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Green SÖP Extended: The Socio-Ecological Panel Surveys 2020 and 2022

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Green SÖP Extended: The Socio-Ecological Panel Surveys 2020 and 2022

Abstract

The proliferation of instruments targeted at combatting climate change necessitates evidence-based evaluation to identify strategies that are not only effective and cost-efficient, but also supported by the population. In Germany, the data needed to support such analysis is scarce, however. A rare exception is Green SÖP, a panel data set that was established within the project Eval-MAP funded by the German Ministry of Education and Research (BMBF). Green SÖP encompasses household data collected by the survey institute forsa over four years, spanning 2012 - 2015. The BMBF-funded project Eval-MAP 2 extends the Green SÖP panel data set by two additional surveys conducted in 2020 and 2022 and covering mitigation and adaptation behavior.

JEL-Codes: Q3, Q4

Keywords: Household panel; climate policy

May 2023

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1. Introduction

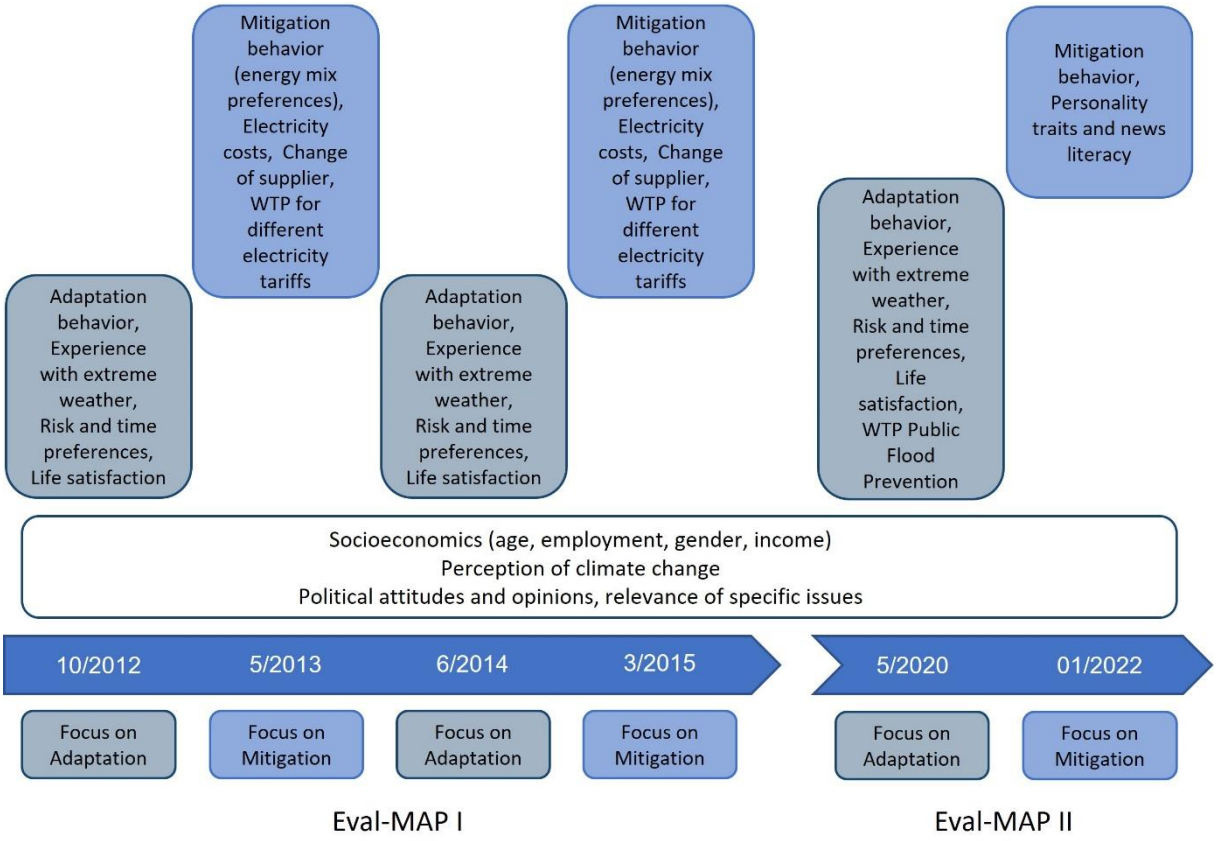
To meet the obligations of the Paris Agreement, Germany has implemented a broad mix of policy instruments that reduce carbon emissions (for a review, see Bardt et al. 2019 and BMUV 2016). Among the key mitigation instruments is carbon pricing, which was introduced in 2021 to reduce the consumption of fossil fuels such as petrol, diesel, natural gas and heating oil in the transport and building sector (Edenhofer et al. 2020). Other mitigation measures include promoting the deployment of renewable energy sources, fostering investments into energy efficiency, and subsidizing climate-friendly alternatives, such as electric vehicles. At the same time, spurred by the devastating floods in 2013 and 2021 (Frondel et al. 2017 Osberghaus 2017, Trenczek et al. 2022), Germany has stipulated measures to promote adaptation to the consequences of climate change, such as early warning systems and the construction of dikes. These public programs have been complemented by private actions, such as the installation of backflow flaps and protection covers for windows and doors.

As the number of mitigation and adaptation instruments proliferates, their evidence-based evaluation becomes indispensable to identify strategies that are effective, cost-efficient, and supported by the population. In Germany, the data needed to support such analysis is generally lacking, however. A rare exception is Green SÖP (Socio-Ecological Panel, Sozial-Ökologisches Panel), a panel data set that was established within the project Eval-MAP funded by the German Ministry of Education and Research (BMBF). In this project, household data were collected by the survey institute forsa in four years, spanning 2012 – 2015 (Kussel and Larysch 2017). The BMBF-funded project Eval-MAP 2 extends the Green SÖP panel data set by two additional surveys in 2020 and 2022 covering mitigation and adaptation behavior.

