



Fundamental decarbonisation
through sufficiency by lifestyle changes

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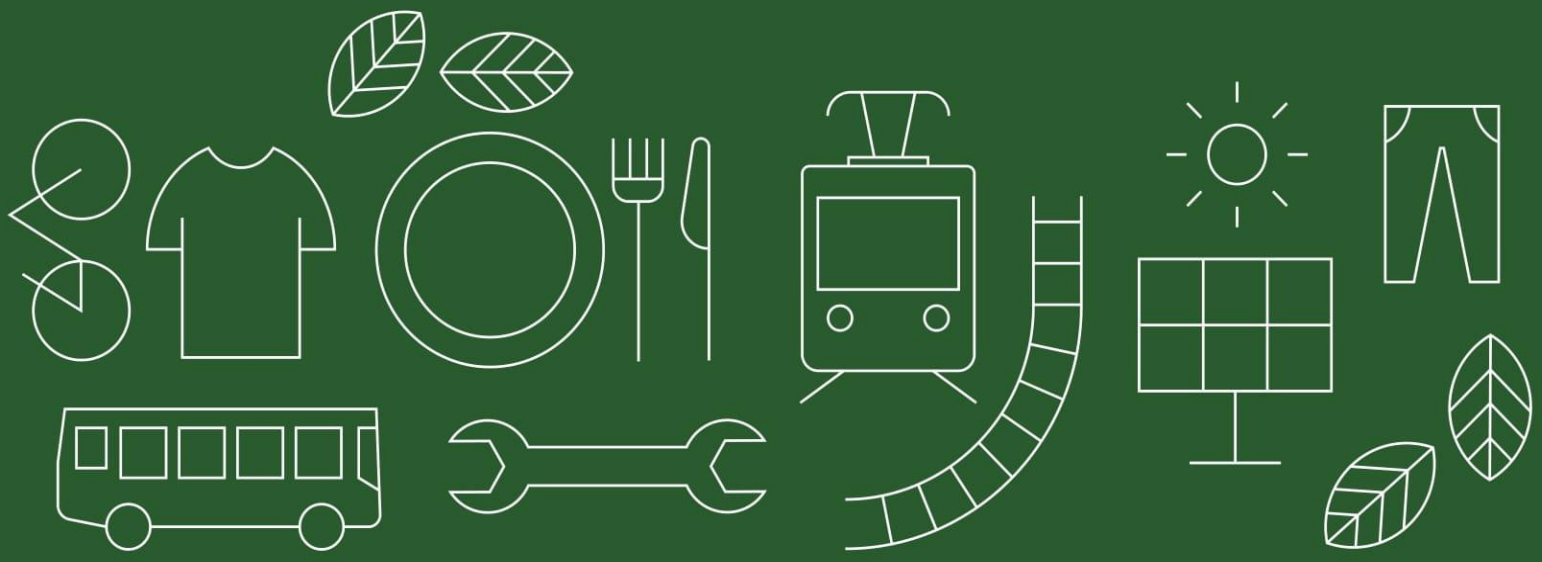
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List of Abbreviations

CO_{2eq}-emissions	Greenhouse gas emissions in CO ₂ equivalents
EU	European Union
SSH	Social sciences and humanities
WP	Work Package



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Abstract/Summary

The aim of this deliverable is to summarise and synthesise the findings of the micro-level studies in FULFILL, which combined comprehensive questionnaire studies and socio-anthropological fieldwork based mainly on interviews. The empirical work was carried out in six countries, Denmark, France, Germany, Italy and Latvia, with India as a contrasting, non-European country in addition. This report reviews the methodological approaches and summarises the results by describing the situation of sufficiency-oriented lifestyles, including barriers and drivers, outlining pathways to sufficiency and pointing to two areas of potential impact, namely gender equality and social deprivation.



1. Introduction: Micro-level analyses of sufficiency-oriented lifestyles in FULFILL

As an overarching objective, work package (WP) 3 has the aim to investigate the mechanisms of lifestyle change and sufficiency-oriented lifestyles using social science and humanities (SSH) research methods at the micro level (individual, household). It thus contributes to developing a better understanding of the potential scope and diffusion of sufficiency-oriented lifestyles. It involved the collection of a comprehensive set of survey and interview data collected at three points in time and in six countries, five from the European Union (EU) (DK, FR, DE, IT, LV) and in India.

