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## Sufficiency: A systematic literature review

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### ABSTRACT

The making of sustainable economies calls for sufficiency in production and consumption. The discussion, however, lacks a shared understanding on what it means to operationalize sufficiency. In this article, we review and analyze the concept of sufficiency with a focus on its linkages to different economic scales (with a focus on micro- and macroeconomics) and economic actors (particularly consumers and producers). Altogether 307 articles were screened, resulting in a final data set of 94 peer-reviewed articles. In addition to the core assumption of ‘enoughness’, we found three premises describing the concept: (1) complementarity of capitals, (2) social metabolism, and (3) altruism. In the reviewed literature, sufficiency is understood as both an end in itself and a means for bringing consumption and production within ecological limits. By conducting the first systematic literature review on sufficiency, the study explicates a more integrated understanding of sufficiency and highlights the need to treat sufficiency across economic scales and actors. In future research, empirical work should be emphasized to grasp the contextual varieties in the operationalization of sufficiency.

### 1. Introduction

From a general systems point of view (Boulding, 1956; Boulding, 1966; see also Spash, 2013), the overuse of earthbound resources is troublesome for humans (Daly and Ehrlich, 1992; Barnosky et al., 2012; IPCC, 2014). As a sub-system of the biosphere (the global sum of all ecosystems), the economic system is dependent on the proper functioning of its host system (Meadows et al., 1972; Wackernagel et al., 2002; Rees, 2020). This signifies that to sustain the human economy, as Goodland and Daly (1996) demarcate, all resource use must be fitted within the regenerative capacities of those resources and/or matched with the rate of developing substitutes for the used resources. Moreover, all waste from the economy must be kept within the assimilative capacities of its supporting ecosystems (ibid, see also Georgescu-Roegen, 1975).

While the need to reorganize the economy according to these principles is increasingly acknowledged—for instance, as expressed in the United Nations Climate Change Conference’s call for net zero emissions and phasing out coal (United Nations, 2021)—alterations to the prevailing productivist economy is challenging to implement. Advances have been made in increasing the efficiency of the global economy, but some of the saved resources and waste reductions have bounced back to human use (Alcott, 2005; Sorrell and Dimitropoulos, 2008; Wei and Liu, 2017). In addition to this so-called rebound effect, there is inadequate

empirical evidence and theoretical support for the decoupling hypothesis, warranting changes in the economy beyond conventional efficiency improvements (Wiedmann et al., 2015; Parrique et al., 2019; Haberl et al., 2020; Vadén et al., 2020; Heikkurinen and Ruuska, 2021; Bonnedahl et al., 2022).

In his book *The Logic of Sufficiency*, Princen (2005) analyzes the idea of sufficiency to address the overuse of resources. Influenced by Daly and Georgescu-Roegen, he states that “[s]ufficiency begins as a simple idea and, under certain conditions, especially ecological constraint, can lead to major social organizing principles, ones that rival, indeed, compete with cooperation and efficiency” (Princen, 2003: 43). This intuitively rather lucid idea of ‘enough’, which challenges the principles of constantly more and faster, seems to be shared among sufficiency scholars, like Young and Tilley (2006), Salleh (2009), Dietz and O’Neill (2013), and Spangenberg and Lorek (2019), to name a few. However, the sufficiency literature that connects to sustainability (also discussed under the terms ‘ecological sufficiency’ and ‘eco-sufficiency’), however, is less unanimous on the question of what it means to operationalize sufficiency. For instance, is sufficiency treated first and foremost as a macro- or microeconomic question, or perhaps something to be solved on the industry and sector levels? How about sufficiency initiatives: are they presumed to originate on the demand or supply side of the economy? What roles do consumers, on the one hand, and producers, on the other hand, play in building a sufficiency-based economy?

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Heindl and Kanschik (2016), Gossen et al. (2019), and Niessen and Bocken (2021), among others, have pointed out that the field would benefit from a more synthesized understanding of sufficiency. And efforts have indeed recently been made to clarify the field. Sandberg (2021), for instance, summarized the sufficiency literature into a typology of consumption changes, while Niessen and Bocken (2021) provided a review of sufficiency in the business context. These reviews are valuable contributions to the field, particularly for understanding either the consumer or producer point of view at the micro scale of organizing. An analysis on the microeconomic scale, however, is partial, lacking an explanation of the decisions taking place in governments and national policy. Consequently, a more comprehensive analysis enabling to map the field's emphasis on the two conventional economic scales of micro and macro as well as economic actors (consumers and producers) is needed.