Eval-MAP 2 recruited as many respondents as possible from the four survey waves of 2012 to 2015 to establish a longer timeline of behavioral changes. The result of this endeavor is the extension of the existing panel data set described by Klick, Kussel and Sommer (2021). Just like the data of the first four survey waves, the data collected in the two new survey waves of 2020 and 2022 are available for download at FDZ Ruhr (https://fdz.rwi-essen.de/en/). Figure 1 provides an overview of the six survey waves and the contents of the respective questionnaires.

The subsequent section provides details about the data collection within Eval-MAP 2. Section 3 reports descriptive statistics on the socioeconomic characteristics of the survey participants. Section 4 presents some findings from the survey waves 2020 and 2022, while Section 5 briefly summarizes a few examples of analyses that have been conducted with the Green SÖP data. Finally, the last section provides details about data access.

Figure 1: Overview over all surveys conducted within the Eval-MAP project



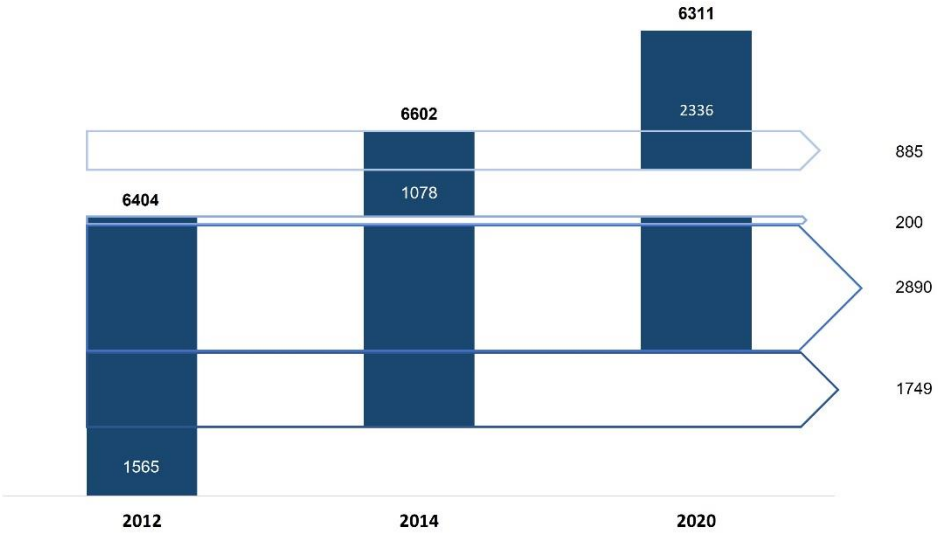
2. Data collection

Eval-MAP 2 implemented two surveys designed by researchers from RWI – Leibniz Institute for Economic Research and ZEW Leibniz Centre for European Economic Research and conducted in cooperation with the market research institute forsa in the years 2020 and 2022. These two surveys extend the panel data set established within the project Eval-MAP that originates from four surveys among members of the household panel of the survey institute forsa, conducted annually between 2012 to 2015. To link the findings of the surveys of 2020 and 2022 to the previous panel waves of 2012 to 2015, as many participants as possible were recruited from the former surveys. Only after exhausting the pool of former survey participants, new subjects were randomly drawn from forsa's omninet panel (for more information, see https://www.forsa.de/methoden/).

The forsa.omninet panel is a representative sample of the German population aged 14 and above. Covering all of Germany, the data comprises roughly 100,000 members who were recruited offline by phone. The panel members, whose location is recorded by their zip code and county of residence, are usually familiar with surveys. Owing to the topics of the surveys, such as investments into adaptation measures, we sent the questionnaire to the household head who is, by forsa's definition, the person who makes decisions on financial matters — alone or with the partner. By participating in the survey, household heads could gain bonus points, which can be traded for rewards.

The survey wave of 2020, conducted in May and June, focused on adaptation behavior, just like the survey waves of 2012 and 2014 (see Figure 1). As illustrated in Figure 2, deliberately, there is substantial overlap in the participants across the three surveys of 2012, 2014, and 2020. While a different set of participants was recruited for the survey waves of 2013 and 2015, which primarily dealt with the mitigation behavior of private households, participants of the surveys of 2013 and 2015 were recruited for the 2020 survey as well. Finally, the sample was completed by other members of the forsa.omninet panel who did not participate in the surveys of 2012 to 2015 to achieve the targeted sample size. In total, 8,847 persons were invited to take part in the 2020 survey, 6,311 of whom, that is roughly 70 percent, accepted this invitation. 6,059 respondents fully answered the questionnaire, while 252 persons quit at some point. This corresponds to a dropout-rate of roughly 4 percent. With 3,975 (= 2,890 + 200 + 885) individuals, almost two-thirds of the 6,059 individuals who completed the questionnaire were recruited from participants of the surveys of 2012 and 2014 (Figure 2). In addition, almost 30 percent had participated in the surveys of 2013 and 2015. Hence, only about four percent of the participants of the 2020 survey did not participate in one of the four former surveys. Notably, with 2,890 individuals, more than 45 percent of the participants from the year 2020 already participated in the surveys of 2012 and 2014 on adaptation behavior (Figure 2).

