parties may also show higher differences in the results after the flood in 2021.

8 Methodology

After presenting the Descriptive Statistics, I will now turn to the Methodolgy that I am going to use for my more sophisticated analysis. More precisely, I will introduce the Difference-in-Differences (DiD) estimation.

8.1 Difference-in-Differences approach

DiD allows for comparisons between treated and non-treated individuals before and after the treatment. The basic idea can be grasped from the following expression:

$$DiD = Y^T_{post} - Y^T_{pre} - (Y^C_{post} - Y^C_{pre}) \tag{1}$$

This involves taking the differences between the pre-and post-treatment scores for both the treatment and the control group and then taking the difference from the differences. By doing both, it is possible to account for time-specific effects as well as for selection biases. If just looking at the sample before and after the treatment, one would neglect that the outcome could have changed for other reasons happening over time and therefore the effect could be more or less pronounced. If just considering the differences of the treatment and the control group one would not consider the possibility that the two groups strongly differ from each other. Often, there is a self-selection bias, where people consider a treatment valuable to themselves and therefore will actively seek the treatment. These people might e.g. have certain information due to higher education. In this case, people might live in flooded areas, which are predominantly rural, due to their profession as a farmer and therefore have a different attitude towards agriculture and climate. Therefore, it is crucial to consider both, the time difference and the difference between treated and non-treated to prevent biases in selection and the time trend. To yield reliable results while using the DiD approach it is therefore important to have parallel time trends and that the selection bias stays constant over time. I already checked for both in Section 7.2.

Let's look back at Table 4 and now include the change in means instead of the Percentage Change in means, which is depicted in Table 6. One arrives at the following result which makes it clear why it is crucial to look at both time and control/treatment group variances.

Table 6: Means and differences in the importance of CAP climate priorities

year	flood1 = 0	flood1 = 1	Difference in Mean
2020	1.581	1.544	-0.037
2022	1.611	1.729	0.118
Difference in Mean	0.030	0.185	**0.155**

Source: Own calculation using "Eurobarometer 93.2 (2020)" (2021) and "Eurobarometer 97.1 (2022)" (2023)

It becomes evident that the DiD, no matter what difference one takes first, yields the same result. Again, both differences must be considered. The effect of the flooding is therefore not 0.185 but 0.155.

8.2 Difference-in-Differences regressions

As the flood represents the perfect treatment and it is easy to separate the treatment and control group as done in Section 7.1.2, a DiD approach using the Eurobarometer waves before and after the event as time controls is quite useful. In my analysis, the DiD approach yields the following expression:

$$Y_{i,t} = \beta_0 + \beta_1 flood1_i + \beta_2 year\_after_t + \beta_3(flood1_i \times year\_after_t) + \varepsilon_{i,t} \quad (2)$$

Y is the outcome variable and applicable for all dependent variables depicted in Equation 2. The time before and after the flood is reflected by the indices t and the observation-specific indices are reflected by i. The constant in the regression is represented by β_0. The variable $flood1$ is a dummy variable indicating the treatment and the variable $year\_after$ indicates whether the time period is prior to or post of the flooding. The interaction term, $(flood1 \times year\_after)$, yields the DiD-estimator. If both values take the value of one the results account for both, the time variable and the indication of the treatment group. If β_1, β_2, and β_3 are all plugged into Equation 1, all betas will cancel out, and just β_3, the DiD-estimator, will be left. Finally, the error term ε describes the regression residual.

In my analysis, I will gradually include independent variables to improve the precision and statistical significance and to avoid multicollinearity. The final equation, including all the independent variables, is depicted in Equation 3.

$$\begin{aligned} Y_{i,t} = \beta_0 + \beta_1 flood1_i + \beta_2 year\_after_t + \beta_3(flood1_i \times year\_after_t) + \beta_4 flood2_i + \\ \beta_5(flood2_i \times year\_after_t) + rural_i + protest\_diff_i + protest\_before_{i,t} + \\ protest\_after_{i,t} + female_i + edu_i + social\ class_i + agegroup_i + \\ leftright_i + region_i + country_i + \varepsilon_{i,t} \end{aligned} \tag{3}$$

The stepwise inclusion will be conducted for my main dependent variable $qa7\_5$ whilst the remaining dependent variables will be conducted with the full Equation 3. Furthermore, for the variables, $qa7\_5$, $qa18\_6$, and $qa19\_1$ as well as when including the protest variable $protest\_before$, $protest\_after$, and $protest\_diff$, the regressions will just be conducted focusing on the survey waves from 2020 and 2022 due to missing observations for the year 2017. Further, I will control for multicollinearity starting with a correlation analysis for all dependent variables. In addition, I will use the Variation Inflation Factor (VIF) and conduct a test for heteroskedasticity. To control this issue, I will use the robust option in STATA and use Clustered Standard Errors. Moreover, I will use country FE and FE for political orientation. Furthermore, I will conduct a regression including the less affected areas using the variable $flood2$ to see whether there are differences in the outcome variable related to spatial proximity. As a final robustness check, I will conduct a Placebo test. Any potential problems and the reasoning behind the tests and variations in the regressions are explained in detail in Section 9, where I conduct the Empirical analysis, as it helps to understand the individual steps better by seeing them together with the results.

9 Empirical Analysis

Before starting with the stepwise regressions on the main variable, I took a closer look at the independent variables to mitigate problems related to multicollinearity from the beginning. Thus, I performed a correlation analysis with all explanatory variables to see which ones are correlated and should therefore not both be included in the regression. Following Dormann et al. (2013) I will drop one variable if it is correlated to a degree of 0.7 or higher with another variable. The results can be found in Table 7.

Table 7: Correlation: independent variables

	flood1	flood2	floodno	year_after	protest_before	protest_diff	protest_after	female	agegroup	edu	d63	leftright	rural	region	country
flood1	1.000														
flood2	-0.192	1.000													
floodno	-0.575	-0.693	1.000												
year_after	0.014	-0.015	0.002	1.000											
protest_before	0.012	-0.106	0.080	0.017	1.000										
protest_diff	0.160	-0.140	-0.001	-0.017	-0.774	1.000									
protest_after	0.243	-0.305	0.076	-0.006	0.156	0.478	1.000								
female	-0.006	0.007	-0.001	-0.021	-0.018	0.023	0.006	1.000							
agegroup	-0.091	-0.033	0.094	0.019	0.033	-0.035	-0.025	-0.013	1.000						
edu	0.029	0.027	-0.044	0.018	-0.106	0.080	-0.012	-0.084	-0.318	1.000					
d63	-0.009	0.039	-0.026	-0.025	-0.046	-0.016	-0.099	-0.036	-0.002	0.371	1.000				
leftright	-0.021	0.026	-0.006	-0.009	0.003	0.002	0.009	-0.036	0.018	-0.113	-0.007	1.000			
rural	0.006	0.041	-0.038	-0.016	0.020	0.027	0.049	-0.001	0.075	-0.074	0.001	0.069	1.000		
region	-0.226	0.096	0.086	-0.002	-0.237	0.300	0.146	0.041	-0.019	0.065	0.039	0.001	-0.016	1.000	
country	0.109	0.068	-0.137	0.001	0.382	-0.552	-0.360	-0.023	0.012	-0.148	-0.101	-0.016	-0.039	-0.768	1.000

Source: Own calculation

Thus, looking at the results I decided to not include the variable *protest_before* in my regression as it is highly correlated with *protest_diff* exceeding the threshold of 0.7. As *protest_diff* shows if the average number of protests per month and region is increasing or decreasing and *protest_after*, which is just correlated to a degree of 0.478 with *protest_diff*, already serves as an indicator for the absolute amount of protesting, it was logical to drop *protest_before* out of both variables.

Moreover, the variables *region* and *country* have a correlation of -0.768 and therefore one will be excluded from the regression. As the variable *region* will have collinearity issues with the dummy variable *flood1* when it takes the values either zero or one, I will drop the variable *region* and keep *country* to include it as FE in the second step. Moreover, as described in Section 7.2 the different characteristics of the countries can play an important role in predicting the outcome variable.

9.1 Regressions

First, I conducted some baseline regression using stepwise inclusion. I started with a regression that only includes the dummy variables $flood1$ and $year\_after$, which indicate if a region was heavily affected by the flooding and the time determining if the survey was conducted before or after the treatment, and their interaction term. Thus, in the first regression, I just looked at the DiD-estimator. Then, I used a mixed approach of forward and backward induction, to assess whether and how the independent variables influence each other's effects and explanatory power on the outcome variable. The results of adding and dropping the variables in the regressions can be found in Table 8.

Table 8: Stepwise regression

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	qa7_5	qa7_5	qa7_5	qa7_5	qa7_5	qa7_5	qa7_5
flood1=1	-0.037	-0.048	-0.053	-0.048	-0.044	-0.048	-0.047
	(-1.23)	(-1.58)	(-1.75)	(-1.58)	(-1.43)	(-1.56)	(-1.56)
year_after=1	0.030*	0.032*	0.032*	0.031*	0.025	0.026	0.024
	(1.97)	(2.07)	(2.06)	(2.01)	(1.61)	(1.64)	(1.55)
flood1=1 × year_after=1	0.155***	0.150***	0.153***	0.140***	0.148***	0.163***	0.164***
	(3.71)	(3.59)	(3.67)	(3.34)	(3.52)	(3.90)	(3.94)
protest_diff		0.021***	0.022***	0.025***	0.024***	0.023***	0.023***
		(3.51)	(3.64)	(4.10)	(3.96)	(3.82)	(4.27)
protest_after		0.001	0.000	-0.004	-0.002	-0.001	
		(0.16)	(0.06)	(-0.49)	(-0.23)	(-0.06)	
rural			0.036*	0.033*	0.011	0.011	
			(2.35)	(2.14)	(0.73)	(0.74)	
female			-0.109***	-0.116***	-0.103***	-0.103***	-0.102***
			(-7.63)	(-8.01)	(-7.08)	(-7.08)	(-7.07)
agegroup			-0.000	-0.006	-0.006	-0.005	
			(-0.03)	(-0.96)	(-0.90)	(-0.76)	
edu				-0.014**	-0.004		
				(-3.09)	(-0.87)		
social class				-0.012	-0.015	-0.017*	-0.017*
				(-1.41)	(-1.77)	(-2.14)	(-2.20)
leftright					0.229***	0.230***	0.231***
					(16.43)	(16.66)	(16.81)
Constant	1.581***	1.587***	1.632***	1.756***	1.295***	1.274***	1.261***
	(146.79)	(121.86)	(65.89)	(44.94)	(26.42)	(29.97)	(34.48)
Adjusted R-squared	0.003	0.005	0.011	0.012	0.040	0.040	0.041
N	10126	10126	10116	9954	9371	9443	9448

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Own calculation

The baseline regression shows significant results at a 0.1 percent significance level for the interaction term, where the flooding raises the mean of whether help tackling climate change should have a high CAP priority importance. As a reminder, answering with one attributes the highest importance whereas four does not give high importance to tackling climate change within the CAP framework. The DiD-estimator indicates that the mean of $qa7\_5$ increases by 0.155 points due to the flooding. If including the variables $protest\_diff$ and $protest\_after$ depicting the difference in the mean number of protests per month and region before and after the flooding and the absolute number of mean protests per month and region after the flooding, the DiD-estimator shows a slightly lower increase in the outcome variable of 0.150. However, the variable $protest\_diff$ is, at the same significance level, increasing the mean of $qa7\_5$ by 0.021 points. Thus, an increase of one extra protest, comparing the time before and after the flooding, decreases the perception of the priority importance of climate change within the CAP. Nevertheless, the absolute number of protests after the flooding does not yield significant results and, independently from the other regressors, will not show a significant effect on $qa7\_5$. That is why I dropped the variable in the end. Next, I included the variables *rural*, $female$, and *agegroup* to account for the characteristics of the respondents. This has no meaningful effect on the other independent variables already included in the model. However, the adjusted R-squared rises from 0.003 in the beginning to 0.011. Now, the model explains 1.1 percent of the variance in the outcome variable through the independent variables. In addition, the variable *rural* is significant at a five percent level and indicates living in a rural area increases the outcome variable by 0.036 points. Even clearer are the results for the dummy variable $female$, which decreases $qa7\_5$ by 0.109 and is highly significant. Thus, if the gender is female the support for the importance of the CAP priority to help tackle climate change increases majorly. The variable *agegroup*, on the other hand, has no effect and will remain no matter what other explanatory variables are added or dropped to the regression. Then, I added *edu* and *social class* both being related to the broader field of income. Adding both variables decreases the interaction term by 0.013 points and decreases the regressor $female$ even further to 0.116 points. Otherwise, there are no major changes. The variable *edu* is significant at a one percent significance level and decreases the outcome by 0.014 points. Thus, one education level higher on the ISCED scale increases the CAP priority importance to help tackle climate change. The same holds for *social class*, which is insignificant, and has a t value of -1.41. In a final inclusion step, I added the variable $leftright$ to control for political orientation. In the baseline regression, I assume the variable $leftright$ to be categorical with being left indicated with one center with a two and right-wing with a three. While adding this variable, major changes can be observed. First, the DiD-estimator rises again and reaches 0.148 as well as $female$ which now is at a value of -0.103. Thus, the effect of $flood1$ is now higher and lower for $female$. Further, the estimators for the variables *rural* and *edu* decrease and do not yield significant results anymore. Thus, adding the variable $leftright$, indicating that moving to the right of the political orientation scale, increases the outcome variable by 0.229 meaning that help tackling climate change should have less importance to be a CAP priority. Moreover, it takes away the explanatory power of other independent variables.

As I was using a mixed approach of forward and backward induction I decided to drop the variable *edu* to see if it changes the outcome of the variable *social class* as both variables are related to each other. Indeed, *social class* is becoming significant at a five percent significance level and the effect of the interaction term increased to 0.163 points. Otherwise, there were no mentionable changes. Thus, I decided to include *social class* but neglect *edu* in my further analysis. Moreover, I dropped further insignificant variables, in particular, *agegroup* and *rural*, where the first one was insignificant all along and the second one turned insignificant as I started to control for political orientation. In this step, there were no changes observed considering the remaining estimators. Furthermore, I excluded the variable $protest\_after$ as even if leaving out the variable $protest\_diff$, I could observe no significant results. If dropping any more variables and fostering the explanatory power of the remaining independent variables, the adjusted R-square starts to decline. This value peaked at 0.040 and therefore the model can explain four percent of the variance in the outcome variable. In the end, regression (7) is the final equation that I will use for further analysis of variable $qa7\_5$.