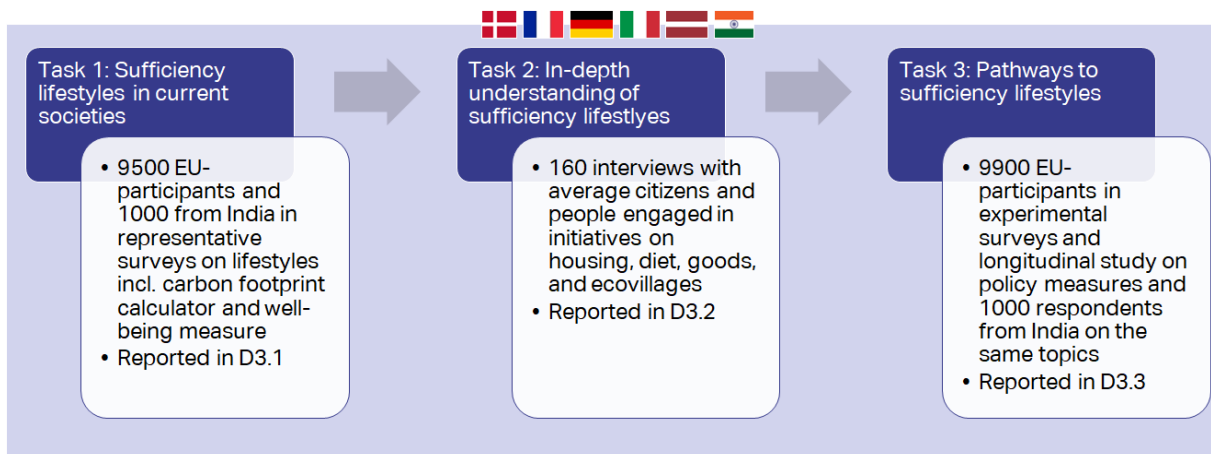


Figure 1 Overview on the micro-level data collection conducted in FULFILL which combined surveys and interview studies in six countries.

The aims of the different studies conducted included the following:

- The first round of surveys in the six countries aimed to identify the existing variety of lifestyles that are present in today's households with a focus on their level of sufficiency. It relied on large sample demographically representative household online surveys in five EU countries (Denmark, France, Germany, Italy, and Latvia) and computer-assisted personal interviews in two major cities in India (Mumbai and Delhi). This involved translating the concept of sufficiency-oriented lifestyles to the micro level for empirical research. In FULFILL, sufficiency is defined as a lifestyle that is low in CO_{2eq}-emissions and at the same time relatively high in individual well-being. Therefore, a comprehensive carbon footprint calculator was developed to measure individual emissions from the following key activities: housing (heating and hot water use), electricity, transport and diet. This was combined with a measure of individual well-being.¹ The European data was collected in summer 2022 referring to year 2021 and in India in summer 2023 referring to 2022.
- Based on the outcomes of the survey, as well as the conceptual work conducted in FULFILL, socio-anthropological fieldwork mainly based on interviews was conducted in all six countries with 57 panel respondents and with 103 respondents engaged in initiatives² focusing on sufficiency practices. The main objective of this step was to explore the diversity of social practices and of socio-demographic profiles associated with sufficiency to understand the motivations behind their adoption and the needs they fulfil, and to address the varieties of sufficient lifestyles and the importance of social contexts. All data was collected between summer 2022 and winter 2022/23.

¹ Unfortunately, due to an error in the questionnaire, the data on well-being is not usable for France.

² Initiatives were selected based on preliminary research on activities that have the potential to contribute to sufficiency, and in collaboration with WP4 which focused on initiatives and municipalities. A smaller proportion of interview respondents completed the carbon footprint calculator which confirmed below average footprints for this sample on average.



- The second round of surveys aimed at a better understanding of the persistence of sufficiency-oriented lifestyles, exploring the acceptability of policy measures supporting sufficiency and investigating potential diffusion pathways for sufficiency-oriented lifestyles. The samples therefore included partially going back to participants in the first round of surveys and partially included new respondents. The geographical scope was identical to that of the first round of surveys. The European data was collected in spring and summer 2023 referring to year 2022 and in India in spring 2024 referring to 2023.

The three tasks resulted in three reports with 488 pages overall ([D3.1](#), [D3.2](#), [D3.3](#)). The aim of the present document is to summarise the findings from the micro-level studies to allow for a quick overview and to outline the main take-aways from the studies. The insights generated have been used in the further steps of the project, for example as input for WP5 (e.g. [D5.1](#) and [D5.3](#)) and for the upcoming concluding policy brief and infographic of the project ([D7.3](#)). A summarising version of this deliverable will be available as D3.5.



2. Sufficiency-oriented lifestyles in today's society

2.1. Sufficiency in the EU

In FULFILL, a sufficiency-oriented lifestyle is defined as a lifestyle that is low in CO_{2eq} emissions and at the same time has a relatively high level of individual well-being. Therefore, a comprehensive carbon footprint calculator was developed to measure emissions that can be attributed to an individual from the following key activities: housing (heating and hot water use, in India also cooling), electricity (subtracting electricity generated by renewable energy by the household), transport (by cars and to some extent by aviation) and diet (see Figure 2 for an overview). This was combined with a renowned measure for individual well-being developed by the WHO for cross-cultural use (Alexander-Haw et al., 2023; Alexander-Haw et al., 2024).