Figure 2: Number of Participants in the Surveys focusing on Adaptation



The data for the 2022 survey wave were collected in January and February of 2022. We first recruited respondents who had participated in the survey wave of 2020. As the survey wave of 2022 has a stronger focus on mitigation behavior, we subsequently recruited respondents from the survey waves of 2013 and 2015 who did not participate in the 2020 survey. Thereafter, respondents from the survey waves 0f 2012 and 2014 who did not yet participate in the 2020 wave were recruited. To

complete the sample, new subjects were drawn from the forsa.omninet panel. In total, 10,937 were invited to participate in the study, of whom 6,861 (roughly 60 percent) accepted the invitation. Among those, 819 did not complete the questionnaire, implying a dropout rate of almost 12 percent. Out of the 6,042 respondents who answered all questions, about 77 percent had already participated in the 2020 wave and only around 16 percent were new participants. It also bears noting that with 2,931 individuals almost half of the participants who completely filled out the 2022 questionnaire had already participated in both surveys on mitigation behavior in 2013 and 2015 (Figure 3).

Figure 3: Number of Participants in the Surveys Focusing on Mitigation.

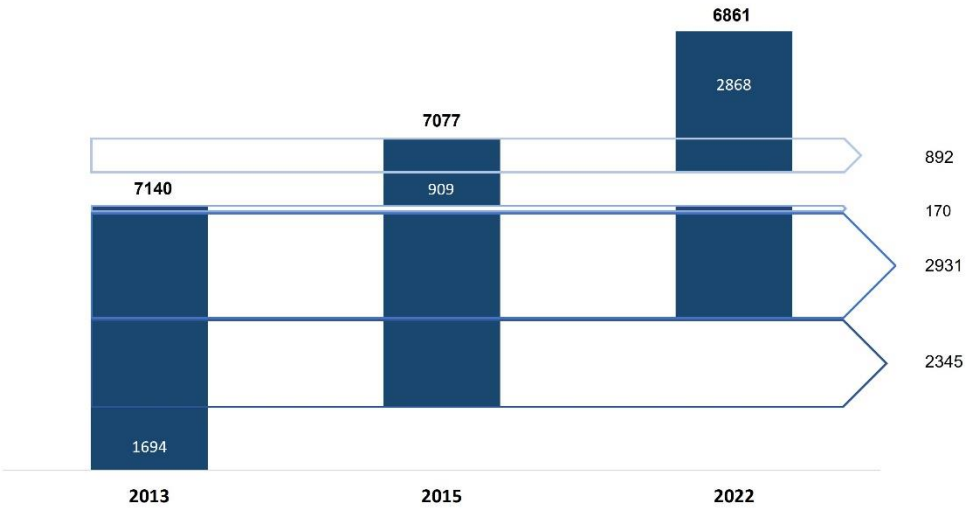


Table 1: Contents of the Survey Waves of 2020 and 2022

Section	Content	2020	2022
A	Personal attitude and experience	X	X
C	House and apartment	X	X
D	Climate change	X	X
E	Investments and insurance	X	X
DCE	Willingness-to-pay for public flood prevention	X	
E1	Questions on the Corona pandemic	X	X
F	Socioeconomic information	X	X
B	Personality traits and news literacy		X

Owing to their different foci, the surveys of 2020 and 2022 each contains special sections. The 2020 survey elicits the willingness-to-pay for public flood prevention while the 2022 survey elicits news literacy. Table 1 provides an overview of the topics of both waves. Note that if a section occurs in both

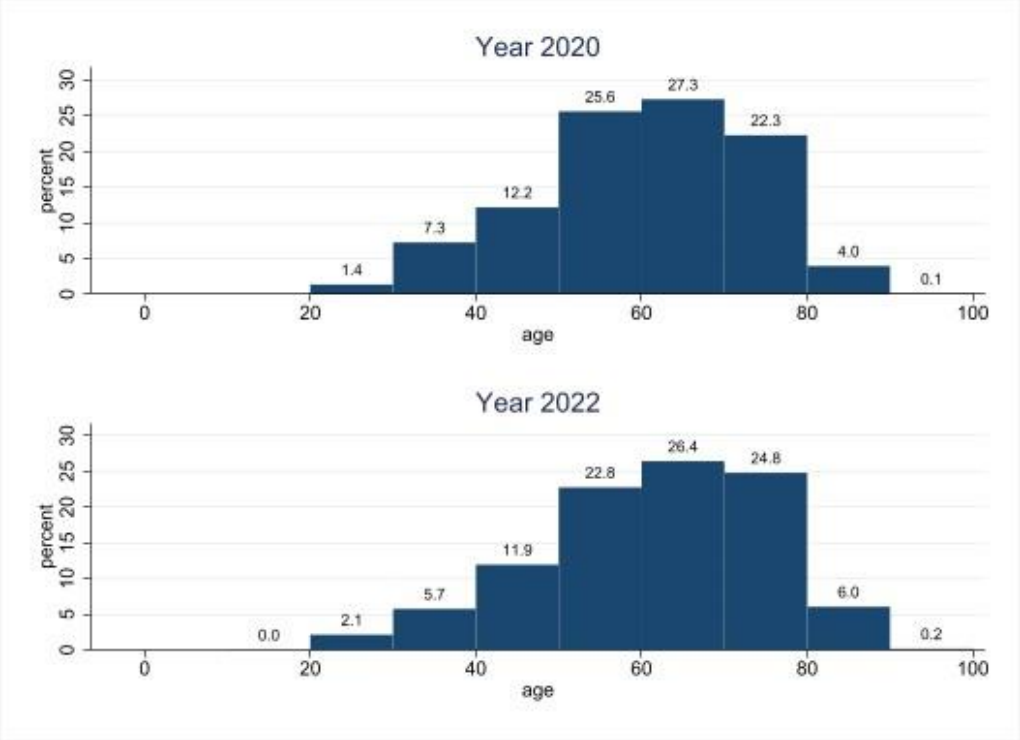
waves of 2020 and 2022, this does not imply that exactly the same set of questions was asked in both waves.