Moreover, I further tested for multicollinearity by conducting the Variable Inflation Factor (VIF). The mean VIF is 1.36 and the values range from 1.00 for the variables *female*, *social class*, and *leftright* to 2.24 for the DiD-estimator. Usually, everything below a value of five is not a cause of concern and does not need to result in alterations of the regression.

In addition, I tested for heteroskedasticity using the Breusch-Pagan test. Heteroskedasticity in a regression analysis is challenging because it violates the assumption that the variance of the residuals is constant (homoskedasticity). This situation can lead to inefficient estimates and unreliable significance tests, which may ultimately lead to incorrect conclusions. For my main specification of the analysis, the Breusch-Pagan test yields a result from chi2 of 192.01 with one degree of freedom and the p-value is 0.0000, which means that the results are highly significant and the null hypothesis of homoskedasticity can be rejected on all common significance levels. Therefore, the analysis has a problem with heteroskedasticity and poorly trustworthy standard errors. For this reason, in my further analysis, I will include the robust option or Clustered Standard Errors, both of which are good options for dealing with heteroskedasticity. While using Clustered Standard Errors it is possible, in addition to accounting for heteroskedasticity, to allow for correlations within clusters. Furthermore, clustering countries allows accounting for inter-regional spillover effects. The results of including the robust option and Clustered Standard Errors can be seen in Table 9. In both regressions, I additionally added *leftright* FE. Thus, I dismissed the assumption of an ordinal scale of left-wing, center, and right-wing supporters and now assume a nominal scale. Moreover, in the second regression, I added country FE together with the Clustered Standard Errors on the country level. The FE will remove the between-country variation and then the analysis only considers the within-country variations. Thus, the effects between, e.g. Belgium and Luxembourg remain constant, whereas the changes within these countries will still be considered.

Table 9: Regression including Fixed Effects

	(1)	(2)
	qa7_5	qa7_5
flood1=1	-0.043	-0.040*
	(-1.57)	(-3.06)
year_after=1	0.023	0.026
	(1.49)	(1.57)
flood1=1 × year_after=1	0.164***	0.162
	(4.00)	(1.23)
protest_diff	0.021***	0.028*
	(3.94)	(3.55)
female	-0.099***	-0.098**
	(-6.85)	(-4.79)
social class	-0.018*	-0.019
	(-2.28)	(-1.00)
Left-wing	-0.170***	-0.165*
	(-10.20)	(-3.86)
Right-wing	0.361***	0.368*
	(10.31)	(4.18)
BE		0.004
		(0.08)
NL		0.009
		(0.74)
LU		0.109***
		(12.38)
DE		0.051**
		(5.32)
Constant	1.700***	1.671***
	(65.34)	(30.54)
Robust	Yes	No
Clustered Standard Errors	No	Yes
Adjusted R-squared	0.044	0.046
N	9448	9448

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Own calculation

In regression (1), I included the robust option and FE concerning the political orientation. Using the robust option should not change the estimators, but the standard errors and resulting p-values and t-statistics. However, the minor changes to the final regression (7) in Table 8 are coming from the FE. As anticipated the characterization left-wing has a significant negative impact on the outcome variable $qa7\_5$ and the characterization right-wing has an even higher significant positive effect. In particular, left-wing raises the mean of the CAP priority importance of helping to tackle climate change by 0.170 points while the right-wing decreases it by 0.361 points. Hence, as foreseen the effect is not ordinal and higher for right-wing support. Further, the adjusted R-squared is 0.004 points higher using the robust option and FE. It gets even higher when including country FE and country Clustered Standard Errors as is done in regression (2). However, even though the effect size is relatively similar, the significance levels differ. Now, the DiD-estimator is not significant anymore on all common significance levels. The same holds for *social class*. The difference in the mean number of protests is, even though slightly higher, significant on a five percent level instead of a 0.1 level. These changes can also be observed for the political variation indicators and can result from the clustering of the standard errors on the country level. The countries Belgium and Netherlands do not show any significant effects on the average of the outcome variable, which is interesting as the Belgian region of Wallonie was hit by the flooding and there are no changes in the outcome variable that can be attributed to being located in Belgium. Luxembourg, on the other hand, shows highly significant results and raises the mean of $qa7\_5$ by 0.109 points, which translates into a negative effect placed on the CAP priority importance of focusing on preventing climate change. The same direction of the effect can be observed for Germany. However, this effect is nearly invisible and barely raises the dependent variable by 0.051. Thus, the treatment of extreme flooding affected Germany and, even though not coded with a one in $flood1$, Luxembourg's estimator and therefore had an effect on the outcome variable. The positive and significant coefficient of Luxembourg could occur as Luxembourg is geographically close to the areas coded with a one in the $flood1$ variable. Therefore, there could be some spillover effects as Luxembourg's spatial proximity could also lead to a shift in mentality. Luxembourg will not just have experienced the consequences in a social context, but will most likely also be affected by a broken infrastructure. Further, Luxembourg experienced some flooding, even though to a lighter degree than the adjacent regions in Germany and Belgium.

To look at the role of the extent of the flooding and spatial proximity to the extremely flooded areas, I included the dummy variable $flood2$ and its interaction term with the variable indicating the period after the treatment in the regressions depicted in Table 10. All regions within Luxembourg, Grand Est in France, and Limburg in the Netherlands lie geographically close to the regions immensely affected by the treatment and were hit by some flooding as well, even though to a lesser extent. The regions of Bayern and Sachsen did experience some flooding, which qualifies them for being included in the $flood2$ regions. However, they do not share a border with the extremely flooded areas.

Table 10: Regression including lower affected areas

	(1) qa7_5	(2) qa7_5	(3) qa7_5
flood1=1	-0.040	-0.046	-0.046*
	(-1.36)	(-1.53)	(-3.35)
year_after=1	0.026	0.012	0.012
	(1.64)	(0.69)	(0.58)
flood1=1 × year_after=1	0.162***	0.175***	0.175
	(3.95)	(4.19)	(1.41)
protest_diff	0.028***	0.028***	0.028*
	(3.81)	(3.79)	(4.04)
female	-0.098***	-0.098***	-0.098**
	(-6.81)	(-6.82)	(-4.78)
social class	-0.019*	-0.019*	-0.019
	(-2.24)	(-2.24)	(-1.00)
Left-wing	-0.165***	-0.164***	-0.164*
	(-9.85)	(-9.77)	(-3.80)
Right-wing	0.368***	0.367***	0.367*
	(10.47)	(10.45)	(4.18)
flood2=1		-0.020	-0.020
		(-0.60)	(-0.41)
flood2=1 × year_after=1		0.060	0.060
		(1.61)	(1.06)
Constant	1.671***	1.676***	1.676***
	(56.26)	(55.73)	(29.98)
Country FE	Yes	Yes	Yes
Robust	Yes	Yes	No
Clustered Standard Errors	No	No	Yes
Adjusted R-squared	0.046	0.046	0.046
N	9448	9448	9448

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Own calculation

It is noteworthy that when adding the $flood2$ variable and interaction term to the equation, while the estimators alone have values close to zero and are insignificant, the interaction term of the variable $flood1$, indicating the effect of the flooding on the independent variable, went up even more. With adding $flood2$ and its interaction term, the variable DiD-estimator for $flood1$ increases the outcome variable by 0.175 points instead of 0.162 points before. Thus, the effect of decreasing the CAP priority importance of helping to tackle climate change is even higher.

To check whether this is due to multicollinearity I conducted the VIF test which yields 3.37 for the interaction term of $flood2 \times year\_after$. However, as mentioned before, even though some multicollinearity exists, values below five are no reason for concern. Otherwise, no significant changes can be observed. With Clustered Standard Errors, the overall significance levels are decreasing and the DiD-estimator of flood one is not significant anymore.

Moreover, I tested for other outcome variables in the area of the CAP or agriculture and climate change-related issues to see if overall changes relating to climate change and agriculture can be observed. Here, I included all the independent variables, including *agegroup* and *rural* again as they might yield more significant results than in the analysis before. For the first two outcome variables, responses were additionally included in the 2017 survey wave, so there are more observations for these regressions. As I am using the 2017 observations, I will not include the farmers' protest variables in these regressions, as the data considering the demonstrations start in 2020. Further, I conducted each regression with either the robust option or country Clustered Standard Errors and country FE. The results are depicted in Table 11.

Table 11: Regression of different outcome variables

	(1) qa5_6	(2) qa5_6	(3) qa10_6	(4) qa10_6	(5) qa18_6	(6) qa18_6	(7) qa19_1	(8) qa19_1
flood1=1	0.081**	0.050	-0.037**	-0.019	-0.068*	-0.126*	-0.027	0.002
	(2.79)	(0.57)	(-2.89)	(-0.99)	(-2.39)	(-4.35)	(-0.72)	(0.11)
year_after=1	-0.132***	-0.130*	0.009	0.010	-0.002	-0.002	0.068**	0.072
	(-6.39)	(-3.72)	(0.98)	(0.63)	(-0.13)	(-0.04)	(3.01)	(2.26)
flood1=1 × year_after=1	0.134**	0.134	0.004	0.003	0.122**	0.118	-0.030	-0.032
	(2.85)	(1.24)	(0.18)	(0.04)	(3.05)	(1.57)	(-0.57)	(-0.96)
flood2=1	0.187***	0.190*	-0.034**	0.004	-0.147***	-0.062	0.039	0.089
	(7.03)	(3.11)	(-3.05)	(0.27)	(-6.02)	(-2.19)	(1.18)	(2.77)
flood2=1 × year_after=1	-0.084	-0.092*	0.015	0.017	-0.012	-0.011	-0.017	-0.023
	(-1.94)	(-2.88)	(0.76)	(0.63)	(-0.36)	(-0.34)	(-0.36)	(-0.32)
female	-0.003	-0.012	0.024***	0.025	-0.030*	-0.025	0.040*	0.039
	(-0.21)	(-0.31)	(3.36)	(2.59)	(-2.21)	(-1.47)	(2.17)	(2.12)
agegroup	-0.026***	-0.005	-0.001	-0.003	0.038***	0.033	0.025**	0.029
	(-3.44)	(-0.34)	(-0.24)	(-1.75)	(5.79)	(2.10)	(2.79)	(1.75)
edu	0.033***	0.040*	-0.003	-0.002	0.009*	0.011	-0.034***	-0.027*
	(6.18)	(3.84)	(-1.39)	(-1.22)	(2.10)	(0.96)	(-5.66)	(-3.74)
social class	-0.005	0.043*	0.004	0.000	-0.033***	-0.033	-0.029**	-0.018
	(-0.49)	(3.02)	(1.05)	(0.06)	(-3.97)	(-1.99)	(-2.62)	(-0.70)
Left-wing	0.089***	0.095*	0.024**	0.021	0.084***	0.089	-0.184***	-0.190*
	(4.21)	(2.99)	(2.60)	(2.24)	(4.85)	(2.47)	(-7.95)	(-2.80)
Right-wing	0.075*	0.077	-0.008	-0.007	-0.010	0.000	0.128***	0.142
	(2.51)	(1.72)	(-0.58)	(-0.39)	(-0.35)	(0.01)	(3.47)	(2.02)
rural	-0.060***	-0.021	0.009	0.008	-0.015	-0.020	0.089***	0.101**
	(-3.51)	(-0.85)	(1.18)	(0.67)	(-1.05)	(-2.06)	(4.63)	(5.40)
protest_diff					0.020***	0.033**	-0.036***	0.006
					(3.63)	(5.04)	(-4.62)	(1.14)
protest_after					-0.017	-0.004	0.009	0.008
					(-1.94)	(-0.08)	(0.78)	(0.27)
Constant	2.191***	1.960***	0.228***	0.231***	1.885***	1.875***	2.789***	2.708***
	(51.23)	(13.96)	(11.96)	(13.95)	(47.51)	(15.02)	(52.28)	(24.46)
Observations 2017	Yes	Yes	Yes	Yes	No	No	No	No
Country FE	No	Yes	No	Yes	No	Yes	No	Yes
Robust	Yes	No	Yes	No	Yes	No	Yes	No
Adjusted R-squared	0.021	0.068	0.003	0.006	0.020	0.030	0.032	0.040
N	13301	13301	13983	13983	9296	9296	9109	9109

t statistics in parentheses

Country Fixed Effects are always combined with Clustered Standard Errors

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Own calculation

Regressions (1) and (2) check whether the CAP performance includes protecting the environment and tackling climate change. The scale of answers ranges from 1) "Totally agree" to 4) "Totally disagree". Here, the interaction term of the main DiD-estimator, ($flood1 \times year\_after$), is positive, and without the country FE and Clustered Standard Errors even significant at a one percent level. The results indicate that the DiD-estimator increases the outcome variable by 0.134, which indicates a decrease in the perception that the CAP performance includes protecting the environment. Interestingly, the interaction term including $flood2$ is negative and becomes significant at a five percent level, when including country FE and Clustered Standard Errors. Thus, being in a slightly flooded area increases the perception that the CAP indeed helps the environment. The effect, nonetheless, is quite small and takes up a value of -0.092. In contrast to the priority importance that should be placed on the environment from question $qa7\_5$ from my main analysis, the variable $female$ has no explanatory power anymore. However, without country FE and Clustered Standard Errors, the variables *agegroup* and *rural* show significant negative effects, and the variable *edu* has significant positive effects. Considering the variable education, the effects stay significant at a five percent level controlling for country FE and have a positive influence of 0.040 on the outcome variable. The same holds for *social class* with 0.043, which is insignificant and has a value close to zero without the FE and Clustered Standard Errors. If looking at the political orientation it is striking that in this framework the left-wing indicator has a positive estimator of 0.089 or 0.095, depending on the regression specifics, and is significant in both cases. Thus, when looking at the performance and not the priority importance both groups on the scale of political orientation increase the outcome variable meaning that the agreement that the CAP performance includes climate change issues is lowered. Furthermore, the coefficient is 2.191 and 1.960, depending on the regression specifics, which is higher compared to the main dependent variable.