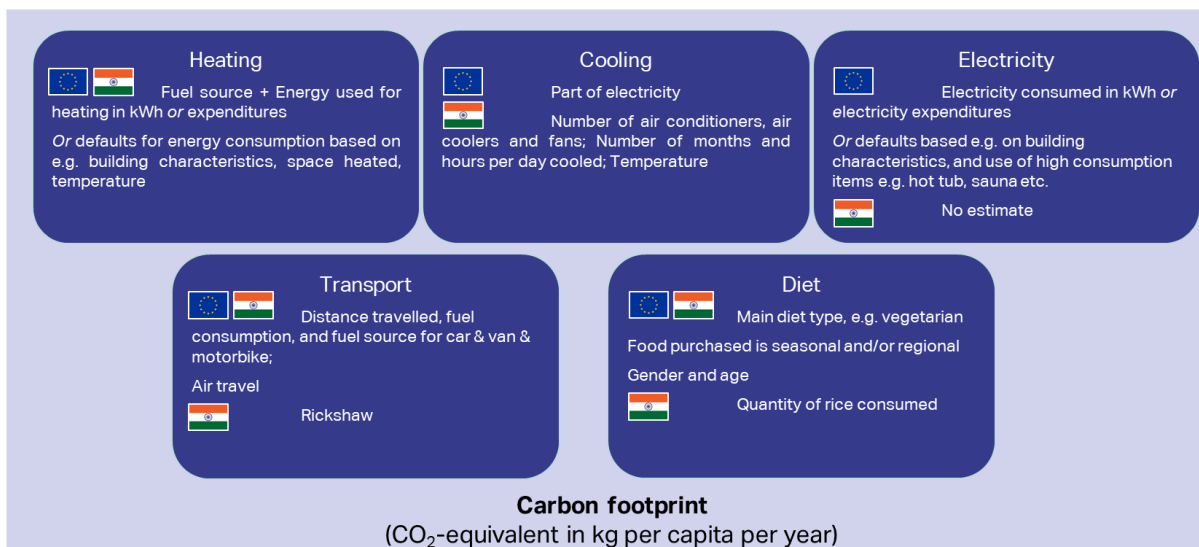


Figure 2 Activities analysed as part of the carbon footprint calculation; also indicating differences between measurement in EU member states and India

To identify people with a sufficiency-oriented lifestyle a relative approach was used, i.e. we categorise people as sufficient if their carbon footprint is within the lowest 25% in their respective country and who in addition have above median well-being. Regarding carbon emissions, we differentiated between respondents whose emissions are below the median for all activities considered and have above median wellbeing scores ("very sufficient") and those who have low emissions overall but not across all activities and above median wellbeing scores ("partially sufficient"). The data analyses show that 3-4% of the respondents from the overall sample per European country are identified as very sufficient and 8-9% as partially sufficient (see Figure 3). This means that a small, but relevant, share of the population is leading a comparatively sufficient lifestyle in relation to the overall society in their country. The share of respondents categorised as sufficient thus corresponds to about half of the share of the lowest 25%. This gives an indication that well-being and carbon footprint are not necessarily related, i.e. low carbon footprints are possible in combination with high and low well-being.

For means of comparison, the remaining sample was categorised as either having an average footprint (second and third quartile in terms of carbon emissions) or a high carbon lifestyle (highest quartile).

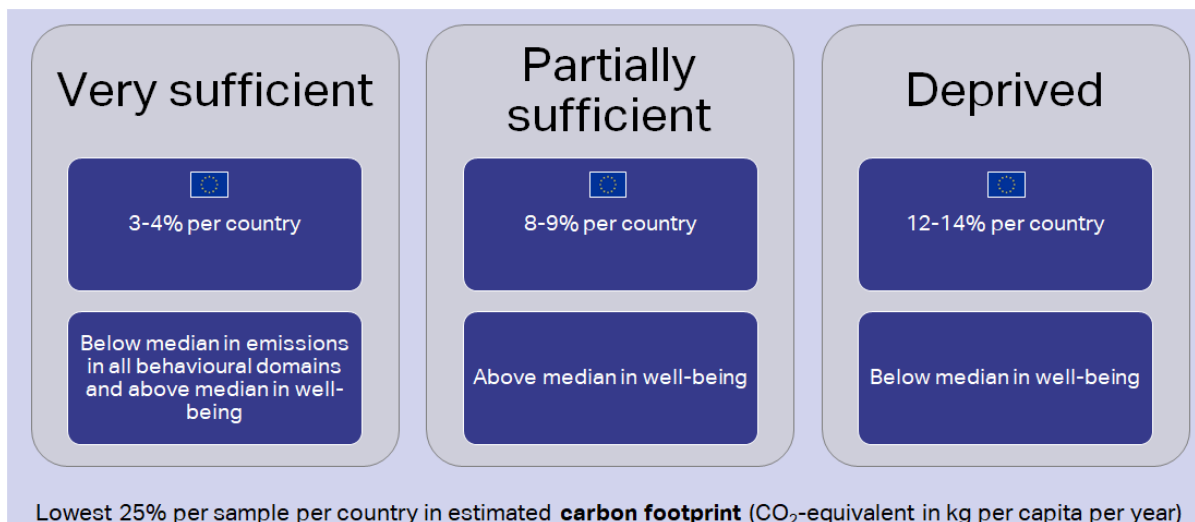


Figure 3 Overview on low carbon lifestyles identified³ in first survey

Further analyses relied on regression analyses that related respondents' answers on socio-demographic attributes, attitudes and living situation to the identified lifestyle as well as the qualitative research from the second task (Alexander-Haw et al., 2023; Flipo & Ravourdin, 2023; Flipo et al., 2023).