3. Socioeconomic Characteristics

In this section, we describe the sample households' socioeconomic characteristics and compare them across survey waves, as well as with the population of household heads in Germany. To this end, we contrast the sample statistics of the 2020 wave with official data provided by the German Federal Statistical Office (Mikrozensus 2019, Destatis 2022a). In qualitative terms, the overall pattern is the same for the 2022 survey wave.

For starters, with respect to the regional distribution, the sample matches closely the distribution of households across the federal states as given by the Mikrozensus 2019 (see Table 2 in the appendix). The age distribution of the participants is relatively constant across survey waves (Figure 4). In both waves, respondents aged between 60 and 70 years represent the largest group, with the age groups 50-60 and 70-80 following closely behind.

Figure 4: Age distributions of the 2020 and 2022 Survey Waves



In Table 3, we contrast the age of our survey respondents with the age of the household heads in the Mikrozensus 2019 data as reported by Destatis (2022b). The age distributions illustrate that younger age groups are underrepresented in our sample. This can be partly ascribed to the aim of reaching out to persons who already participated in the Eval-MAP survey, which started in 2012. Moreover, the difference in the age distribution might be caused by different definitions of the

household head. In the Mikrozensus, the household head is defined as the household's primary income earner. In contrast, our survey targets the person in the household who decides on financial matters, either alone or with the partner.

Table 3: Age Distribution of Household Heads in the Sample and in Germany

Age group	Share in 2020 Wave	Share in 2022 Wave	Share according to Mikrozensus 2019
Below 25	0.3%	0.6%	4.7%
25 to below 45	13.2%	12.7%	30.2%
45 to below 65	45.9%	42.2%	37.1%
65 and above	40.6%	44.6%	28.0%

Source: Destatis (2022b) and own calculations.

66.4% of the household heads of the 2020 survey are male, in the 2022 survey, this share is 2.7 percentage points lower. These shares are in line with the Mikrozensus data for 2019, where 64.1% of the main income earners are male (Destatis, 2022c). The uneven gender distribution is likely due to the fact that both our surveys and the Mikrozensus target the household head and primary income earner, respectively, who is predominantly male. In both survey waves of 2020 and 2022, about half of the respondents live in a two-person household and another 30% live alone (Table 4). Persons living in a 3- or 4-member household make up around 10% and 8%, respectively. The share of households with five or more members is around 2%. Contrasting the household size distribution of our surveys to the distribution according to the Mikrozensus 2019 data, we find that two-person households are overrepresented in our surveys, whereas single-person households are underrepresented.

Table 4: Household Size Distributions

Household size	Share in 2020 Wave	Share in 2022 Wave	Share according to Mikrozensus 2019
1 person	29.4%	31.0%	42.3%
2 persons	49.5%	49.5%	33.2%
3 persons	10.8%	9.6%	11.9%
4 persons	8.3%	7.9%	9.1%
5 or more persons	2.0%	1.9%	3.5%

Source: Destatis (2022d) and own calculations.

The monthly household net income is measured on a scale of 500 Euro intervals ranging from below 1,000 Euro to 5,500 Euro and more. The median household income is 3,000 to below 3,500 Euro, and the mode is 2,500 to below 3,000 Euro (Figure 5). In Figure 6, we compare the income distribution in 2020 to the income distribution according to the Mikrozensus 2021 data. Household incomes below

2,000 Euro are highly underrepresented in the survey, whereas households with an income of 2,000 to below 5,000 Euro are overrepresented.