The variable $qa10\_6$ is a binary variable that is one if the respondent chooses to address the environment and climate as one of the options to the question on the budget decisions of the EU regarding the CAP. It is striking to see that there are barely significant results, especially considering both interaction terms with the variables indicating flooding. The dummy variable $female$ does raise the value of the outcome variable by 0.024 and is significant on a 0.1 percent significance level. It has a t-value of 2.59 with an estimator of 0.025 when including country FE and Clustered Standard Errors, which is still quite significant. This means, that the dummy variable $female$, if one, increases the outcome variable by 0.025 and therefore raises the answer rate that acknowledges climate protection as part of the CAP major EU budget of 40 percent. Furthermore, being left-wing increases the value by around the same value. The estimators both, with and without controls for the variable country, have t-values above two and are therefore significant. Here, age, education, social class, right-wing, and the dummy *rural* do not play a role in explaining the outcome variable. The adjusted R-squared is furthermore especially low with 0.003 and 0.006 and thus does not explain much of the variance in the outcome variable.

Question $qa18\_6$ does not consider the CAP and agriculture per se and asks the respondents to evaluate the environment and the landscape in their rural areas. However, rural areas are often tightly connected to agriculture and additionally, it is interesting to look at differences in responses when agriculture is not mentioned. Again, there is a scale from 1) "Very good" to 4) "Very bad". As for the main variable $qa7\_5$, the DiD-estimator considering the variable $flood1$ has a positive value and raises the outcome variable. For the independent variable $qa18\_6$ this amounts to 0.122 and 0.118 when adding country FE and Clustered Standard Errors. Without controlling for the country this effect is even significant at a one percent significance level.

Therefore, flooding decreases the perception of the environment and climate in rural areas on average among all respondents. The interaction term with $flood2$ on the other hand does not yield significant or high results. The variable $female$ has a negative estimator and lowers the outcome variable by 0.030, which is significant for the basic regression. Without controlling for country-specific effects, *agegroup* and *social class* are highly significant and have estimators of 0.038 and -0.033, with older generations raising the scale to answer more negatively and a higher *social class* lowering the effect and perceiving the environment and climate in rural areas as more positively. What is interesting here is that the estimator for left-wing is positive and has t-statistics above two for both regressions, meaning that the values are significant. Unlike the main independent variable $qa7\_5$, this estimator raises the outcome variable to rate the environment and climate in rural areas more badly. The results for the right-wing, on the other hand, are neglectable. In this regression, the protest variables are included again, as I only used observations from the 2020 and 2022 waves. The variable $protest\_diff$ is positive and significantly independent from using country FE and Clustered Standard Errors. If the mean difference of farmers' protests increases by one per month and region the outcome variable rises by 0.020 and 0.033 respectively. Thus if there are more protests this hurts the rural area appraisal considering the environment and climate.

Finally, the variable $qa19\_1$ considers the statement that agriculture causes climate change. This is very interesting as it does not question agricultural policies but just looks at the sector itself. Thus, there is a separation from politics. Again, the values range from 1) "Totally agree" to 4) "Totally disagree". Here, no significant effects of the estimator from both interaction terms can be observed. Therefore, flooding to no extent affects the perception that agriculture is a cause of climate change. Hence, it is interesting that it has a positive effect on the main outcome variable considering the priority importance of climate within the CAP, but no effects whatsoever if just agriculture is considered. The variable $female$ has t-statistics above two and therefore is significant with values of 0.040 and 0.039 for both regressions. This means that the gender female raises the outcome of variable $qa19\_1$ and therefore, contrary to the previous regressions, lowers the agreement to the specific statement which in this case is that agriculture is a cause of climate change. Likewise, *agegroup* raises the outcome by around 0.025 and is significant on all common significance levels without country FE and Clustered Standard Errors. The variables *edu* and *social class* both harm the outcome variable, with significant results of -0.034 and -0.029 respectively. If controlling for country effects the variable *edu* remains significant and has an effect size of -0.027. Therefore, a higher education and a higher social class result in a value of the outcome variable that agrees more with agriculture being a cause of climate change. This effect, even higher, can also be observed for the estimator for left-wing which is -0.184 and -0.190 if controlling for country-specific effects. Both estimators are significant at at least a five percent significance level. On the other hand, also significant for both specifications with t-statistics above two, the indicator for right-wing and the dummy variable *rural* both have positive estimators. The effect size is around 0.128 (0.142) for the political orientation right-wing and a little lower, but even more significant with 0.089 (0.101) for $rural$. The values in brackets depict the regressions using country FE and Clustered Standard Errors. Thus, the perception that agriculture is a cause of climate change is lowered. It is interesting that for this outcome variable $rural$, independent from country-specific controls, is significant on at least a one percent significance level. Finally, if looking at the difference in farmers' protests it is interesting to see that one protest more, contrary to all previous results, lowers the outcome variable by 0.036 points. This result is highly significant for the basic regression and becomes neglectable if including country FE and Standard Clustered Errors. Nevertheless, the first specification states that positive changes in mean protests per month and region lower the outcome variable, and therefore the respondents tend to agree more with agriculture being a cause of climate change.

9.2 Placebo test

For further robustness checks, in addition to the country FE and Clustered Standard Errors from Section 9.1 and the test for parallel pre-trends from Section 7.2, I will include a Placebo test to check the significance of the flood event on the outcome variables. Theoretically, there may be other region-specific factors that cause the DiD estimator, the interaction term of $flood1$ and $year\_after$ to produce significant results. To check whether the positive effect on the outcome is indeed due to the treatment, I constructed the variable $fakeflood$, which uses similar regions in terms of characteristics from the sample that were not affected by the flood and pretends that they are classified as extremely flooded instead of the real flooded regions. I suspect that the DiD-estimator will not give significant and clear results.

For the German region of Nordrhein-Westfalen, I have chosen the French region of Hauts-de-France as a comparable counterpart, as both share the same historical background in the coal industry, in particular the region of Nord-Pas-De-Calais within Hauts-de-France. When comparing the share of rural population using the Eurobarometer surveys, both regions are characterized by a low share of rural population. The share of non-urban observations from the 2020 and 2022 samples is 21.59 for Nordrhein-Westfalen and 16.83 for Hauts-de-France. Although Nordrhein-Westfalen has more urban centers than Hauts-de-France, there are still some important urban agglomerations, such as the city of Lille. In addition, both regions have a temperate climate, resulting in similar agricultural progress. Both regions are therefore important for crop production and are vital for their respective countries in producing potatoes (Goffart et al., 2022, p.506). Moreover, both areas have a relatively high output of agricultural products, with 7940.35 and 6509.18 million euros for Nordrhein-Westfalen and Hauts de France respectively in 2020 ("Economic Accounts for Agriculture by NUTS 2 Regions", n.d.). Furthermore, the distribution of political orientation on a left-right scale of 1-10 is skewed to the right for both regions, with the mass for Hauts-de-France being slightly more to the right. This is confirmed in Figure E.1 in Appendix E. Consequently, if one considers the historical context of the coal industry, together with the socio-economic challenges it has created, and in particular, for my analysis, the agricultural sector, the proportion of the population living in rural areas, and the political orientation, both regions have comparable characteristics. Therefore, Hauts-de-France serves as a suitable area for creating a fake flood.

Furthermore, I compared Rheinland-Pfalz with the adjacent region of Hessen. As they are neighboring regions, they both have a similar geography and a similar topography, including rivers and hills. Moreover, the share of the rural population in my sample is around 45 percent for each region and the population density in 2021 is quite similar, with 207 inhabitants per km^2 for Rheinland-Pfalz and 298 per km^2 for Hessen. Both regions have close cultural ties and the capital cities of Mainz and Wiesbaden are geographically close, separated only by the Rhine River. They therefore share a common history and have close similarities to this day. In addition, the age distribution from both regions in the sample is comparable, with a peak around the age of 60 and fewer observations for people in their forties. A closer look at the age distribution can be found in Figure E.2 in Appendix E. Moreover, both regions show similar results in the 2024 European elections, with the CDU getting the highest share of 30 percent, the Greens 9 percent (Rheinland-Pfalz) and 13 percent (Hessen), and the far-right AfD reaching 13 percent in both regions ("Ergebnisse - Die Bundeswahlleiterin", n.d.). The GDP per capita of 45,755 euros is slightly higher in Hessen than the 35,260 euros per capita of Rheinland-Pfalz, which could be related to the financial and economic center in Frankfurt ("Bruttoinlandsprodukt, Bruttowertschöpfung | Statistikportal.de", 2024). Nevertheless, the two regions are similar enough, especially in terms of culture and agriculture, to compare and construct a fake flood in Hessen for the Placebo test.

Finally, I chose Thüringen as a placebo region for Wallonie. Both regions had a strong industrial past, with Wallonie focusing on coal and Thüringen on manufacturing. Despite this, both regions faced economic difficulties in the period after the Second World War. While Wallonie is attempting to catch up after the decline of the coal industry ("Economic Performance, Competitiveness, and Well-Being in Wallonia", n.d.), Thüringen is struggling to find its place after the German reunification. Moreover, both regions have a similar GDP per capita in 2020, which amounts to 29,310 euros in Wallonie ("Belgium GDP per Capita: Walloon Region | Economic Indicators | CEIC", n.d.) and 29,746 euros in Thüringen ("Bruttoinlandsprodukt, Bruttowertschöpfung | Statistikportal.de", 2024). In addition, both regions are characterized by a similar share of the rural population in my sample, which is 38.77 and 42.78 percent for Wallonie and Thüringen respectively. Moreover, the agricultural output is also comparable. It ranges from EUR 1796.71 million (Thüringen) to EUR 2462.22 million (Wallonie). Thus, these two regions can easily be compared in my analysis, especially taking into account the focus on agriculture.

The fact that all these regions are located in similar temperate climate zones ("Main Climates of Europe", n.d.) is also important for my focus on climate awareness and extreme weather events.

In Table 12 I plotted the results of the Placebo tests, where the regions Hauts-de-France, Hessen, and Thüringen are coded with a one in the newly constructed variable $fakeflood$, instead of the regions Nordrhein-Westfalen, Rheinland-Pfalz, and Wallonie, which are considered as severely flooded in my main analysis. These regions are now coded with a zero as if they were not affected by the flood. As a result, the underlying assumptions should remain consistent and simply include a control group that is identified as treated but is not expected to change its perspective on climate change or the urgency of addressing it within the CAP, as it was not subject to the extreme weather event. Again, I have chosen the variable $qa7\_5$ considering the importance of tackling climate change as a CAP priority.

Table 12: Placebo test

	(1) qa7_5	(2) qa7_5
floodfake=1	0.065	0.097
	(1.48)	(2.53)
year_after=1	0.044**	0.046
	(2.93)	(1.86)
floodfake=1 × year_after=1	0.023	0.018
	(0.38)	(0.37)
protest_diff	0.023***	0.023*
	(3.71)	(4.09)
female	-0.100***	-0.098*
	(-6.87)	(-4.37)
Left-wing	-0.167***	-0.161*
	(-9.86)	(-3.85)
Right-wing	0.356***	0.364*
	(10.10)	(4.10)
Constant	1.718***	1.616***
	(41.15)	(18.47)
Robust	Yes	No
Country FE	No	Yes
Adjusted R-squared	0.042	0.046
N	9371	9371

t statistics in parentheses
Variables protest_after, agegroup, edu, d63 and rural are additionally included controls
Country Fixed Effects are always combined with Clustered Standard Errors
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Own calculation

First and foremost, it is important to mention that the interaction terms of $floodfake$ and $year\_after$ yield insignificant results with and without Country FE and Clustered Standard Errors. Further, the regions indicated by a one in the fake treatment variable lead to a neglectable 0.027 point rise in the mean answer on a scale from one to four whether tackling the environment should be a CAP priority importance. For the main analysis, regressing on Nordrhein-Westfalen, Rheinland-Pfalz, and Wallonie, as heavily affected regions the rise was 0.147, which is substantially higher. The values for $female$, the political orientation, and the difference in the number of protests do not yield different results. Thus, the Placebo test served its purpose in confirming that the results and change in responses indeed stem from being affected by the extreme weather event in July 2021.

10 Discussion

In this Section, I will take a closer look at the results and particularly the implications and use them for further interpretations. Moreover, I will consider the limitations of the analysis and provide suggestions for further research.

10.1 Evaluation of results

When looking at the main variable $qa7\_5$ considering whether help tackling climate change should be a CAP priority importance, I assumed the DiD-estimator, the effect of severe flooding ($flood1 \times year\_after$), to be negative. Thus, in line with the literature, I expected that the extreme weather event would raise climate consciousness. In addition, I assumed that the increased climate perception would translate to an increased support of climate policies including the CAP. However, this effect is positive and thus indicates a shift towards "Not at all important". Contrary to my expectations, the flooding in 2021 lowered the importance given to the

CAP priority importance related to climate change. Probable reasons could be that the priority after the flooding lies in reconstruction and mitigating further economic impacts. As found in the literature review in Section 2.2, regions with lower GDP first place importance on their financial situation before climate policies. Thus, the hit to the economy through the flooding could have a higher effect than the effect on the priority to counteract climate change through climate policies. Therefore, looking at the effect sizes after a longer period, when the economic damage is contained, would be interesting to further investigate. Moreover, it would be interesting to see whether climate change per se is perceived as more of a threat in the first place and whether the respondents recognize the climate measures of the CAP as useful. The latter can be seen in the analysis of the outcome variable $qa5\_6$ which considers the CAP performance. Again, the DiD-estimator is positive, reflecting a negative decrease in the perception of CAP performance. This could also explain why the perceived importance of CAP environmental measures decreases after the flood, as the perception of CAP the performance is reduced by the natural extreme weather event, which could translate into a sense of frustration and a feeling of uselessness of climate policies. A lower trust in the policy will for sure lower its support. Hence, it would be crucial to increase the research of economic and political effects on environmental policy support, to improve more efficient policy designs e.g. through financial incentives.