What characterizes and drives them? What are barriers?

A deeper analysis from the quantitative data points out that those categorised as sufficient share a corresponding value orientation towards low consumption (=sufficiency orientation) or a higher environmental identity as well as the absence of social deprivation. Social deprivation was measured in the survey through questions relating to areas of consumption, social life and comfort, such as not being able to accept an invitation due to lack of transport, or not being able to keep the home at a comfortable temperature in summer and winter. For those with a low carbon lifestyle and low well-being who were categorised as deprived, we find that this is linked to an insecure economic situation, such as low income, unemployment and being a tenant. These socio-economic variables do not show up in the analysis of the sufficiency groups. Those who are categorised as very sufficient are more likely to live in cities which points to the relationship between mobility and place of living, i.e. car dependency in rural areas.

The role of environmental values and the desire for low consumption was also one of the motivators for people interviewed during the qualitative work who were engaged in sufficiency initiatives. However, these respondents also emphasised other motivations, such as being part of a collective of like-minded people, better health or curiosity, which were not enquired about in the survey. It should be noted, that the motivations of people joining initiatives may differ from those of people leading sufficiency-oriented lifestyles in general.

The qualitative research added further depths to our understanding of sufficiency-oriented lifestyles in today's societies. First of all, while the concept of sufficiency as reflecting the necessity not to overpass the planet's boundaries and to focus on fundamental needs. was not widely known among interview participants in most countries except France - it resonated well with the views of participants on what sustainability should be. Cleavages occur when individual freedom is at stake, especially of high-income respondents who value freedom and also comfort. Low-income respondents were more concerned with distrust towards political elites

³ As an error occurred in the French survey with measuring well-being this part of the data could not be used for this analysis.

(except in Denmark) and worried that sufficiency oriented policies might worsen their economic situation.

The role of, and access to, resources such as money and time, or the lack thereof, which characterised people in the deprived category of the survey, was also raised in the interviews, backing up the findings on the deprived group: a sufficiency-oriented lifestyle - at least in today's society - requires resources. The interviewees from the initiatives were typically highly educated and/or could draw on savings which enabled more flexible use of time or initial investments if needed or on certain skills that facilitated their engagement.

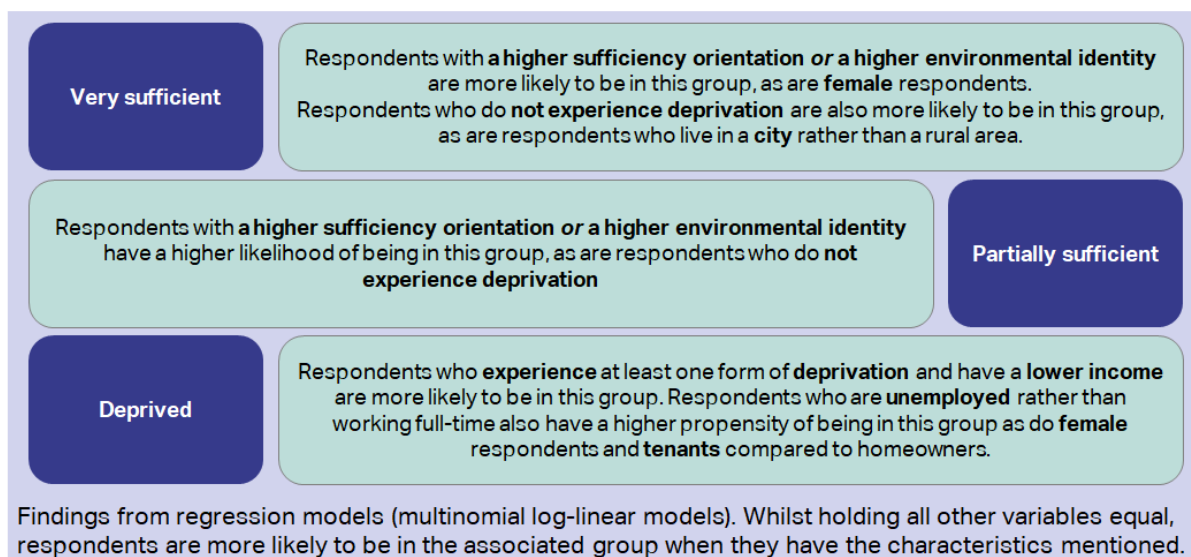


Figure 4 Characteristics of low carbon lifestyles based on the survey data in Denmark, Germany, Italy and Latvia⁴

Surveys as well as interviews also drew attention to gender as a topic: For two groups, the survey analyses also revealed a link with gender, i.e. female respondents were more likely to be part of the very sufficient and the deprived group. This points out, that women are more likely to have a lower carbon footprint⁵ - for some in line with a high well-being, for some connected to deprivation and lower well-being. Gender as a topic was sometimes raised in the interviews with initiatives and tended to point to a struggle to balance care work, paid work and initiative engagement - not only for women.