Figure 5: Distribution of Monthly Household Net Income

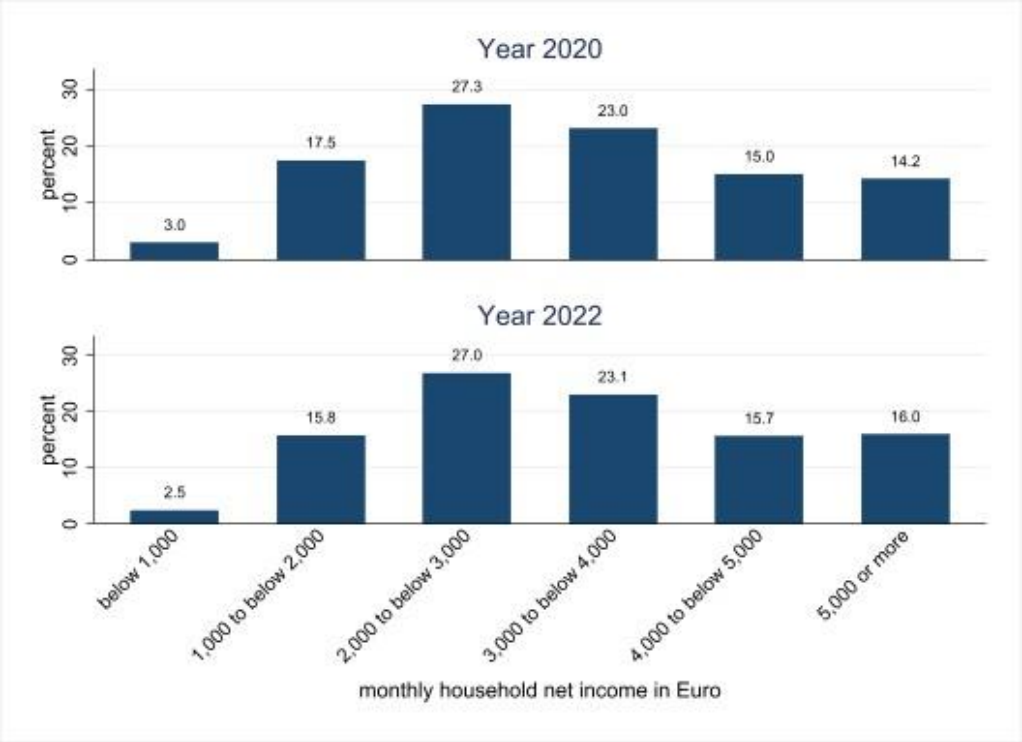
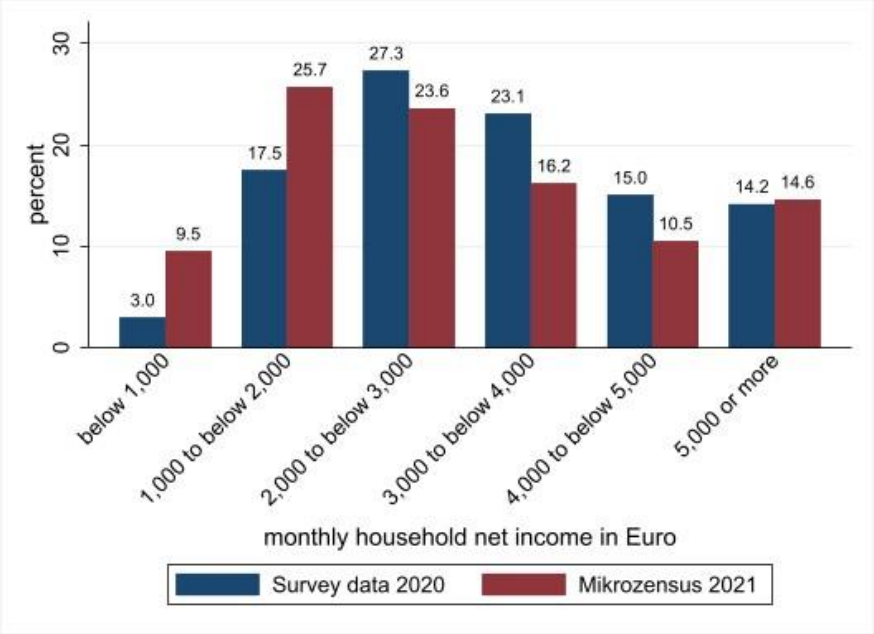


Figure 6: Comparison of Monthly Household Net Income Distribution of the Survey Data for 2020 and the Mikrozensus 2021 (Destatis 2022e).



With respect to school education, there is no significant difference between the 2020 and the 2022 surveys (Table 5). Compared to the official data on the German population originating from the

Mikrozensus 2019 (Destatis, 2022f), higher educated persons are overrepresented in the surveys. Most notably, the percentage of respondents having a (technical) university entrance qualification ("(Fach-)Hochschulreife") lies around 45% in the surveys, but less than 34% obtained such a degree according to the Mikrozensus data. Conversely, in both survey waves, only around 18% of the respondents have a basic school-leaving qualification ("Volks-/Hauptschulabschluss"), relative to more than 28% in the Mikrozensus data. Partly, the overrepresentation of individuals with a high-school qualification can be attributed to the fact that the Mikrozensus data not only targets household heads, but looks at the general population of households in Germany aged 15 or above. For the same reason, in the surveys, only very few individuals are still attending school, whereas this share amounts to 3.5% in the Mikrozensus.

Table 5: School Education in the 2020 and 2022 Survey Waves and according to Mikrozensus 2019 (Destatis (2022f).

	Share in 2020	**Share in 2022**	**Share according to Mikrozensus 2019**
Currently still attending school	0.0%	0.0%	3.5%
No school-leaving qualification	0.1%	0.1%	4.0%
Haupt-/Volksschulabschluss	17.9%	17.6%	28.6%
Mittlere Reife or equivalent	36.4%	36.3%	30.1%
(Fach-)Hochschulreife	45.0%	45.6%	33.5%
Other school-leaving qualification	0.5%	0.3%	-

Source: Destatis (2022f)