Furthermore, I assumed that spatial proximity and the extent of the flooding might be important considering the effect sizes. As the results from the literature are ambiguous, I constructed two flood dummy variables that separate the degree to which regions experienced flooding to verify the results for my analysis. Overall, there were no significant findings considering the $flood2$ interaction term. However, it raised the estimators for the $flood1$ interaction term of the main outcome variable. Even though the VIF test did not reveal any problematic correlation issues, it could be possible that the effect of $flood2$, which is not significant, is included in the DiD-estimator of flood1. Furthermore, it could be possible that as $flood2$ is not significant $flood1$ tries to explain the additional variance in the model. When considering the effect of the lower flood extremes on the outcome variable $qa5\_6$, which represents the CAP performance, the effect is, as always assumed, negative, meaning that there is more agreement with the statement. However, this effect is rather close to zero and not extreme with -0.084 points.

Moreover, looking at the different countries and country-specific effects is interesting. I used country FE to control for differences between countries. However, it would be interesting to analyze what differences are driving the changes in the different responses for each country. Thus, it would help to explain why the effect of Belgium is insignificant and marginal in size, whereas the effect for Germany is significant and relatively high, even though both countries have at least one region coded with $flood1$. Again, the reasoning could be found when looking at the economic damage caused by the flooding or maybe environmental education within the countries. In addition, the effect of Luxembourg is striking which is even higher and more significant than Germany's. This is surprising, as Luxembourg just experienced the lighter amount of flooding ($flood2$). I assume spillover effects from the higher flooded areas such as hits to the infrastructure. However, this could also be related to different levels of preparation for the flooding, different past experiences, and the importance of the affected areas. In my analysis, I used country FE to hold the differences between countries constant. However, it would be interesting for future research to further analyze the reasons for the different effects based on the countries, as this could provide important insights and policy improvements.

Moreover, it would be interesting to include even more countries in the analysis and extend the treatment to different extreme weather events. The literature showed, as explained in Section

2.2, that temperate regions are more likely to respond to extreme weather, especially extreme heat, than Mediterranean countries. Therefore, additionally, it would be interesting to consider countries in different climate zones.

Further, the role of farmers' protests in the outcome is important. I assumed that more protests, both in absolute terms and the differences from before and after the event, decrease the support for the environmental aspect within the CAP. Moreover, I assumed that the protests would decrease the perception of the performance as well as its support in general. In addition, I correctly suspected a positive effect on the outcome variable when considering perceptions of the environment and landscape in rural areas. Positive effects on this scale can be translated to less support for the statements. On the other hand, the effect of the protest on the statement that climate change is partly caused by agriculture will decrease as the protests will raise awareness of the farmer's issue and the connection between climate and agriculture. My results align with these assumptions when considering the difference in protests. Thus, citizens seem to perceive a change in the amount of protests and base their reactions on this perception. However, the coefficient related to the total number of protests after the floods is insignificant. Therefore, the support for the policies decreases with a noticeably increasing number of protests. However, the statement that agriculture is a cause of climate change is more supported within the population when protests increase. Nevertheless, this positive effect does not translate into support for the CAP, which could be due to its structure and the effectiveness of its policies, as well as farmers' dissatisfaction. Hence, the increase in farmers' protests has both positive and negative consequences. It would be beneficial to listen to farmers and restructure the CAP to reduce protests and increase support for the CAP. Furthermore, it would be interesting to see the impact on other policies related to climate and agriculture, especially looking at commonly recognized policies. Extending the research to other policies would control for CAP-specific effects and could exclude factors such as EU resentment. Another possibility could be to educate the non-farming population more about the CAP and the relationship between agriculture and climate change, to provide a basis for more evidence-based views. This could have major effects, as seen in Section 7.2, only 9.17 percent had detailed knowledge about the CAP. In addition, it would be beneficial to redirect the demonstrations away from the CAP and to listen to farmers' protests while developing new policies being accepted by all parties. Furthermore, to improve understanding and unite policymakers and farmers, it would be beneficial to consider all of the protester's concerns, such as basing subsidies on factors other than farm size. Moreover, involving farmers in greening strategies, given their expertise in this area, would increase the efficiency of the CAP and further reduce the frequency of demonstrations.

Furthermore, looking at the variable *rural* I considered it to play a bigger role when analyzing the main outcome variable about the priority importance of the environment given by the CAP. However, when the variable controlling for political orientation was added, the effects were explained by it and the *rural* variable became insignificant and the effect size decreased. It neither played a significant role when looking at the budget reasoning nor the rural area environment appraisal. Both effects are surprising to me, as I would have expected the rural population to be more connected to the environment and to have more points of contact with agriculture, as farms are geographically closer and neighbors are more likely to be farmers. However, looking at the CAP performance, not including country FE and Clustered Standard Errors, the variable *rural* has a negative effect on the outcome variable. Therefore, the estimator of the dummy variable *rural* increases the support for the CAP. However, even if the effect size is small it is significant. The rural population might be more familiar with the effects of the CAP, which can be related to the closer proximity to the farming sector in many countries. Moreover, surprisingly, the *rural* estimator raises the outcome variable that climate change is partly caused by agriculture. Here, as depicted in the literature, the resentment and feeling of neglect of the farmers and rural population could play a role in lowering the agreement to this statement. Reducing the urban-rural divide and improving education in rural areas could counteract this effect.

In addition, I want to briefly look at the demographics. I expected the gender female, a higher level of education, and a higher social class to heighten the priority placement of climate strategies within the CAP, and be more positive about its performance and in support of its budgeting. Additionally, I expected that these groups were more likely to see agriculture as a cause of climate change. Looking at the main outcome variable, the importance attached to environmental protection by the CAP, my expectations were met. However, when looking at the actual performance and the appraisal of the environment in rural areas, social class behaved as expected, but higher education showed less support for the performance of the CAP. Thus, there is a divide between the support for the CAP and the perception of its efficiency when considering the education variable. Here, it becomes evident that a revision of the CAP is needed. Surprisingly, the effects of agreeing with the statement that agriculture is causing climate change were lower for females. Furthermore, I suspected the older generations to agree less with all statements and therefore *agegroup* to have positive estimators in all regressions. However, in the main analysis, I even dropped the variable as it was insignificant and had effect sizes not worth mentioning. When the performance of the CAP is considered, the estimator is negative and significant, heightening the support for the CAP performance statement, which is contrary to my assumptions. On the other hand, a higher *agegroup* lowers the support for the statement that agriculture is causing climate change and the appraisal of the environment in rural areas.

There is room for further research here, as the first assumption is always that there is a greater awareness of climate change among the younger generations who take part in demonstrations such as Fridays for the Future. Nevertheless, there was also a high number of protests and the emergence of Green parties in the 1980s, when citizens protested, among other things, against nuclear power. Including other protests, especially environmental ones, and focusing more on different age groups could be a whole research in itself.

Moreover, political orientation plays a crucial role as an explanatory variable. I suspected left-wing voters to have a higher perception of climate change and to support the CAP more than supporters of the center or right-wing. This holds true and is significant for all regression specifications considering the main outcome variable. Thus, when people consider themselves as left-wing, the $leftright$ variable is negative, showing more agreement with the environmental policies being a part of the CAP. The effect for the right-wing in the other direction is even higher. However, when analyzing the actual performance, right and left show similar results, although less pronounced than when considering the priority importance. The results indicate a slightly positive effect on the outcome variable, lowering the support for the CAP performance statement. Thus, if even left-wing voters, who typically have a high climate consciousness, doubt the performance of the CAP, it becomes evident that policy changes are needed. Furthermore, right-wing voters tend to lower the agreement to the statement that agriculture is causing climate change. Here, it would be interesting to look at the relationship between rural areas and political orientation as this knowledge could be used to gain support for the CAP, e.g. to make Green party policy programs more in line with the needs of the rural population.

It is important to listen to and minimize farmers‘ protests by incorporating farmers’ knowledge and wishes into CAP environmental policy and by supporting their independence. It would also be beneficial to reduce the urban-rural divide, increase the efficiency of the policy, and utilize campaigns to increase support for the CAP. In addition, a higher level of education could help to capture the link between climate and agriculture, raise awareness of the impacts, and thus increase support for environmental policies.

10.2 Limitations

In this Section, I will explore various limitations of my analysis and suggest potential directions for future research. It is important to recognize these limitations as they may affect the credibility and applicability of the findings. In particular, I will examine concerns related to the data used and the specifications of the model. By identifying these limitations, I aim to provide a more precise interpretation of the results and insights to improve future research.

First, I used just three waves of the Eurobarometer data, which could be expanded in further research. In addition, I was using mostly just two waves, one before and one after the treatment, as the farmers’ protest data and some of the outcome variables were only available starting in 2020. It would be interesting to look at the effects of the 2021 flood in subsequent years to see whether the effects are just temporary and if time proximity plays a role in the significant effect of the flooding. With the data available it was only possible to look at the result around seven months after the flooding. Additionally, it would be useful to go back even more in time to include further controls for parallel pre-trends of the treatment and control group. In my analysis, it was possible to control for similarities in the treatment and control group before the treatment in the year 2020 and for some variables additionally for 2017. However, it would have been interesting to have more clarity on whether the groups had moved similarly over time before the treatment, as this would have relaxed the assumption of similar control and treatment groups.

Furthermore, the waves from the Eurobarometer after being merged together build a cross-sectional data structure. Thus, there are different respondents of the survey for each wave, which might falsely represent the changes in the outcome variable as people might have answered differently over time than the earlier respondents. However, my sample size is big enough to comply with the Law of Large Numbers and therefore the results per wave should represent the whole population. Another advantage of the cross-section is that there are no problems with attrition.

Furthermore, as mentioned before, spillover effects of the three different areas that were hit or not affected by flooding to a different extent could be problematic. This could lead to changes in estimators and significance of the results as one region could be affected by the flooding even though not through the extreme weather event itself, but through e.g. economic connections to the flooded regions.

In addition, it is important to consider reverse causality when running regressions. For example, the ineffectiveness of environmental policies could fail to mitigate the effects of climate change and lead to an increased likelihood of flooding. Furthermore, the lack of importance of the CAP is likely to lead to even more protests by farmers and thus to an increase in the variable $protest\_diff$. However, I do not consider this to be too problematic as the relationship between climate policy and extreme weather events resulting from a policy is firstly very weak and secondly cannot be established in the short term. For the farmers' protests, the results for the outcome variable and the other independent variables, as well as the model fit, do not show much change when the protest variables are excluded.

In addition, there are some further variables that could have been included. Unfortunately, the results of the Ramsey RESET test show an Omitted Variable Bias (OMV). The model specifications could be improved by adding more significant explanatory variables. For example, it would be helpful to include region-specific socio-economic variables. GDP could help to control for the economic size of the region and whether, as seen in 2.2, this has an impact on the willingness to invest in climate change mitigation strategies and to justify the CAP budget. In addition, variables could be added that reflect general attitudes towards climate change, such as self-assessed climate concern, or including the extent of climate protests, like the Fridays for Future protests. I would further consider media coverage of climate-related issues to be informative. Moreover, it would be interesting to include real differences in electoral votes before and after the floods to further control for political orientation. This would most likely improve the model fit and thus the adjusted R-squared and help to address endogeneity concerns.

11 Conclusion

In my thesis, I examined the effect of extreme weather events, in particular, the flooding in the Ahr-Valley and surrounding areas in July 2021, on climate consciousness and the attitude towards green elements within agricultural policies, specifically the CAP. In the DiD analysis, which I conducted next to a literature review, I used flooding as a treatment for several outcome variables representing the average perception of the environmental part of the CAP, in particular its priority importance, budgetary reasons, and performance. Furthermore, regressions were run on variables representing perceptions of the environment in rural areas and the perception that climate change is partly caused by agriculture. To counteract heteroskedasticity, I added robust and country Clustered Standard Errors. As the Descriptive Statistics showed large differences between countries, I included country FE. As an additional robustness check, I ran a Placebo analysis, the results of which showed no effects for the interaction term of the fake flood variable and the time dummy indicating the period after the extreme flooding. The data is taken from three Eurobarometer waves (2017, 2020, and 2022), the ACLED project to account for farmers' protests, and Copernicus Climate Centre data to classify flooded areas.

I expected the floods to have a positive effect on support for environmental policies and climate awareness in general. However, the effect on the CAP support goes in the opposite direction. In fact, the floods in July 2021 even lowered support for the CAP, which could be related to a shift in budgetary priorities caused by the economic damage. It would be interesting for further research to examine the relationship between climate awareness, economic impact, economic climate policy subsidies, and the translation into the willingness to adapt to climate change. In addition, the decline in agreement with the priority statement could be related to the decline in belief in the effectiveness of the CAP's performance, which could more logically be attributed to the flooding and frustration within the population. On the contrary, the literature review found that extreme weather events, especially extreme heat, can have a positive effect on climate awareness and Green voter turnout, especially in temperate climates, which can be translated into support for Green policies. However, the effect of increased climate awareness tends to diminish quickly and is most pronounced in the immediate aftermath of an extreme weather event. As I only had one Eurobarometer survey to work with after the flood event, I could not extend my research to look at the effects over a longer time frame, which could be an interesting area for further research.

With regard to the CAP, the literature identified several problems. Even though the greening strategy was implemented in 2013, there is still room for improvement in terms of efficiency. This is also shown by the overall negative attitude towards the CAP's environmental performance stemming from the DiD analysis. It even shows positive values, reducing the agreement with the outcome variable, for the left-wing and higher education characteristics, whose effect on the importance of environmental factors within the CAP has the opposite effect. A revision of the CAP should therefore be considered. The main considerations from the literature are that the redistribution of subsidies should not depend on farm size, as this could limit biodiversity loss. In addition, the budget for climate and environmental policy within the CAP should be increased.

Furthermore, the rural-urban divide yields interesting results. Rural disadvantage in terms of employment opportunities, education, and digital access leads to resentment and higher support for anti-EU parties, most of which do not focus on climate policies. With regard to the statement that agriculture causes climate change, the *rural* dummy raises the outcome variable to a lower level of agreement in my analysis. Here, a better environmental education would help to counteract this feeling.

I further looked into the farmer protests and the underlying sentiment of being misunderstood in society. Moreover, the literature depicted the reasoning behind the protests, which was economic at the beginning and is shifting more and more to demonstrate against environmental policies. However, while farmers are protesting climate policies they are not necessarily opposed to implementing farming strategies to mitigate climate change. It was interesting to see that the mean number of protests decreased from 2020 to 2022 with the only exception being protests in Belgium. In my analysis, the absolute number of protests gives insignificant outcomes, the monthly difference in means before and after the flooding, however, has significantly positive estimators. Thus, the support considering the CAP environmental priority decreases.