Stability of sufficiency-oriented lifestyles (longitudinal study)

By repeating the first survey and moving the year of reference from 2021 to 2022, we were able to replicate the sufficiency groups in the countries (for detailed results see Alexander-Haw et al., 2024): Between 5-7% of respondents were categorised as very sufficient, 4-6% per country as partially sufficient and 13-16% as deprived. Thus, the shares were quite similar to the first survey. However, they do not (fully) consist of the same people. As outlined in Figure 5, between around one third and a half of the respondents remained in the sufficiency groups while in Latvia and Italy the majority are now categorised differently. Most frequently, but to a varying degree across countries, they are now classified as leading a lifestyle with average emission levels, i.e. being in the second and third quartile regarding the carbon footprint in their respective country. With the exception of Germany, around 15% were now found to be deprived, which means that

⁴ As an error occurred in the French survey with measuring well-being this part of the data could not be used for this analysis.

⁵ It has to be noted that the estimation of the carbon footprint for diet assumed a higher calorie intake for men than for women, which makes it easier for women with the same type of diet to have a lower carbon footprint. This difference was made based on scientific studies on nutrition and, thus, mirrors the actual situation, at least on average.



their well-being deteriorated between the two waves. A smaller share of 5-8% was now identified as having a high carbon lifestyle.

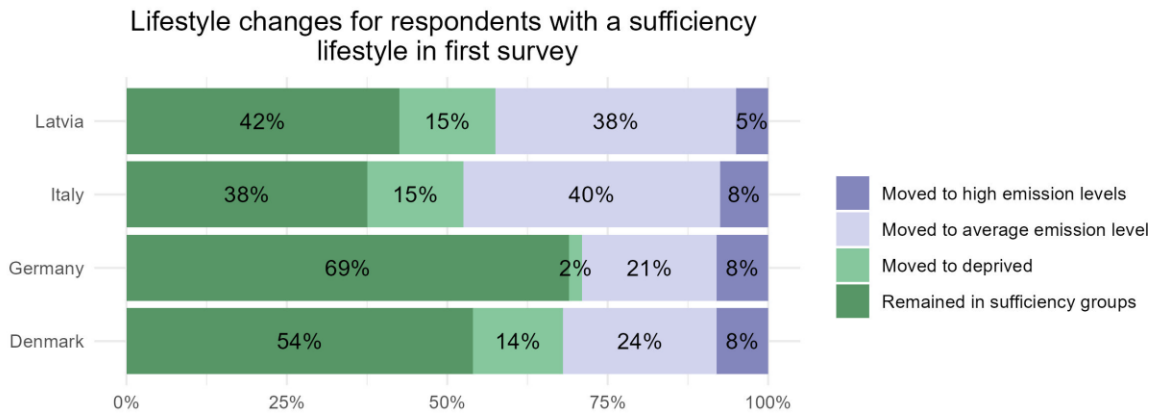


Figure 5 Changes in lifestyles for respondents with a sufficiency-oriented lifestyle in first survey

When considering the full sample, people were more likely to stay in the same lifestyle group. Indeed, the majority of respondents (62%) remain within their respective lifestyle group, with transitions mainly taking place between neighbouring carbon footprint groups⁶ (92%).

2.2. Sufficiency in India compared to Europe

Empirical work in India was included in the micro-level studies for a number of reasons. Firstly, India is a strong contrast to the EU countries, with a lower GDP, but a rapidly growing economy from which at least a larger proportion of the population is benefiting. This also raises sustainability issues, including to control rising carbon emissions. Secondly, India is characterised by a more dynamic development and diversity within society, not only in economic terms, but also in terms of culture, religion and daily practices. Third, India has deeply rooted cultural practices, such as lower meat consumption, that are more related to religious customs and other traditions than to economic shortcomings (Pagliano & Erba, 2022), making it an even more interesting case for comparison. Finally, despite its economic development, significant proportions of the population in India are poor, raising questions about sufficiency as a combination of low emissions and high well-being in a very different context.

While the higher diversity was one of the reasons to study India, we nevertheless aimed to reduce the variability within the country due to time and budgetary constraints. India is a large country which has the size of three-quarters of the size of the EU and its population is three times higher. Thus, respondents were recruited from two major cities, namely Delhi and Mumbai. The focus on cities was chosen to enhance the comparability in regard to living standards in terms of mobility and availability of energy. The specific cities were selected based on their location and to keep some variety. Delhi is located in the North of India (without a coastal line). As it is a state city and the capital of India, it does not suffer largely from high poverty rates. In contrast, Mumbai is located on the Arabian Sea in the West of India with a very humid and hot climate and a medium poverty rate.

The findings indicate that, as expected, respondents in India have much lower emissions than in Europe. While the average emission level in the first survey and for the activities covered varied between 3.1 and 4.7 tons CO_{2eq}-emissions per capita in the EU countries, the average for Indian

⁶ We differentiated three groups within the lowest quarter, the average footprint group and the high footprint group, thus, five overall. If respondents moved between groups, this was usually between the next higher/lower footprint.



respondents was around 1.5 tons (for detailed results see Alexander-Haw et al., 2023). Across all countries studied and also for both Indian cities, the highest share of the carbon footprint was attributed to diet (see Figure 6). With exception of Germany, where heating caused a large share of the emissions, heating in Europe and cooling in India constitute similar shares of the footprint. The emissions from transport (without aviation) in Delhi were similar to Europe, but less significant in Mumbai.