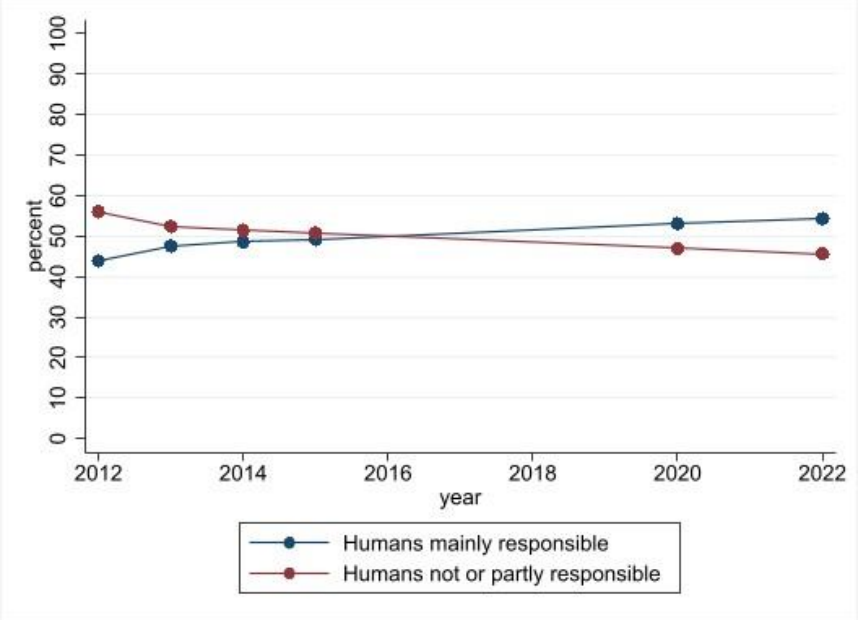
4. Select Questions on Climate Change

The objective of Eval-MAP 2 is to provide data on adaptation and emission mitigation measures in terms of their acceptance and impact on private households, including the social impact of these measures. This section presents selected descriptive results for a small subset of issues. To facilitate the exposition, respondents who did not respond to a question or answer with "Do not know" are excluded from the following illustrations.

In all six survey waves, we asked whether the participants think that climate change is happening. About 94% to 98% of the respondents state that climate change will happen, either now or later. While less than 3% of the participants of the 2022 survey prefer to not provide an answer to this question, more than 90% of the respondents believe that climate change is already taking place, about 6% believe that climate change will take place within the next few decades, and around 2% believe that it will start thereafter. Only a little more than 1% of the respondents believe that climate change will not happen at any point in time. Intertemporally, this share of "climate change deniers" tends to shrink.

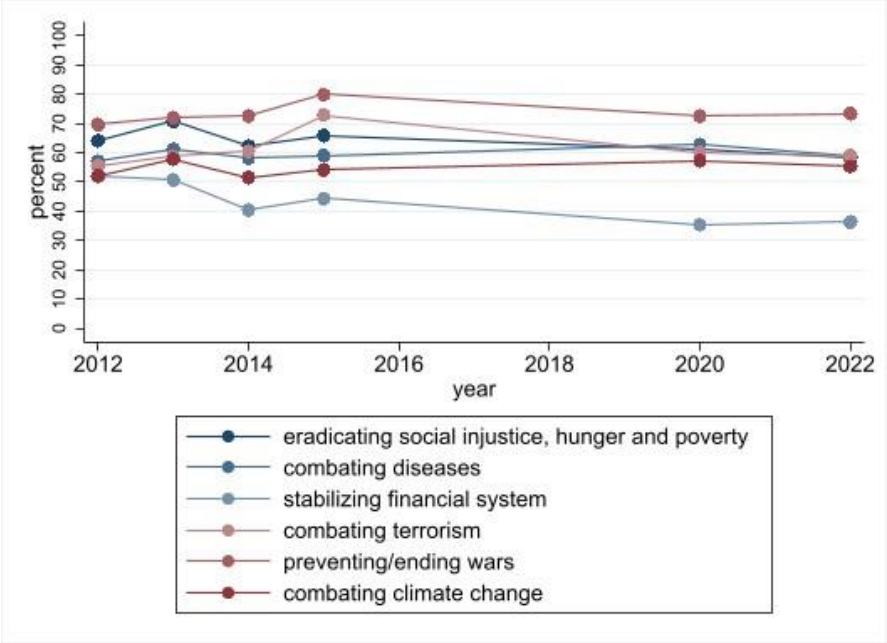
Those 6,207 respondents who believe that climate change will happen, either now or later, were asked to indicate the cause that they consider to be responsible for climate change, with the — randomly presented — response options being “natural processes are mainly responsible”, “humans are mainly responsible”, “both natural processes and humans are responsible“, and “Don’t know/no specification”. In the decade between 2012 and 2022, the share of respondents who regard humans to be mainly responsible for climate change increased steadily from about 44% to 54% (Figure 7). Conversely, the share of respondents who see the cause of climate change in both humans and natural processes has decreased steadily, to about 46% of the respondents in 2022. Not presented in the figure are some 4% who ascribe the responsibility to natural processes alone, while 0.3% of the 6,207 respondents prefer to not give an answer.

Figure 7: Responsibility for Climate Change over time



Moreover, in all six survey waves, participants were asked to rate the importance of combating climate change on a five-point Likert scale, as well as five other global challenges, such as preventing wars and combating terrorism. Figure 8 depicts the share of respondents who regard these global challenges as very important. Throughout all survey waves, respondents deem the prevention and the ending of wars as most important, and the stabilization of the financial system as the least important challenge. Furthermore, apart from stabilizing the financial systems, combating climate change appears to be the least important of the six global challenges presented.

Figure 8: Assessment of six Global Challenges, such as Climate Change, as Very Important



In three of the six survey waves, we asked the participants whether they are willing to pay additional taxes for measures that help to protect the climate (Figure 9). In 2014, 43.5% of the respondents stated that they are willing to pay additional taxes for this task. This share rises to about 58% in 2020, but then decreases to 54.9% in 2022. In a similar vein, with respect to the support for an increase in spending on climate change mitigation by 10%, the vast majority of respondents stating an opinion, 78.7%, indicated their support for such an initiative in 2020, while 21.3% were opposed to it. By 2022, support decreased by 5.4 percentage points to 73.3% while opposition increased to 26.7%. Note that in both survey waves of 2020 and 2022, between 12% and 15% of the respondents chose the option “Don’t know / No specification”.

With respect to the adaptation to climate change, respondents were asked how informed they feel about possible measures to adapt, the responses being measured on a five-point Likert scale that ranges from “Very bad” to “Very good”. This question was asked in both 2020 and 2022, but as there are no significant intertemporal differences, we only report here the figures for 2020. Of the 6,145 participants who were asked this question in 2020, 2.6% do not indicate a response. Among the remainder, 4.4% of the respondents stated that they feel very well informed, and another 28.4% respondents said that they feel well informed. 39.2% of the participants answer that they feel moderately well informed. The shares of those respondents who feel poorly and very poorly informed amount to 23.5% and 4.5%, respectively.