Moreover, the literature review showed ambiguous effects concerning the effect of extreme weather events on climate consciousness and green voting, and therefore the support for climate policies, related to spatial proximity. Some found that being further away or in less affected areas decreases the effect on climate awareness, whereas some research at least on the effect on Green voting found no results for spatial proximity whatsoever. When I included a $flood2$ interaction term, for the lower affected areas, the DiD-estimator for the highly flooded areas increased, but there were no considerable effects for the $flood2$ results for the main outcome variable. The higher effect size for $flood1$ could be as it might absorb the effects of $flood2$.

Furthermore, I found interesting results when looking at the effects of the different countries in the analysis. While Germany and Belgium had regions classified with $flood1$, just the dummy variable for Germany showed significant results on the CAP priority importance, which best replicates climate awareness. In addition, although only classified as $flood2$ and thus just slightly affected by the floods, Luxembourg showed significant results and also had a higher effect size than Germany. Both country estimators show positive values indicating a negative effect on the priority that is put on the CAP environmental strategies. Differences could be due to economic reasons, overall preparedness for extreme weather, environmental education, spatial proximity, and spillover effects. Nevertheless, a deeper dive, e.g. through country-specific regressions and their comparison would help to understand the country-specific estimators better.

This could also be insightful when designing and implementing climate policies. Furthermore, it would be interesting to include a larger set of countries, different extreme weather events, and a wider range of climate zones. Most importantly, climate policies should be diverse and adapted to the needs of specific regions and their characteristics.

When looking at demographics, the results are as previously assumed. The variables $female$, higher *edu*, and *social class* increase the support for environmental policies. When looking at political orientation, the results are as expected with left-wing voters having a higher support for the CAP importance of including environmental policies whereas right-wing voters show the strongest opposing effect on this outcome variable. The estimators of the $leftright$ variable are the most significant in the analysis and, together with the DiD-estimator, have the largest effect sizes.

To counteract the statistical limitations and to improve the model fit in further studies, it would be helpful to include more waves of surveys to strengthen the common trend assumption. Furthermore, to counteract OVB it would be helpful to include even more explanatory variables. I would consider some economic indicators, the general attitude towards climate change, media coverage of climate events, electoral results, and the number of climate protests, e.g. Fridays for Future protests, as useful.

Ultimately, both the flooding and the farmers' protests have a negative impact on the priority given to environmental policies within the CAP. However, this is most likely due to economic reasons and frustration and cannot be transferred to climate consciousness, as the literature clearly shows an increase in climate concern due to extreme weather events. To gain more support for the CAP, a revision of its environmental policy and its financial budget, compromises with farmers, and environmental education could be effective.

References

2024 European election results. (2024). https://results.election.europa.eu/. Retrieved June 26, 2024, from https://results.elections.europa.eu/en/
Last Modified: 2024-06-25T07:19:13.933021318Z.

About Eurobarometer. (n.d.). European Union. Retrieved August 8, 2024, from https://europa.eu/eurobarometer/about/eurobarometer

ACLED (Armed Conflict Location and Event Data). (2024, July 16). ACLED. Retrieved August 5, 2024, from https://acleddata.com/

Anton, C. E., & Lawrence, C. (2016). The relationship between place attachment, the theory of planned behaviour and residents' response to place change. *Journal of Environmental Psychology*, *47*, 145–154. https://doi.org/10.1016/j.jenvp.2016.05.010

Arbuckle, J. G., Morton, L. W., & Hobbs, J. (2015). Understanding Farmer Perspectives on Climate Change Adaptation and Mitigation. *Environment and Behavior*, *47*(2), 205–234. https://doi.org/10.1177/0013916513503832

Armed Conflict Location & Event Data Project (ACLED). (n.d.). Retrieved March 21, 2024, from www.acleddata.com

Baccini, L., & Leemann, L. (2021). Do natural disasters help the environment? How voters respond and what that means. *Political Science Research and Methods*, *9*(3), 468–484. https://doi.org/10.1017/psrm.2020.25

Bauern-Demos: Darum gehen die Landwirte auf die Straße [newspaper]. (2019). *Der Spiegel: Wirtschaft*. Retrieved August 5, 2024, from https://www.spiegel.de/wirtschaft/soziales/deutschland-warum-tausende-bauern-auf-die-strasse-gehen-a-1292690.html

Belgium GDP per Capita: Walloon Region | Economic Indicators | CEIC. (n.d.). Retrieved August 21, 2024, from https://www.ceicdata.com/en/belgium/esa-2010-gdp-by-region-and-per-capita/gdp-per-capita-walloon-region

Bergquist, M., Nilsson, A., & Schultz, P. W. (2019). Experiencing a Severe Weather Event Increases Concern About Climate Change. *Frontiers in Psychology*, *10*. https://doi.org/10.3389/fpsyg.2019.00220

Bericht zur Hochwasserkatastrophe 2021: Katastrophenhilfe, Wiederaufbau und Evaluierungsprozesse. (2022). Retrieved April 8, 2024, from https://www.bmi.bund.de/SharedDocs/downloads/DE/veroeffentlichungen/2022/abschlussbericht-hochwasserkatastrophe.pdf?__blob=publicationFile&v=1

Bernard, J. (2019). Where Have All the Rural Poor Gone? Explaining the Rural–Urban Poverty Gap in European Countries. *Sociologia Ruralis*, *59*(3), 369–392. https://doi.org/10.1111/soru.12235

Bilewicz, A., Mamonova, N., & Burdyka, K. (2022). "Paradoxical" Dissatisfaction among Post-Socialist Farmers with the EU's Common Agricultural Policy: A Study of Farmers' Subjectivities in Rural Poland. *East European Politics and Societies: and Cultures*, *36*(3), 892–912. https://doi.org/10.1177/08883254211036717

Borras Jr., S. M. (2018). Understanding and Subverting Contemporary Right-wing Populism: Preliminary notes from a critical agrarian perspective.

Bosma, A., & Peeren, E. (2021, August 26). #Proudofthefarmer. In *Politics and Policies of Rural Authenticity*. Taylor & Francis. https://doi.org/10.4324/9781003091714-10 Accepted: 2021-08-26T10:07:01Z.

Bruttoinlandsprodukt, Bruttowertschöpfung | Statistikportal.de. (2024, March 28). Statistische Ämter des Bundes und der Länder | Gemeinsames Statistikportal. Retrieved August 21, 2024, from https://www.statistikportal.de/de/veroeffentlichungen/bruttoinlandsprodukt-bruttowertschoepfung

Bulut, H., & Samuel, R. (2024). The influence of the 2021 European flooding on pro-environmental attitudes and partial behaviour transition. *npj Climate Action*, *3*(1), 1–7. https://doi.org/10.1038/s44168-024-00103-7

CAP at a glance. (2024, June 25). European Commission. Retrieved July 4, 2024, from https://agriculture.ec.europa.eu/common-agricultural-policy/cap-overview/cap-glance_en

CAP expenditure. (2024, June 25). European Commission. Retrieved July 4, 2024, from https://agriculture.ec.europa.eu/data-and-analysis/financing/cap-expenditure_en

CAP Strategic Plans. (2023, November 23). European Commission. Retrieved July 2, 2024, from https://agriculture.ec.europa.eu/cap-my-country/cap-strategic-plans_en

Classificazione delle generazioni. (2016). *Instituto Nazionale di Statistica*.

CO2 and Greenhouse Gas Emissions Data Explorer. (n.d.). Our World in Data. Retrieved September 1, 2024, from https://ourworldindata.org/explorers/co2

Common Agricultural Policy - an overview. (n.d.). ScienceDirect Topics. Retrieved July 4, 2024, from https://www.sciencedirect.com/topics/earth-and-planetary-sciences/common-agricultural-policy

The Common Agricultural Policy: An overview. (n.d.). Retrieved May 30, 2024, from https://eu-cap-network.ec.europa.eu/common-agricultural-policy-overview_en

Compulsory education in Europe 2022/2023. (n.d.).

Cuadros-Casanova, I., Cristiano, A., Biancolini, D., Cimatti, M., Sessa, A. A., Mendez Angarita, V. Y., Dragonetti, C., Pacifici, M., Rondinini, C., & Di Marco, M. (2023). Opportunities and challenges for Common Agricultural Policy reform to support the European Green Deal. *Conservation Biology*, *37*(3), e14052. https://doi.org/10.1111/cobi.14052

De Dominicis, L., Dijkstra, L., & Pontarollo, N. (2022). Why are cities less opposed to European integration than rural areas? Factors affecting the Eurosceptic vote by degree of urbanization. *Cities*, *130*, 103937. https://doi.org/10.1016/j.cities.2022.103937

Dhanya, P., & Ramachandran, A. (2016). Farmers' perceptions of climate change and the proposed agriculture adaptation strategies in a semi arid region of south India. *Journal of Integrative Environmental Sciences*, *13*(1), 1–18. https://doi.org/10.1080/1943815X.2015.1062031

Dormann, C. F., Elith, J., Bacher, S., Buchmann, C., Carl, G., Carré, G., Marquéz, J. R. G., Gruber, B., Lafourcade, B., Leitão, P. J., Münkemüller, T., McClean, C., Osborne, P. E., Reineking, B., Schröder, B., Skidmore, A. K., Zurell, D., & Lautenbach, S. (2013). Collinearity: A review of methods to deal with it and a simulation study evaluating their performance. *Ecography*, *36*(1), 27–46. https://doi.org/10.1111/j.1600-0587.2012.07348.x

Driscoll, D. A., Catford, J. A., Barney, J. N., Hulme, P. E., Inderjit, Martin, T. G., Pauchard, A., Pyšek, P., Richardson, D. M., Riley, S., & Visser, V. (2014). New pasture plants intensify invasive species risk. *Proceedings of the National Academy of Sciences*, *111*(46), 16622–16627. https://doi.org/10.1073/pnas.1409347111

Economic accounts for agriculture by NUTS 2 regions. (n.d.). Retrieved August 20, 2024, from https://ec.europa.eu/eurostat/databrowser/view/agr_r_accts/default/table?lang=en&category=reg.reg_agr.reg_agr_

Economic performance, competitiveness, and well-being in Wallonia: A comparative analysis with other European transition regions. (n.d.). Retrieved August 21, 2024, from https://www.nbb.be/en/articles/economic-performance-competitiveness-and-well-being-wallonia-comparative-analysis-other-0

Ergebnisse - Die Bundeswahlleiterin. (n.d.). Retrieved August 21, 2024, from https://www.bundeswahlleiterin.de/europawahlen/2024/ergebnisse.html

Eurobarometer 88.4 (2017) (ZA6939; Version 3.0.0). (2022). ZA6939. Brussels, European Commission, GESIS Data Archive, Cologne. https://doi.org/10.4232/1.14003

Eurobarometer 93.2 (2020) (ZA7739; Version 1.0.0). (2021). Brussels, European Commission, GESIS Data Archive, Cologne. https://doi.org/10.4232/1.13706

Eurobarometer 97.1 (2022) (ZA7886; Version 2.0.0). (2023). ZA7886. Brussels, European Commission, GESIS Data Archive, Cologne. https://doi.org/10.4232/1.14101

European Commission. Directorate General for Agriculture and Rural Development., ECORYS., METIS., & Agrosynergy. (2023). *Mapping and analysis of CAP strategic plans: Assessment of joint efforts for 2023 2027*. Publications Office. LU. Retrieved July 9, 2024, from https://data.europa.eu/doi/10.2762/71556

Farms and farmland in the European Union - statistics. (n.d.-a). Retrieved September 1, 2024, from https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Farms_and_farmland_in_the_European_Union_-_statistics

Farms and farmland in the European Union - statistics. (n.d.-b). Retrieved August 5, 2024, from https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Farms_and_farmland_in_the_European_Union_-_statistics

Ford, R., & Jennings, W. (2020). The Changing Cleavage Politics of Western Europe. *Annual Review of Political Science*, *23*(1), 295–314. https://doi.org/10.1146/annurev-polisci-052217-104957

Free Spatial Data - Country level. (2017). Retrieved April 7, 2024, from https://www.diva-gis.org/documentation

DIVA-GIS.

Galdies, C., Said, A., Camilleri, L., & Caruana, M. (2016). Climate change trends in Malta and related beliefs, concerns and attitudes toward adaptation among Gozitan farmers. *European Journal of Agronomy*, *74*, 18–28. https://doi.org/10.1016/j.eja.2015.11.011

García del Horno, R., Rico, G., & Hernández, E. (n.d.). Do they feel like they don't matter? The rural-urban divide in external political efficacy. *West European Politics*, *0*(0), 1–26. https://doi.org/10.1080/01402382.2023.2261085

Garside, S., & Zhai, H. (2022). If not now, when? Climate disaster and the Green vote following the 2021 Germany floods. *Research & Politics*, *9*(4), 20531680221141523. https://doi.org/10.1177/20531680221141523

GDP per capita, consumption per capita and price level indices. (n.d.). Retrieved June 27, 2024, from https://ec.europa.eu/eurostat/statistics-explained/index.php?title=GDP_per_capita,_consumption_per_capita_and_price_level_indices

Geppert, C., Hass, A., Földesi, R., Donkó, B., Akter, A., Tscharntke, T., & Batáry, P. (2020). Agri-environment schemes enhance pollinator richness and abundance but bumblebee reproduction depends on field size. *Journal of Applied Ecology*, *57*(9), 1818–1828. https://doi.org/10.1111/1365-2664.13682

Goffart, J.-P., Haverkort, A., Storey, M., Haase, N., Martin, M., Lebrun, P., Ryckmans, D., Florins, D., & Demeulemeester, K. (2022). Potato Production in Northwestern Europe (Germany, France, the Netherlands, United Kingdom, Belgium): Characteristics, Issues, Challenges and Opportunities. *Potato Research*, *65*(3), 503–547. https://doi.org/10.1007/s11540-021-09535-8

Gohin, A., & Zheng, Y. (2020). Reforming the European Common Agricultural Policy: From price & income support to risk management. *Journal of Policy Modeling*, *42*(3), 712–727. https://doi.org/10.1016/j.jpolmod.2020.02.008

A Greener and Fairer CAP. (2021). *European Commission*. Retrieved July 2, 2024, from https://agriculture.ec.europa.eu/system/files/2022-02/factsheet-newcap-environment-fairness_en_0.pdf

Grimaldi, S., Salamon, Barnard, C., Wetterhall, F., Ferrario, I., Mazzetti, C., Alfieri, L., Salamon, P., & Prudhomme, C. (2022). *River discharge and related historical data from the Global Flood Awareness System*. https://doi.org/10.24381/cds.a4fdd6b9

European Commission, Joint Research Centre (JRC).