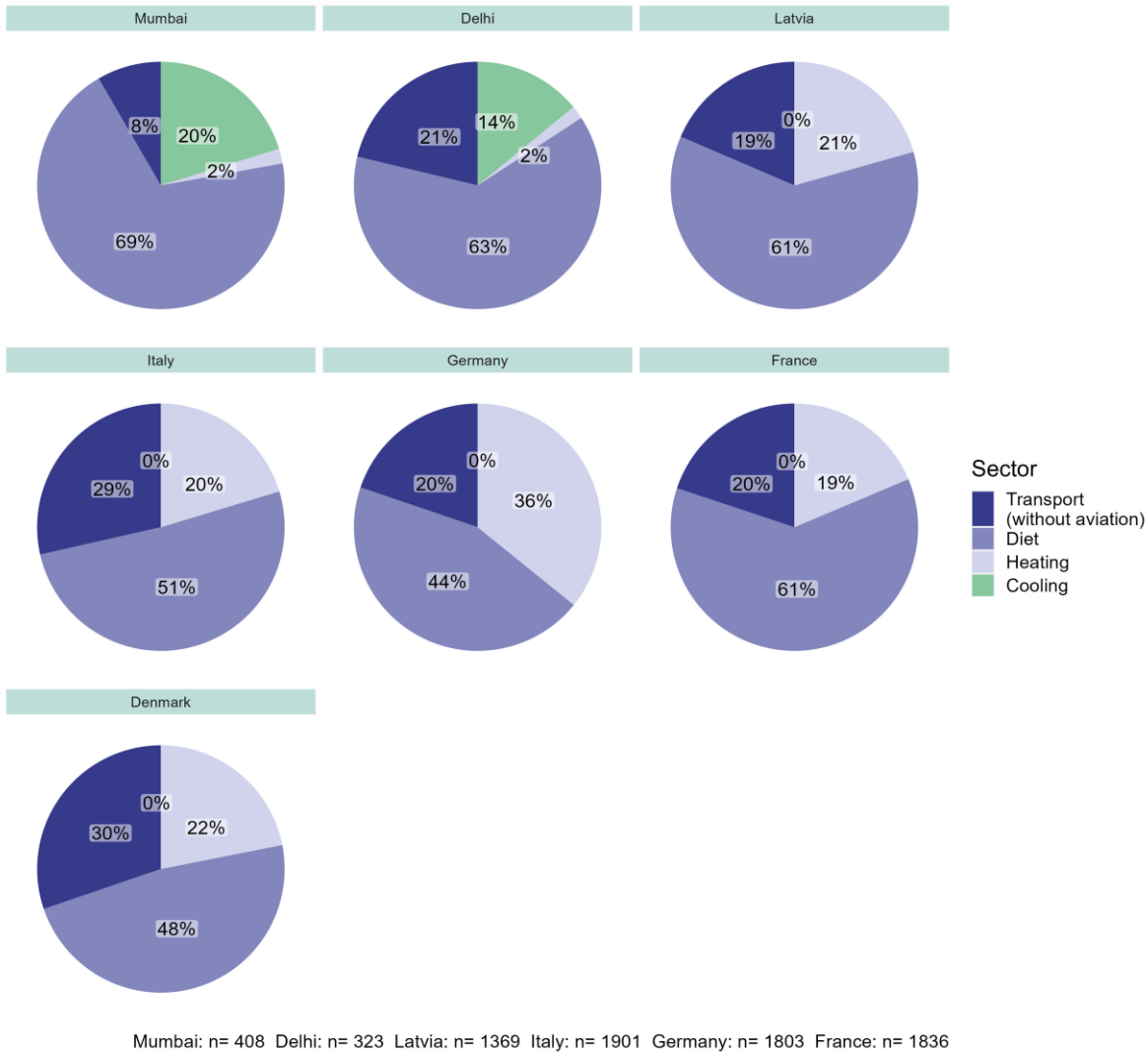


Figure 6 Composition of carbon footprints in Europe and India

In terms of the relationship between carbon footprint and well-being, India also shows different patterns to Europe. While in most European countries well-being and carbon footprint are not significantly related (with the exception of Latvia where a low correlation emerges), this is different for the study in India; in Mumbai, a medium correlation emerges and in Delhi a high one. This suggests that economic well-being as a precondition to overall well-being plays a different role in India where possibly more basic needs are not fulfilled for some respondents. In line with this, the share of respondents categorised as deprived is higher in Delhi primarily (23%), but similar to Europe in Mumbai (12%). Furthermore, the shares of very and partially sufficient respondent in Mumbai resembled the results from Europe while in Delhi few respondents at all (2%) were identified as sufficient. In the second survey, this picture changed to some extent as by then we identified significantly more respondents as sufficient also in Delhi (11%), however,



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it is important to note that the sample of respondents who participated twice is not fully representative.