Figure 9: Share of Respondents who are Willing to Pay Additional Taxes for Mitigation Measures

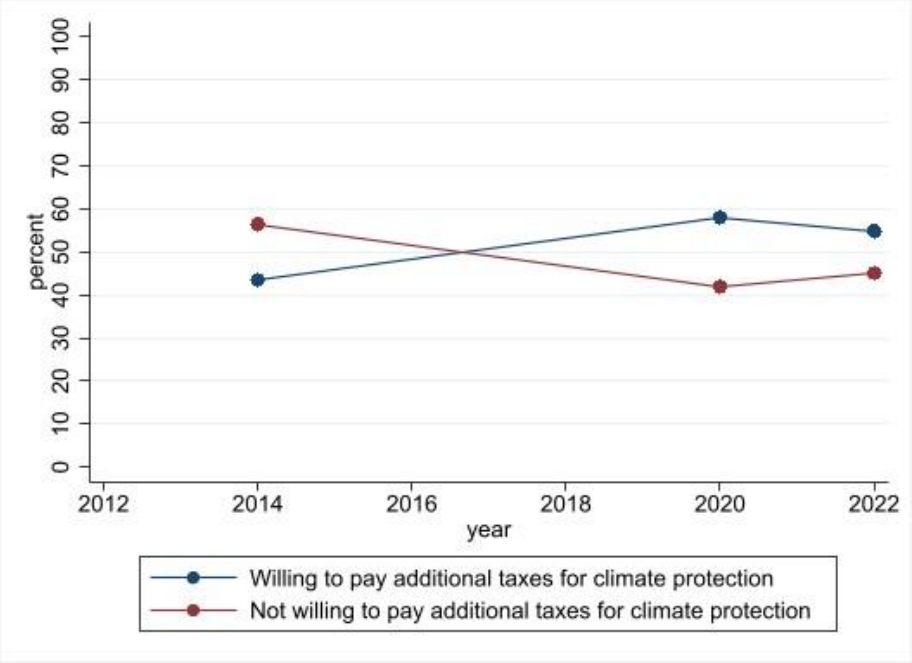
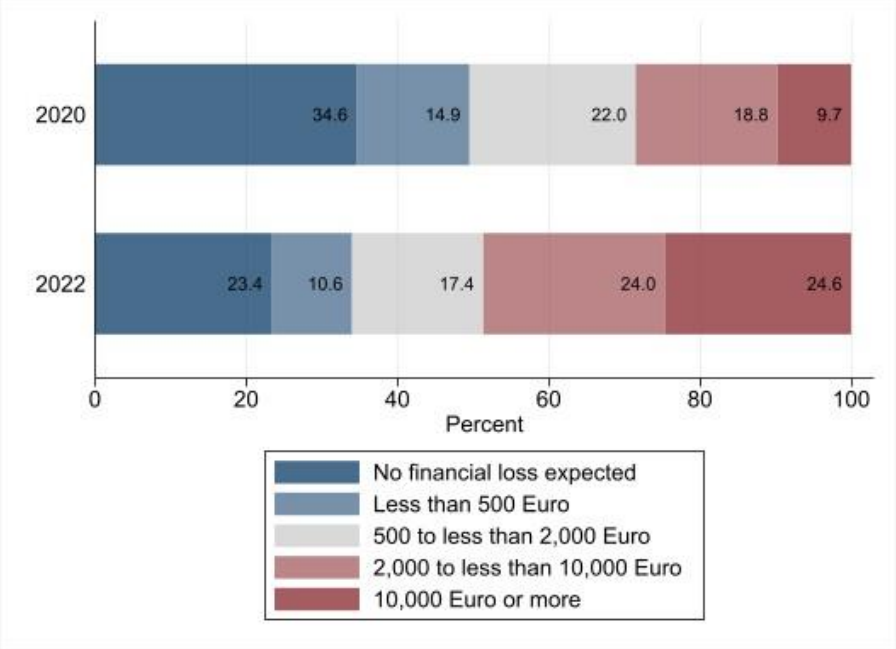


Figure 10: In the Event of Flooding (irrespective of whether originating from rivers or heavy rains), what financial loss do you expect in your household?



Not least, the participants were presented questions on natural hazards and the associated expected costs. One of the questions requested the participants to indicate the monetary loss that they expect to occur in the event of flooding. In both survey waves of 2020 and 2022, between 12% and 14% of all the participants asked did not answer. In 2020, more than a third of the remaining respondents indicated that they do not expect to incur any financial loss in the event of flooding, while

the share of respondents who expected a monetary loss between 2,000 and 10,000 Euro is 18.8%; almost 10% expected a financial loss of 10,000 Euro or more (Figure 10). The shares of respondents who expected financial losses due to high water significantly increased from the 2020 to the 2022 survey: In 2022, less than a quarter of the respondents expected no financial loss, compared to more than a third in 2020, whereas almost a quarter of all respondents expected a financial loss of over 10,000 Euro.