Guyomard, H., Détang-Dessendre, C., Dupraz, P., Delaby, L., Huyghe, C., Peyraud, J.-L., Reboud, X., & Sirami, C. (2023). How the Green Architecture of the 2023–2027 Common Agricultural Policy could have been greener. *Ambio*, *52*(8), 1327–1338. https://doi.org/10.1007/s13280-023-01861-0

Habtemariam, L. T., Gandorfer, M., Kassa, G. A., & Heissenhuber, A. (2016). Factors Influencing Smallholder Farmers' Climate Change Perceptions: A Study from Farmers in Ethiopia. *Environmental Management*, *58*(2), 343–358. https://doi.org/10.1007/s00267-016-0708-0

Hagenlocher, M., Okamoto, S., Nagabhatla, N., Dietrich, S., Hassel, J., Van Der Heijden, S., Kreft, S., De Lombarde, P., Nick, F., Oakes, R., Rackelmann, F., Rimmert, M., Sandholz, S., Sebesvari, Z., Shen, X., Skripka, T., Stojanovic, T., Szarzynski, J., Van De Walle, B., & Werners, S. (2023, May 24). *Building Climate Resilience: Lessons from the 2021 Floods in Western Europe*. United Nations University - Institute for Environment and Human Security (UNU-EHS). https://doi.org/10.53324/INCS5390

He, K., Yang, Q., Shen, X., & Anagnostou, E. N. (2021, November 12). *Brief communication: Western Europe flood in 2021: Mapping agriculture flood exposure from SAR*. https://doi.org/10.5194/nhess-2021-307

Hersbach, H., Berrisford, B., Biavati, P., Horányi, G., Muñoz Sabater, A., Nicolas, J., Peubey, J., Radu, C., Rozum, R., Schepers, I., Simmons, D., Soci, A., Dee, C., & Thépaut, D. (2023). *ERA5 hourly data on single levels from 1940 to present*. https://doi.org/10.24381/cds.adbb2d47

Copernicus Climate Change Service (C3S) Climate Data Store (CDS).

Hilbig, H., & Riaz, S. (n.d.). Natural Disasters and Electoral Support for Green Parties – Evidence from the 2021 Flood in Germany.

Hilbig, H., & Riaz, S. (2024). Natural Disasters and Green Party Support. *The Journal of Politics*, *86*(1), 241–256. https://doi.org/10.1086/726917

Hoffmann, R., Muttarak, R., Peisker, J., & Stanig, P. (2021, August 10). *Climate change experiences raise environmental concerns and promote green voting*. https://doi.org/10.21203/rs.3.rs-738080/v1

Jakubowska-Loren, E., Chemnitz, C., & Rehmer, C. (2019). *ATLAS ROLNY - Dokąd zmierza europejska wspólna polityka rolna*. Heinrich Böll Stiftung. Warszawa. Retrieved August 5, 2024, from https://pl.boell.org/sites/default/files/atlas_rolny_strony_maly.pdf

Jeffry, L., Ong, M. Y., Nomanbhay, S., Mofijur, M., Mubashir, M., & Show, P. L. (2021). Greenhouse gases utilization: A review. *Fuel*, *301*, 121017. https://doi.org/10.1016/j.fuel.2021.121017

Jennings, W., & Stoker, G. (2016). The Bifurcation of Politics: Two Englands. *The Political Quarterly*, *87*(3), 372–382. https://doi.org/10.1111/1467-923X.12228

Junghänel, T., Bissolli, P., Daßler, J., Fleckenstein, R., Imbery, F., Janssen, W., Kaspar, F., Lengfeld, K., Leppelt, T., Rauthe, M., Rauthe-Schöch, A., Rocek, M., Walawender, E., & Weigl, E. (2021, July 21). *Wetter und Klima - Deutscher Wetterdienst - Leistungen - Hydro-klimatologische Einordnung der Stark- und Dauerniederschläge in Teilen*

Deutschlands im Zusammenhang mit dem Tiefdruckgebiet „Bernd“ vom 12. bis 19. Juli 2021. Retrieved April 26, 2024, from https://www.dwd.de/DE/leistungen/besondereereignisse/niederschlag/20210721_bericht_starkniederschlaege_tief_bernd.html

Kenny, M., & Luca, D. (2021). The urban-rural polarisation of political disenchantment: An investigation of social and political attitudes in 30 European countries. *Cambridge Journal of Regions, Economy and Society*, *14*(3), 565–582. https://doi.org/10.1093/cjres/rsab012

Kok, M., Slager, K., Moel, H. de, Botzen, W., Bruijn, K. de, Wagenaar, D., Rikkert, S., Koks, E., & Ginkel, K. van. (2023). Rapid damage assessment caused by the flooding event 2021 in Limburg, Netherlands. *Journal of Coastal and Riverine Flood Risk*, *2*. https://doi.org/10.59490/jcrfr.2023.0010

Konisky, D. M., Hughes, L., & Kaylor, C. H. (2016). Extreme weather events and climate change concern. *Climatic Change*, *134*(4), 533–547. https://doi.org/10.1007/s10584-015-1555-3

Kronborg, A., Hedegaard, F., Klindt, I., & Vandeweerdt, C. (2024). Do green parties in government benefit from natural catastrophes? How wildfires are linked to voting. *Electoral Studies*, *88*, 102749. https://doi.org/10.1016/j.electstud.2024.102749

Kuepper, B., & Stravens, M. (n.d.). Mapping the European Soy Supply Chain.

Li, Y., Ye, W., Wang, M., & Yan, X. (2009). Climate change and drought: A risk assessment of crop-yield impacts. *Climate Research*, *39*, 31–46. https://doi.org/10.3354/cr00797

Mahato, A. (2014). Climate Change and its Impact on Agriculture. *4*(4).

Main climates of Europe. (n.d.). European Environment Agency. Retrieved August 21, 2024, from https://www.eea.europa.eu/data-and-maps/figures/climate

Malhi, G. S., Kaur, M., & Kaushik, P. (2021). Impact of Climate Change on Agriculture and Its Mitigation Strategies: A Review. *Sustainability*, *13*(3), 1318. https://doi.org/10.3390/su13031318

Mamonova, N., & Franquesa, J. (2020). Populism, Neoliberalism and Agrarian Movements in Europe. Understanding Rural Support for Right-Wing Politics and Looking for Progressive Solutions. *Sociologia Ruralis*, *60*(4), 710–731. https://doi.org/10.1111/soru.12291

Marek, C., & Tosun, J. (2023). Tackling the Environmental and Climate Footprint of Food Systems: How "Transformative" Is the EU's Farm to Fork Strategy? In B. Edmondson (Ed.), *Sustainability Transformations, Social Transitions and Environmental Accountabilities* (pp. 265–297). Springer International Publishing. https://doi.org/10.1007/978-3-031-18268-6_10

Martineau, H., Wiltshire, J., Webb, J., Hart, K., Keenleyside, C., Baldock, D., Bell, H., & Watterson, J. (n.d.). Effective performance of tools for climate action policy - meta-review of Common Agricultural Policy (CAP) mainstreaming.

Matthews, A. (n.d.). Farmer Protests and Income Developments in the EU. *The Political Quarterly*, *n/a*(n/a). https://doi.org/10.1111/1467-923X.13396

Matthews, A. (2024). Farmer Protests and the 2024 European Parliament Elections. *Intereconomics*, *59*(2), 83–87. https://doi.org/10.2478/ie-2024-0018

Mendelsohn, R. (2008). The Impact of Climate Change on Agriculture in Developing Countries. *Journal of Natural Resources Policy Research*, *1*(1), 5–19. https://doi.org/10.1080/19390450802495882
10.1080/19390450802495882.

Mitsch, F., Lee, N., & Ralph Morrow, E. (2021). Faith no more? The divergence of political trust between urban and rural Europe. *Political Geography*, *89*, 102426. https://doi.org/10.1016/j.polgeo.2021.102426

Not just farmers' protests. (2024). *Nature Food*, *5*(2), 93–93. https://doi.org/10.1038/s43016-024-00939-6

Ogunbode, C. A., Doran, R., & Böhm, G. (2020). Individual and local flooding experiences are differentially associated with subjective attribution and climate change concern. *Climatic Change*, *162*(4), 2243–2255. https://doi.org/10.1007/s10584-020-02793-4

On policies and protests. (2024). *Nature Sustainability*, *7*(2), 97–97. https://doi.org/10.1038/s41893-024-01304-y

Opfer- und Schadensdaten zur Flut 2021 in Rheinland-Pfalz. (2022). *Deutsches Komitee Katastrophenvorsorge e.V.* Retrieved May 29, 2024, from https://dkkv.org/wp-content/uploads/2023/02/Anfrage_Opfer-_und_Schadensdaten_der_Flut_2021.pdf

Osberghaus, D., & Fugger, C. (2022). Natural disasters and climate change beliefs: The role of distance and prior beliefs. *Global Environmental Change*, *74*, 102515. https://doi.org/10.1016/j.gloenvcha.2022.102515

Paris Agreement. (2015). *UNFCCC*. Retrieved September 1, 2024, from https://unfccc.int/sites/default/files/english_paris_agreement.pdf

Pe'er, G., Bonn, A., Bruelheide, H., Dieker, P., Eisenhauer, N., Feindt, P. H., Hagedorn, G., Hansjürgens, B., Herzon, I., Lomba, Â., Marquard, E., Moreira, F., Nitsch, H., Oppermann, R., Perino, A., Röder, N., Schleyer, C., Schindler, S., Wolf, C., … Lakner, S. (2020). Action needed for the EU Common Agricultural Policy to address sustainability challenges. *People and Nature*, *2*(2), 305–316. https://doi.org/10.1002/pan3.10080

Ray, D. K., West, P. C., Clark, M., Gerber, J. S., Prishchepov, A. V., & Chatterjee, S. (2019). Climate change has likely already affected global food production. *PLoS ONE*, *14*(5), e0217148. https://doi.org/10.1371/journal.pone.0217148

Requena, F. (2016). Rural–Urban Living and Level of Economic Development as Factors in Subjective Well-Being. *Social Indicators Research*, *128*(2), 693–708. https://doi.org/10.1007/s11205-015-1051-1

Ritchie, H., Rosado, P., & Roser, M. (2024, March 12). *Natural Disasters*. Our World in Data. Retrieved June 29, 2024, from https://ourworldindata.org/natural-disasters

River discharge | Copernicus. (n.d.). Retrieved June 27, 2024, from https://climate.copernicus.eu/esotc/2021/river-discharge

Rodríguez-Pose, A. (2018). The revenge of the places that don't matter (and what to do about it). *Cambridge Journal of Regions, Economy and Society*, *11*(1), 189–209. https://doi.org/10.1093/cjres/rsx024

Schaub, S. (2021). Public contestation over agricultural pollution: A discourse network analysis on narrative strategies in the policy process. *Policy Sciences*, *54*(4), 783–821. https://doi.org/10.1007/s11077-021-09439-x

Schneider, S. L. (2022). The classification of education in surveys: A generalized framework for ex-post harmonization. *Quality & Quantity*, *56*(3), 1829–1866. https://doi.org/10.1007/s11135-021-01101-1

Shahzad, A., Ullah, S., Dar, A. A., Sardar, M. F., Mehmood, T., Tufail, M. A., Shakoor, A., & Haris, M. (2021). Nexus on climate change: Agriculture and possible solution to cope future climate change stresses. *Environmental Science and Pollution Research*, *28*(12), 14211–14232. https://doi.org/10.1007/s11356-021-12649-8

Soubry, B., Sherren, K., & Thornton, T. F. (2020). Are we taking farmers seriously? A review of the literature on farmer perceptions and climate change, 2007–2018. *Journal of Rural Studies*, *74*, 210–222. https://doi.org/10.1016/j.jrurstud.2019.09.005

Stevanovic, M., Popp, A., Lotze-Campen, H., Dietrich, J. P., Müller, C., Bonsch, M., Schmitz, C., Bodirsky, B. L., Humpenöder, F., & Weindl, I. (2016). The impact of high-end climate change on agricultural welfare. *Science Advances*, *2*(8). https://doi.org/10.1126/sciadv.1501452

Streimikis, J., & Baležentis, T. (2020). Agricultural sustainability assessment framework integrating sustainable development goals and interlinked priorities of environmental, climate and agriculture policies. *Sustainable Development*, *28*(6), 1702–1712. https://doi.org/10.1002/sd.2118

Tenbrink, T., & Willcock, S. (2023). Place attachment and perception of climate change as a threat in rural and urban areas. *PLOS ONE*, *18*(9), e0290354. https://doi.org/10.1371/journal.pone.0290354

Timeline - History of the CAP. (n.d.). Consilium. Retrieved July 14, 2024, from https://www.consilium.europa.eu/en/policies/cap-introduction/timeline-history-of-cap/

Tosun, J., Schaub, S., & Marek, C. (2024). Europeans' Attitudes Toward the Goals of Agricultural Policy: A Case of Rural–Urban Divide? *Political Studies Review*, *22*(1), 174–192. https://doi.org/10.1177/14789299221149505

Turck, A., Schloemer, L., & Terlau, W. (2023). Farmers are caught in Tri-Dilemma - Objectives and Challenges for Biodiversity in German Nature-Protected Areas. *International Journal on Food System Dynamics*, *14*(2), 237–250. https://doi.org/10.18461/ijfsd.v14i2.F8

Van Der Ploeg, J. D. (2020). Farmers' upheaval, climate crisis and populism. *The Journal of Peasant Studies*, *47*(3), 589–605. https://doi.org/10.1080/03066150.2020.1725490