3. Pathways to sufficiency

The studies summarised above demonstrate that while a share of the population manages to lead a sufficiency-oriented lifestyle already despite unsupportive societal structures (Pagliano & Erba, 2022), many do not, which calls for enabling measures that need to be supported by citizens in order to be successful. Therefore, the second round of surveys focused on studying support for various sufficiency policies while also trying to explore factors that increase or decrease support. This led to experimental designs of the surveys where subgroups of the respondents received different kinds of information about the policy measures studied and the influence of these variations was tested statistically. Due to the different way of collecting data in India, no experimental design was used.

The policy measures were selected in accordance with other analyses in the project (Breucker & Defard, 2023) and the findings provided input to the citizen conferences conducted (Barbas & Breucker, 2024). Given their high impact on the carbon footprint and, therefore, their relevance for sufficiency including well-being, the focus was on measures for housing and diet. In the housing area, we analysed measures to reduce living space per person as this is a key indicator for energy demand for heating and cooling and also relevant for further environmental impacts such as land-use. As for diet, shifts towards more plant-based diets were studied.

Policies and infrastructural changes are needed to support the transition of high and average carbon footprint individuals to sufficient lifestyles. Hence, we examined the support and perception of sufficiency-related policies (with a focus on housing and diet) (for detailed information on survey design and results see Alexander-Haw et al., 2024). Specifically, we studied perceptions and the level of support for the following policy measures

- Increasing sustainable housing
 - by banning the construction of new single-family homes
 - by introducing an annual financial fee for dwellings with an above-average living space
- Supporting more plant-based diets
 - by a meat tax
 - by an obligatory meat-free day in canteens
 - by a carbon label on all food products

In terms of opposition, we find that

- respondents are more sceptical towards bans (single-family homes) and financial measures (annual fee on living space, meat tax) than towards softer measures (carbon label, meat-free day)
- relevant country differences, e.g. less resistance to both housing measures in Italy, more support for living space fee in India, and stronger oppositions to a meat tax in France in Latvia, which point to the need of in-depth analyses of the national context