5. Empirical Applications

In this section, we present a few empirical studies that are based on the data set described in this article, with most of them being published in international peer-reviewed journals. With respect to flooding, policy briefs as well as numerous papers have been published. First, based on data on the flood event in 2013, Osberghaus and Fugger (2022) analyze the effects of flood experience on beliefs in the prevalence of climate change. While these authors find that spatial proximity to the flood had a significant positive effect on such beliefs, this effect decreases sharply with growing distance. Furthermore, it is demonstrated that the effect is driven by those respondents who already believed in climate change prior to the flood event in 2013. Apparently, these respondents saw their belief confirmed by their experience. In contrast, the spatial proximity to the flooding event had no measurable effect on skeptics. These results suggest that climate skeptics may even not be influenced by the immediate experience of natural disasters, such as a flood at their doorsteps.

Second, the devastating flood event of 2021 triggered a vigorous debate about how Germany's flood insurance system may be altered to get a higher share of households insured. This issue is highly relevant given that Andor et al. (2020) find the phenomenon of charity hazard to be prevalent: households expecting governmental aid in case of a flood take less precautionary measures and forego private insurance. This behavior is particularly pronounced in areas of high flood risk. Third, evaluating public awareness campaigns on flood risk and insurance, Osberghaus and Hinrichs (2021) find no causal effect of the campaigns on household behavior. Fourth, Osberghaus (2021b, 2022) summarize the policy-relevant findings of the empirical literature on flood insurance and suggest introducing a well-designed mandatory flood insurance scheme with risk-based pricing. Fifth, Osberghaus (2021a), as well as Osberghaus and Abeling (2022), use the panel data to assess the vulnerability of economically deprived households in Germany with respect to flooding and heat, respectively.

With respect to the Covid-19 pandemic, the data gathered within the Eval-MAP 2 project allow for an in-depth assessment of the effects of Covid-19 exposure on the perception of climate change and climate policy (Frondel et al. 2020). Although at the time of the 2020 survey only a few respondents had been directly affected by the corona virus, the majority of the respondents was concerned about

the effects of the pandemic. Despite these concerns, climate change remained an important issue: only six percent of those surveyed think that climate change had lost importance since the beginning of 2020. About 70% of the respondents saw no change in the importance of the topic. 23% even believed that climate change had become more important. Nevertheless, the empirical analysis also indicates that households with corona-related financial losses consider climate change to be less significant than households that were not affected.

6. Data Access

While the questionnaires underlying the surveys are available on the project homepage: www.rwi-essen.de/eval-map, the data set is available as a Scientific Use File at the FDZ Ruhr, the research data center at RWI – Leibniz Institute for Economic Research. The data access is only granted for scientific, noncommercial studies. Potential users include researchers affiliated with scientific institutions, universities, and government agencies. Access requires a signed data usage agreement, which can be applied for on the FDZ website. The data can be obtained as a Stata® data set (.dta) or a csv file. Users are requested to cite the source correctly and to inform FDZ Ruhr about publications with the data. The data set consists of all waves described here. When using the data set, please cite each wave separately as:

Wave 2012: Frondel, M., C. Vance, M. Andor, G. Kussel, C.M. Schmidt et al. (2016), Socio-Ecological Panel. First Survey Wave. Green-SÖP. Version: 1. RWI– Leibniz-Institut für Wirtschaftsforschung. Data set. https://doi.org/10.7807/greensoep:en:v1

Wave 2013: Frondel, M., C. Vance, M. Andor, G. Kussel, C.M. Schmidt et al. (2016), Socio-Ecological Panel. Second Survey Wave. Green-SÖP. Version: 1. RWI – Leibniz-Institut für Wirtschaftsforschung. Data set. https://doi.org/10.7807/greensoep:en:v2

Wave 2014: Frondel, M., C. Vance, M. Andor, G. Kussel, C.M. Schmidt et al. (2016), Socio-Ecological Panel. Third Survey Wave. Green-SÖP. Version: 1. RWI – Leibniz-Institut für Wirtschaftsforschung. Data set. https://doi.org/10.7807/greensoep:en:v3

Wave 2015: Frondel, M., C. Vance, M. Andor, C.M. Schmidt, G. Kussel, et al. (2020), Sozial-Ökologisches Panel, 4. Befragungswelle. Green-SÖP. Version: 1. RWI –Leibniz-Institut für Wirtschaftsforschung. Data set. https://doi.org/10.7807/greensoep:en:v4

Wave 2020: Frondel, M., C. Vance, M. Andor, C.M. Schmidt, G. Kussel, et al. (2022), Sozial-Ökologisches Panel, 6. Befragungswelle. Green-SÖP. Version: 1. RWI –Leibniz-Institut für Wirtschaftsforschung. Data set. https://doi.org/10.7807/greensoep:en:v6

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Finally, we recommend citing this data description.

Appendix

Table 2: Distribution of Households across Federal States

Federal state	Share in 2020 Wave	Share in 2022 Wave	Share according to Mikrozensus 2019
Baden-Württemberg	12.1%	12.8%	12.9%
Bavaria	15.5%	16.2%	15.6%
Berlin	4.8%	4.6%	4.9%
Brandenburg	2.6%	2.6%	3.0%
Bremen	0.7%	0.6%	0.9%
Hamburg	2.3%	2.2%	2.4%
Hessia	8.0%	8.0%	7.4%
Lower Saxony	10.2%	10.3%	9.6%
Mecklenburg-Vorpommern	1.7%	1.6%	2.0%
North Rhine-Westphalia	22.5%	22.3%	21.1%
Rhineland-Palatinate	5.5%	5.2%	4.7%
Saarland	1.1%	0.8%	1.2%
Saxony	4.7%	4.2%	5.2%
Saxony-Anhalt	2.0%	1.8%	2.8%
Schleswig-Holstein	4.1%	4.2%	3.5%
Thuringia	2.3%	2.4%	2.7%

Source: Destatis (2022a) and own calculations.

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