Velten, S., Leventon, J., Jager, N., & Newig, J. (2015). What Is Sustainable Agriculture? A Systematic Review. *Sustainability*, *7*(6), 7833–7865. https://doi.org/10.3390/su7067833

Walker, A. J., & Ryan, R. L. (2008). Place attachment and landscape preservation in rural New England: A Maine case study. *Landscape and Urban Planning*, *86*(2), 141–152. https://doi.org/10.1016/j.landurbplan.2008.02.001

Woods, B. A., Nielsen, H. Ø., Pedersen, A. B., & Kristofersson, D. (2017). Farmers' perceptions of climate change and their likely responses in Danish agriculture. *Land Use Policy*, *65*, 109–120. https://doi.org/10.1016/j.landusepol.2017.04.007

Appendices

A Public awareness of the CAP

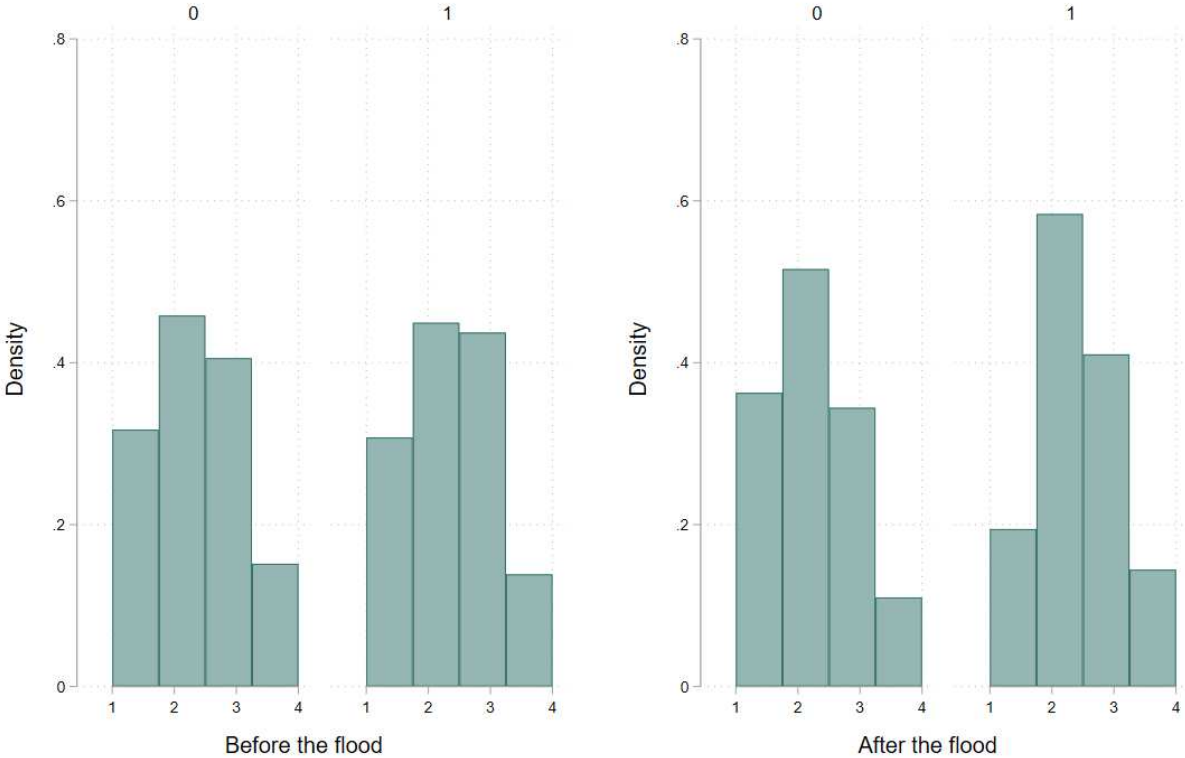
Table A.1: Mean and standard deviation of CAP awareness

	mean	sd
qa_2	2.14478	0.554346
rural		
0	2.159	0.560
1	2.114	0.541
Total	2.145	0.554
education		
Below lower secondary education	2.257	0.601
Lower secondary education	2.233	0.557
Upper secondary education	2.202	0.555
Short-cycle tertiary education	2.145	0.532
Bachelor-level education	2.090	0.515
Master-level education	1.998	0.518
Doctoral-level education	2.146	0.593
Total	2.145	0.555
social class		
Working class	2.315	0.576
Lower middle class	2.218	0.553
Middle class	2.137	0.538
Upper middle class	1.944	0.512
Higher class	1.830	0.553
Total	2.143	0.553
year		
2017	2.141	0.574
2020	2.132	0.514
2022	2.162	0.574
Total	2.145	0.554
female		
0	2.078	0.552
1	2.209	0.549
Total	2.145	0.554
leftright		
Left-wing	2.070	0.552
Center	2.144	0.539
Right-wing	2.117	0.564
Total	2.126	0.545

Source: Own calculation

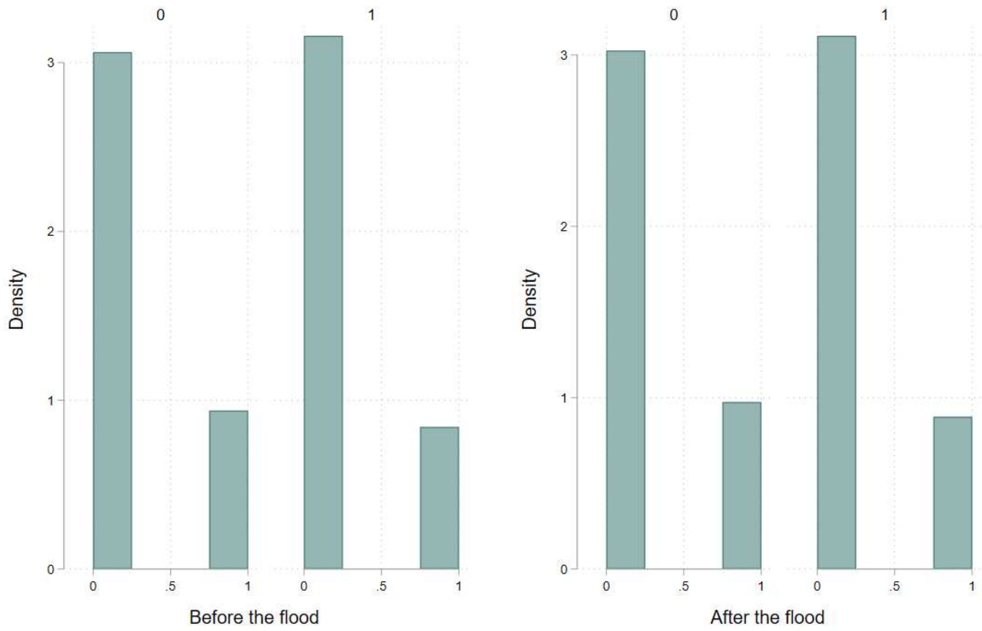
B Tests for pre-trends

Figure B.1: Distribution of opinion towards CAP climate performance



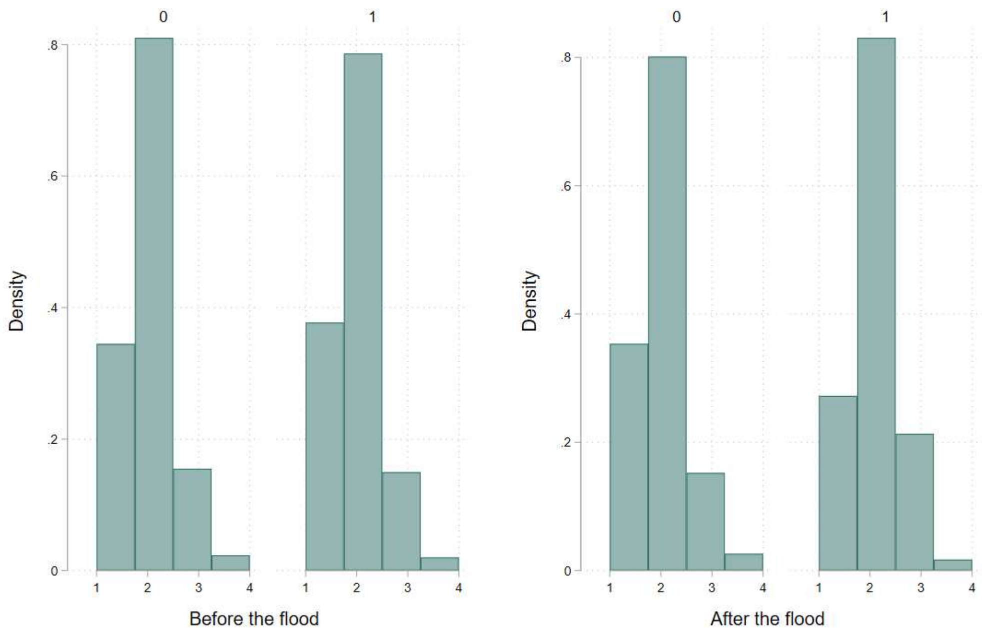
Distributions are seperated by time and treatment and control group
Source: Own representation using "Eurobarometer 88.4 (2017)" (2022), "Eurobarometer 93.2 (2020)" (2021) and "Eurobarometer 97.1 (2022)" (2023)

Figure B.2: Agreement on climate change as a justification for the funding of the CAP



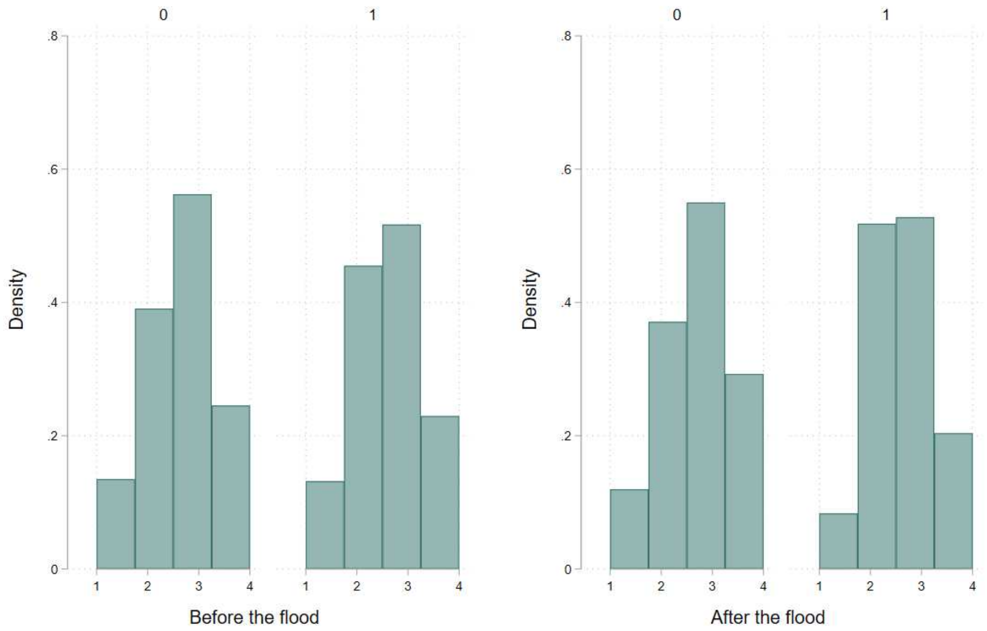
Distributions are seperated by time and treatment and control group
Source: Own representation using "Eurobarometer 88.4 (2017)" (2022),"Eurobarometer 93.2 (2020)" (2021) and "Eurobarometer 97.1 (2022)" (2023)

Figure B.3: Distribution of perceptions of environment and landscape quality in rural areas



Distributions are seperated by time and treatment and control group
Source: Own representation using "Eurobarometer 93.2 (2020)" (2021) and "Eurobarometer 97.1 (2022)" (2023)

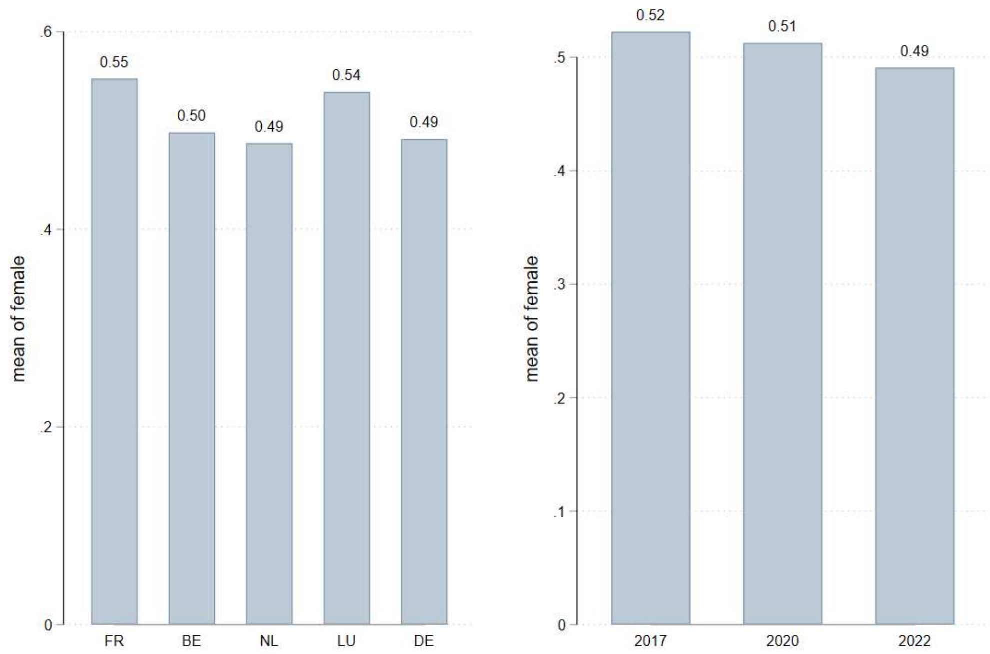
Figure B.4: Distribution of opinions on agriculture's role in climate change



Distributions are seperated by time and treatment and control group
Source: Own representation using "Eurobarometer 93.2 (2020)" (2021) and "Eurobarometer 97.1 (2022)" (2023)