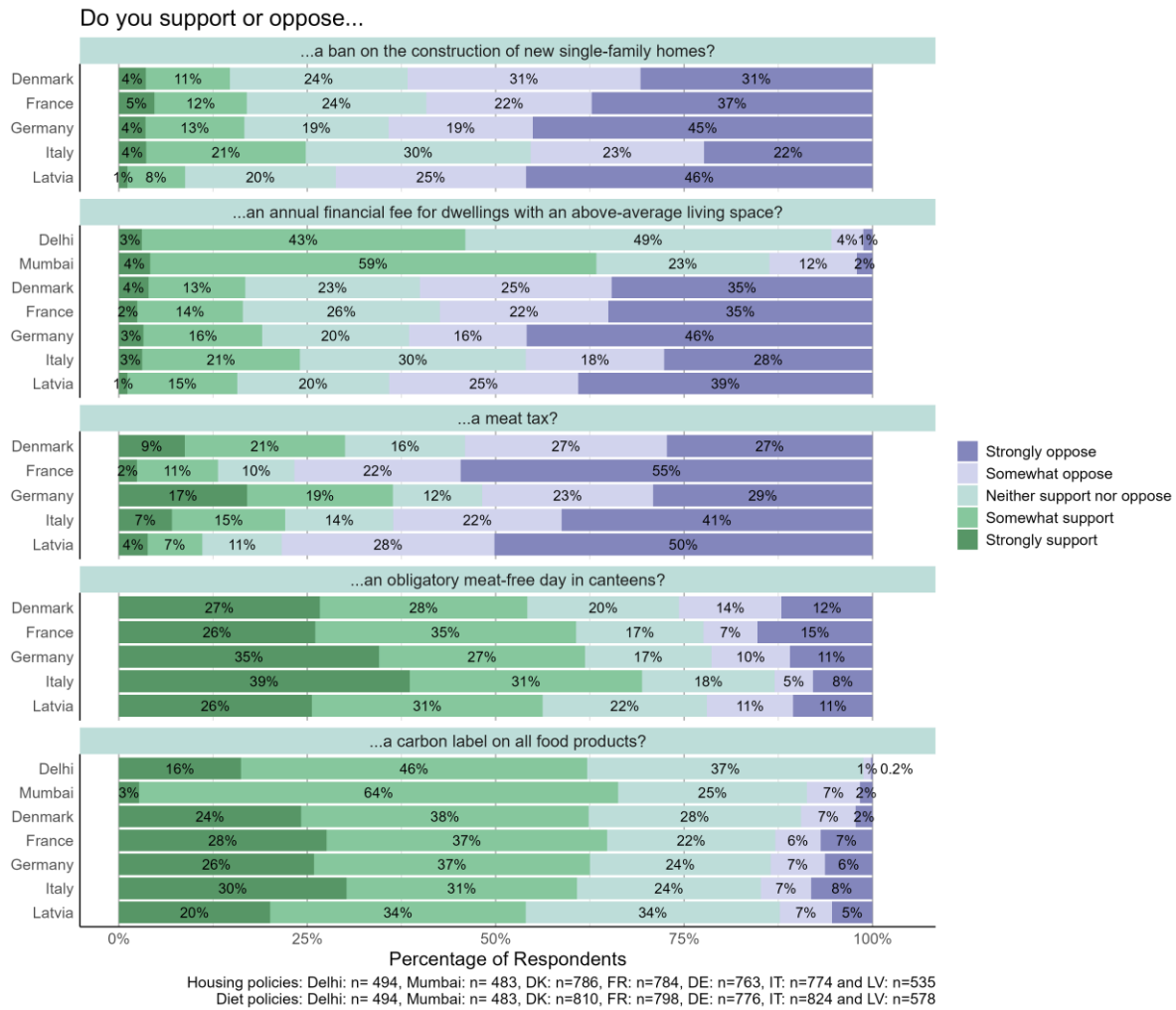


Figure 7 Evaluation of the policy measures

These findings suggest that the public is ready for softer, less intrusive measures to support sufficiency, but likely to oppose more radical measures at the moment. The experimental study revealed ways of engaging the public:

- In the case of the two housing measures, we varied between participants whether the measures were justified by the need to 'overcome' or 'punish' unsustainable housing choices; if people paid attention to the different wording, they were more supportive when 'overcome' was used.
- Also in relation to the housing measures, people were asked to choose the most preferred measures to accompany the policy measure, and the most preferred was to involve citizens in the policy design and, for example, to financially support the renovation of existing buildings.



- Overall, respondents' familiarity with these types of policy measures is low - but those who were more familiar with the topic or more keen to discuss them tended to be more supportive. This is consistent with the findings of the citizens' workshops, where engaged citizens supported stronger sufficiency measures (Barbas & Breucker, 2024).
- In general, and independent of the experimental design, respondent who reported higher trust in policy-makers are also more likely to support the measures.

4. Sufficiency-oriented lifestyles and their intended and unintended consequences

One of the goals of the micro-level studies is also to investigate the consequences of sufficiency. Social consequences were studied in more detail in another part of the project (Teubler et al., 2024), but the micro-level studies provide some indications of relevant issues.

4.1. The gender dimension of sufficiency-oriented lifestyles

As indicated in section 2.1, our analyses revealed some gender differences: women are more likely to have a low carbon footprint than men. This is partly related to a sufficiency-oriented lifestyle, but also to the fact that women are more likely to be living in deprivation. Findings from interviews with people involved in initiatives suggest that many sufficiency measures are related to care work. Care work refers to domestic tasks such as cleaning, cooking or shopping, but also to attending to the needs of other household members such as children, the elderly or spouses. Traditionally, and still today, these tasks are carried out primarily by women and are usually not rewarded financially or only with small incentives such as some pension benefits or tax reductions for married couples. Low-carbon mobility and plant-based diets often require more time and planning of activities than more mainstream practices such as using a car or preparing convenience meals based on meat. Similarly, practices such as sharing goods such as washing machines or cars and taking them back for repairs require information gathering, active networking and extra organisation, adding to the list of unpaid tasks. While respondents from initiatives talked about their active engagement to ensure that these tasks are not shared in traditionally gendered ways, they acknowledge that such lifestyles are at odds with the mainstream. This suggests that sufficiency policies need to be carefully designed and implemented to ensure that they do not contribute to the gender divide in society, but support the equivalence of care work with other societal tasks such as business or paid work.

4.2. Carbon footprints and social deprivation

The results of the above analyses suggest several ways in which carbon footprints and indicators of well-being and social deprivation are related. While in India, especially in Delhi, the relationship between carbon footprint and well-being was strong, in the corresponding analyses for the European countries it only emerged for Latvia and the relationship was lower (see section 2.2). Furthermore, the analyses of the low carbon footprint groups in combination with well-being pointed to the difference between sufficiency-oriented lifestyles and being deprived.

A more detailed analyses shows the following (Alexander-Haw, 2023)⁷:

- Perceptions of being socially deprived are positively related to the carbon footprint from heating and electricity which possibly suggests that some people suffer from high fossil

⁷ An academic paper is submitted. Please contact the authors for updates.



energy costs or inefficient buildings, and electrical appliances which lead to higher consumption.

- There is a negative association between being threatened to be cut off by energy supplier and the heating carbon footprint, thus, those in danger of being cut of are already frugal in their consumption in this area.
- Similarly, we find a negative association between receiving government support and the reported transport deprivation with the carbon footprint for transport, again suggesting that these people already cut back on mobility.
- In contrast, higher incomes and a lower degree of urbanisation of the place of living is associated with higher carbon footprints.

5. Conclusions

The aim of this document was to integrate and synthesise the comprehensive assessment of lifestyles from a micro-level perspective. The findings suggest that while there are sufficiency-oriented lifestyles in contemporary societies, there is also a direct link between economic well-being as a buffer against deprivation and the carbon footprint. This calls for attention in the design of policies to maintain the balance between low carbon emissions and well-being.



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