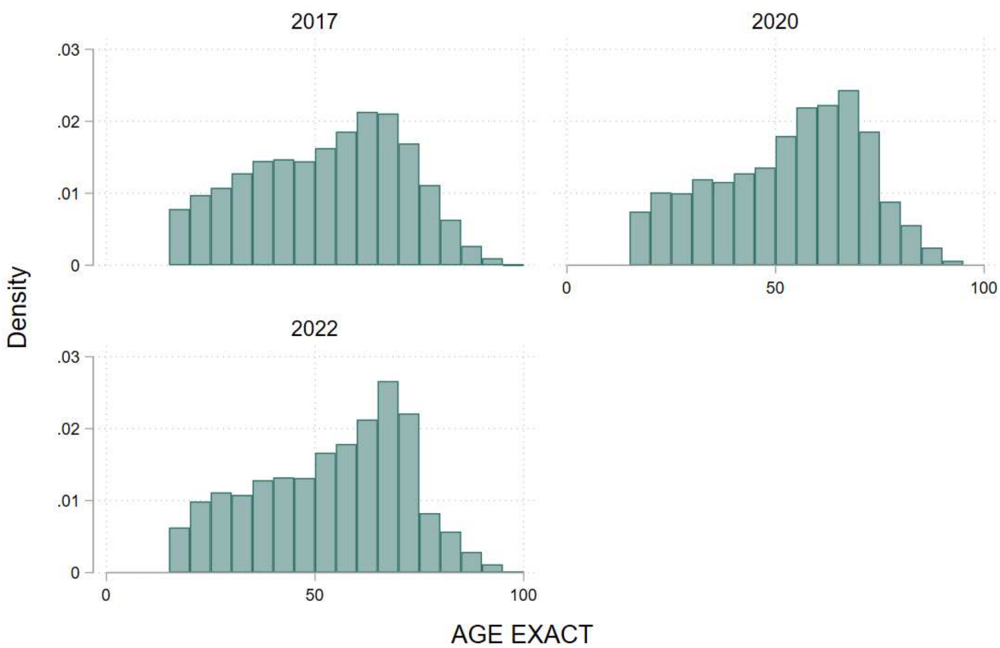
C Additional Descriptive Statistics

Figure C.1: Distribution of female, by country and year



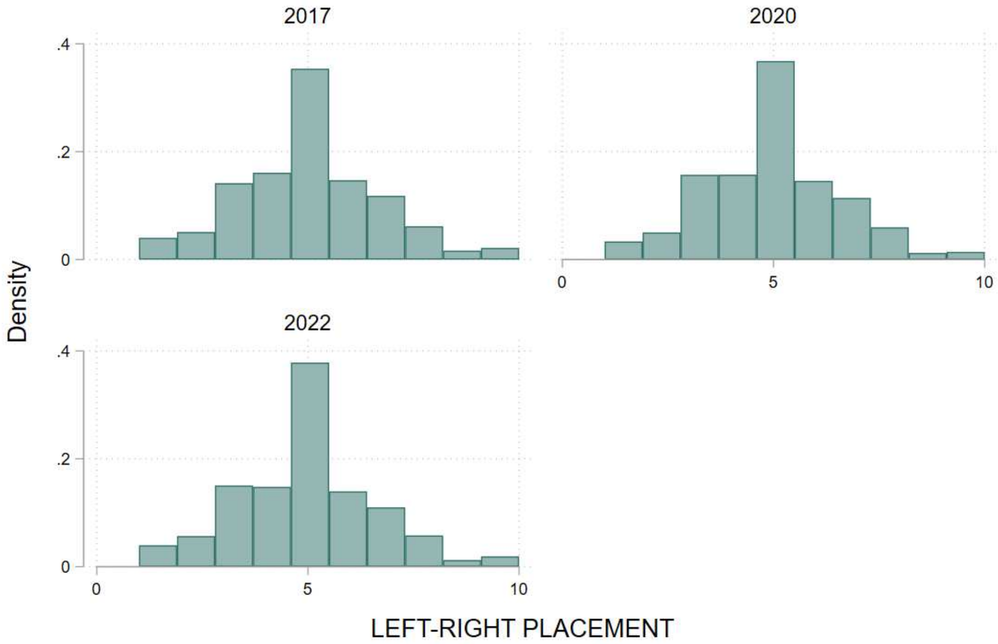
Source: Own representation using “Eurobarometer 93.2 (2020)” (2021) and “Eurobarometer 97.1 (2022)” (2023)

Figure C.2: Distribution of education, by year



Source: Own representation using “Eurobarometer 93.2 (2020)” (2021) and “Eurobarometer 97.1 (2022)” (2023)

Figure C.3: Distribution of political orientation, by year



Source: Own representation using “Eurobarometer 93.2 (2020)” (2021) and “Eurobarometer 97.1 (2022)” (2023)

D Additional regressions for furhter outcome variables

Table D.1: Regressions of additional outcome variables

	(1) qa4_6	(2) qa4_6	(3) qa6_1	(4) qa6_1	(5) qa8_5	(6) qa8_5	(7) qa19_2	(8) qa19_2	(9) qa19_3	(10) qa19_3
flood1=1	-0.084***	-0.042	-0.031*	-0.015	0.118**	0.143	-0.018	-0.038	0.129***	0.140*
	(-5.48)	(-1.52)	(-2.16)	(-1.03)	(2.90)	(1.54)	(-0.51)	(-0.71)	(3.79)	(3.32)
year_after=1	-0.038***	-0.037*	-0.030**	-0.029	-0.012	-0.006	0.070***	0.071	-0.046*	-0.043
	(-3.67)	(-3.32)	(-2.95)	(-2.01)	(-0.52)	(-0.13)	(3.30)	(1.61)	(-2.23)	(-0.93)
flood1=1 × year_after=1	-0.010	-0.012	0.011	0.011	0.067	0.065	0.005	0.004	-0.059	-0.060
	(-0.38)	(-0.16)	(0.46)	(0.30)	(1.24)	(0.98)	(0.11)	(0.06)	(-1.26)	(-1.29)
flood2=1	-0.011	0.046**	-0.044***	-0.009	0.121***	0.101	0.064*	0.054	0.011	0.009
	(-0.85)	(7.00)	(-3.60)	(-0.51)	(3.56)	(1.51)	(2.04)	(1.72)	(0.38)	(0.15)
flood2=1 × year_after=1	-0.028	-0.027	0.004	0.002	0.036	0.026	-0.034	-0.031	-0.052	-0.056
	(-1.21)	(-1.24)	(0.20)	(0.16)	(0.77)	(0.31)	(-0.77)	(-0.70)	(-1.24)	(-0.80)
female	0.053***	0.053*	0.001	-0.000	-0.042*	-0.045	-0.035*	-0.033	-0.048**	-0.049*
	(6.43)	(4.31)	(0.19)	(-0.05)	(-2.27)	(-2.25)	(-2.05)	(-1.48)	(-2.87)	(-2.93)
agegroup	0.013***	0.012	0.013***	0.013*	-0.032***	-0.016	-0.035***	-0.040*	0.030***	0.035
	(3.44)	(1.32)	(3.46)	(3.23)	(-3.62)	(-0.88)	(-4.36)	(-3.55)	(3.84)	(2.45)
edu	0.016***	0.019**	0.012***	0.011*	0.027***	0.036*	-0.042***	-0.042***	0.054***	0.059***
	(6.15)	(7.70)	(4.83)	(3.41)	(4.57)	(3.68)	(-7.46)	(-9.16)	(9.92)	(9.91)
social class	0.038***	0.035***	0.015***	0.016	-0.001	0.028	-0.041***	-0.048	0.071***	0.081*
	(8.06)	(9.56)	(3.39)	(2.74)	(-0.08)	(1.60)	(-4.03)	(-1.70)	(7.19)	(3.64)
Left-wing	0.110***	0.104**	0.084***	0.080*	0.076**	0.076	-0.248***	-0.248*	0.222***	0.220**
	(11.32)	(6.03)	(8.32)	(3.46)	(3.12)	(1.45)	(-12.01)	(-3.84)	(10.78)	(4.61)
Right-wing	-0.136***	-0.136*	-0.073***	-0.081*	0.225***	0.242	0.266***	0.270*	-0.096**	-0.084
	(-8.79)	(-3.80)	(-5.51)	(-4.38)	(5.96)	(2.74)	(6.90)	(3.15)	(-2.89)	(-1.55)
rural	-0.036***	-0.034	-0.013	-0.014	-0.048*	-0.016	0.056**	0.047*	-0.015	-0.005
	(-4.13)	(-1.99)	(-1.60)	(-0.76)	(-2.45)	(-0.53)	(3.08)	(3.14)	(-0.86)	(-0.21)
protest_diff					-0.017*	0.027	0.013	0.020**	-0.043***	-0.017
					(-2.18)	(1.70)	(1.86)	(5.30)	(-5.74)	(-1.72)
protest_after					0.092***	0.030	-0.004	0.043	0.033**	0.027
					(7.54)	(1.11)	(-0.39)	(1.45)	(3.03)	(1.67)
Constant	0.382***	0.367***	0.190***	0.185***	1.941***	1.824***	2.490***	2.494***	1.844***	1.789***
	(17.82)	(14.42)	(9.38)	(9.88)	(37.23)	(11.45)	(49.93)	(21.37)	(38.48)	(17.45)
Observations 2017	Yes	Yes	Yes	Yes	No	No	No	No	No	No
Country FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Robust	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Adjusted R-squared	0.040	0.047	0.016	0.019	0.026	0.050	0.047	0.049	0.057	0.062
N	13983	13983	13983	13983	9030	9030	9070	9070	8735	8735

t statistics in parentheses

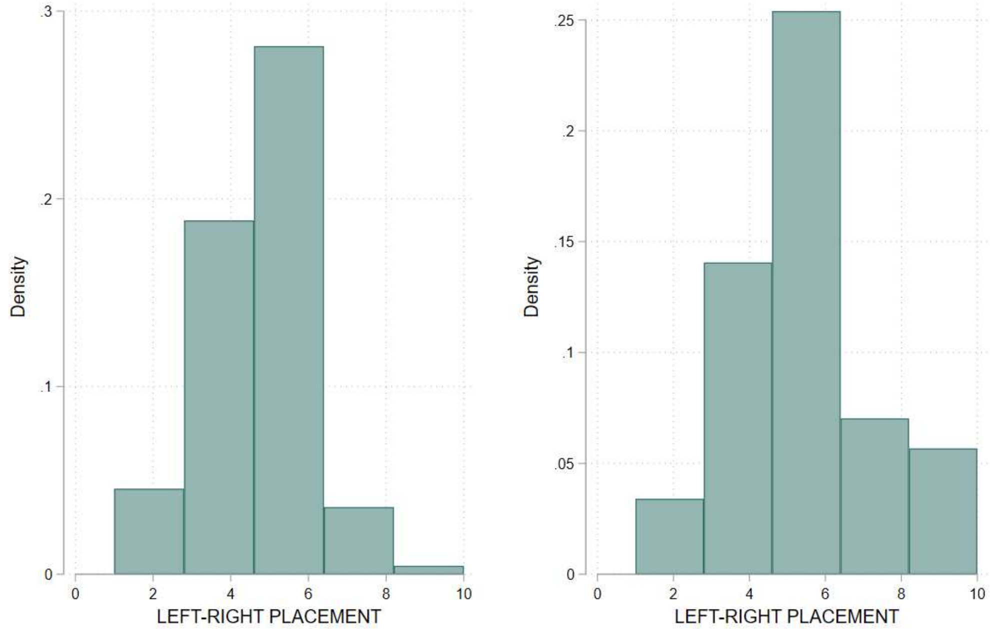
Country Fixed Effects are always combined with Clustered Standard Errors

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Own calculation

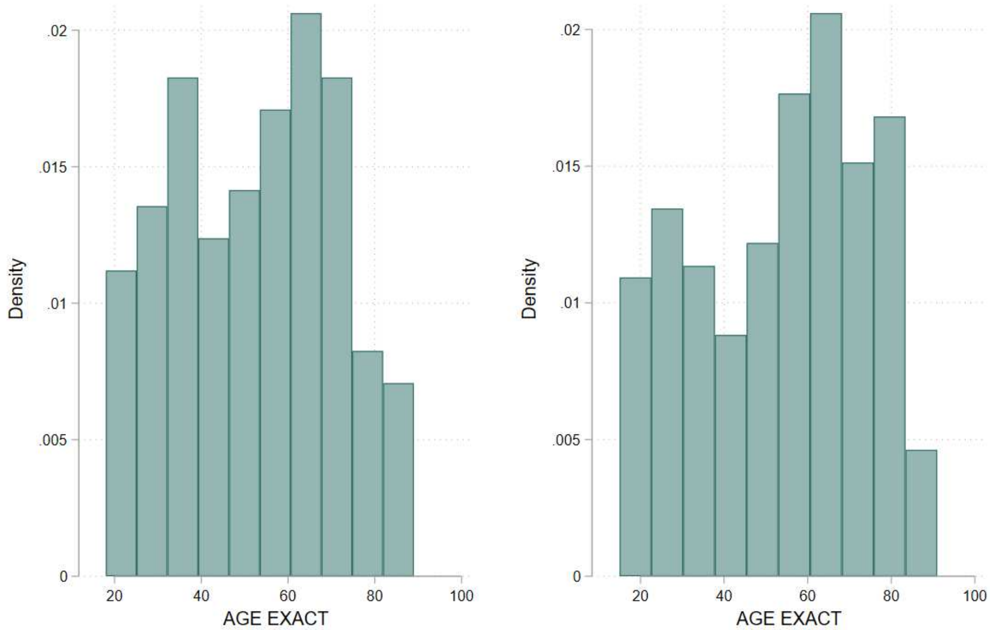
E Placebo test

Figure E.1: Distribution of political orientation, Nordrhein-Westfalen and Hauts-de-France



In the left panel the observations for Nordrhein-Westfalen are depicted and in the right for Hauts-de-France
Source: Own representation using “Eurobarometer 93.2 (2020)” (2021) and “Eurobarometer 97.1 (2022)” (2023)

Figure E.2: Distribution of the exact age, Rheinland-Pfalz and Hessen



In the left panel the observations for Rheinland-Pflaz are depicted and in the right for Hessen
Source: Own representation using “Eurobarometer 93.2 (2020)” (2021) and “Eurobarometer 97.1 (2022)” (2023)