In this article, we review and analyze the concept of sufficiency with a focus on its assumptions and linkages to different economic scales and actors. We aim to contribute to the emerging field of sufficiency studies by providing a synthesized understanding of the concept, including its disciplinary roots, and identifying research gaps. In addition to the field's normative starting point 'enoughness', we identified three commonly shared assumptions, namely: complementarity of capital, social metabolism, and altruism. While these three premises form a steady base for operationalizing sufficiency, the scholarship is rather divided in treating the concept either as a consumption or a production issue. In terms of consumption, sufficiency is found to be manifested in behavioral change towards less and moderate individual consumption, and is claimed to require a macroeconomic transition towards more equitable intra- and intergenerational distribution of affluence. On the production side, sufficiency is manifested in calls for a paradigm shift in business logic and alternative imaginaries to organize human activity in society. Only a few articles are found to connect the economic actors of consumers and producers to each other in-between the different scales of micro- and macroeconomics, which we argue in this article is necessary for effective change.

The article is structured as follows. First, the methodological approach will be described in detail (Section 2). Second, the findings from the review will be presented (Section 3). Finally, the findings and their broader implications will be discussed (Section 4), ending with concluding remarks about the study and sufficiency in general (Section 5).

## 2. Method

Following the methodological procedures and techniques of Tranfield et al. (2003) and Paul and Criado (2020), this study was conducted as a systematic literature review (SLR). Owing to the nascent stage of the sufficiency debate, the data analysis was focused on interpreting the field rather than examining the data through statistical and bibliometric analyses (cf. Sandelowski et al., 1997; Tranfield et al., 2003). The key information concerning the method is summarized in Table 1.

**Table 1**  
Basic information about the systematic literature review (SLR). Adopted from Callahan's (2014) 6W framework.

Who conducted the review?	The authors of this paper
When were the data collected?	During September 2020 to November 2021
Where were the data collected?	Articles in peer-reviewed, scholarly journals Database searches (Web of Science, Scopus, ScienceDirect, Google Scholar); snowball sampling
How were the data found?	Final data set 94 articles
What was found?	Search word found in title, abstract, or keyword; English; explicitly discusses the meaning of sufficiency in relation to sustainability
Why were certain works included (selection criteria)?	

### 2.1. Data collection

The data comprised of literature published up until November 2021 that met the following selection criteria: peer-reviewed articles published in academic journals; written in English; sufficiency or eco-sufficiency mentioned in title, abstract or keywords; explicitly discusses the meaning of sufficiency in relation to sustainability. Moreover, articles were only included if they explicitly described what sufficiency is or how it could be conceptualized or understood. In other words, articles that mentioned sufficiency in passing—without providing any substantial explanation of the concept—were excluded. We followed the systematic search procedure with these criteria, and consequently books, book chapters, conference papers, and public reports were omitted from the data. As the sufficiency debate is still evolving, the search was not limited to any specific time range.

A pilot search in Scopus showed that a search using only the word "sufficiency" would yield over 16,000 articles, while a search with "eco-sufficiency OR 'ecological sufficiency'" yielded only nine articles. The former search led to many publications referring to sufficiency only in passing and was unmanageable with the resources at hand due to the large sample. The latter search again was evidently too restrictive. This test search led us to collect the data in three phases (Fig. 1).

#### 2.1.1. The first search phase

Eco-sufficiency, ecological sufficiency, and sufficiency (without the prefix eco) seemed to be used rather interchangeably in the literature. This observation revealed the importance of using both wordings in the literature search. Thus, in the first search phase the Boolean operators and the search words "eco-sufficiency OR 'ecological sufficiency'" were employed. The search was conducted in three databases, namely Web of Science, Scopus, and ScienceDirect. To minimize the risk of missing relevant publications, the same search word set was used in Google Scholar. As it is not possible to limit the results to title, abstract, and keywords in this search engine, the results in Google Scholar were manually screened to achieve the same search limitations as was used in the above mentioned databases. The search in Google Scholar did not, however, lead to adding new publications in the data.

#### 2.1.2. The second search phase

As was revealed in the pilot phase, a search using only "sufficiency" resulted in over 16,000 articles covering all possible scholarly fields. Consequently, it was concluded that the second search would require a combination of sufficiency and some other relevant keywords, to limit the results to relevant academic debates. The selected search combinations were "consumption AND (sufficiency NOT self\*) AND sustainab\*" and "production AND (sufficiency NOT self\*) AND sustainab\*." These searches largely limited the results to sustainability discussions, particularly sustainable consumption and production, and excluded discussions of self-sufficiency—an interesting topic but outside the scope of this study. The searches were conducted in the same databases as in the first search phase.

The data from the first and second phase, a total of 307 articles, were combined and screened, and duplicates were removed. Abstracts from every article were read carefully to discard publications that did not meet the selection criteria of peer-reviewed journal articles (for example, book chapters or conference papers) or if they used the words eco-sufficiency or sufficiency in passing without referring to sustainability in any sense (simply meaning an adequate level of micronutrients in a medical or biological context, for example). The screening of the abstracts led to a list of 113 articles, which were read and reviewed in detail. From this data, articles extraneous to the research objective were additionally omitted if they did not provide any conceptualization of sufficiency. Finally, the combined list from the first and second search phases contained 81 articles.

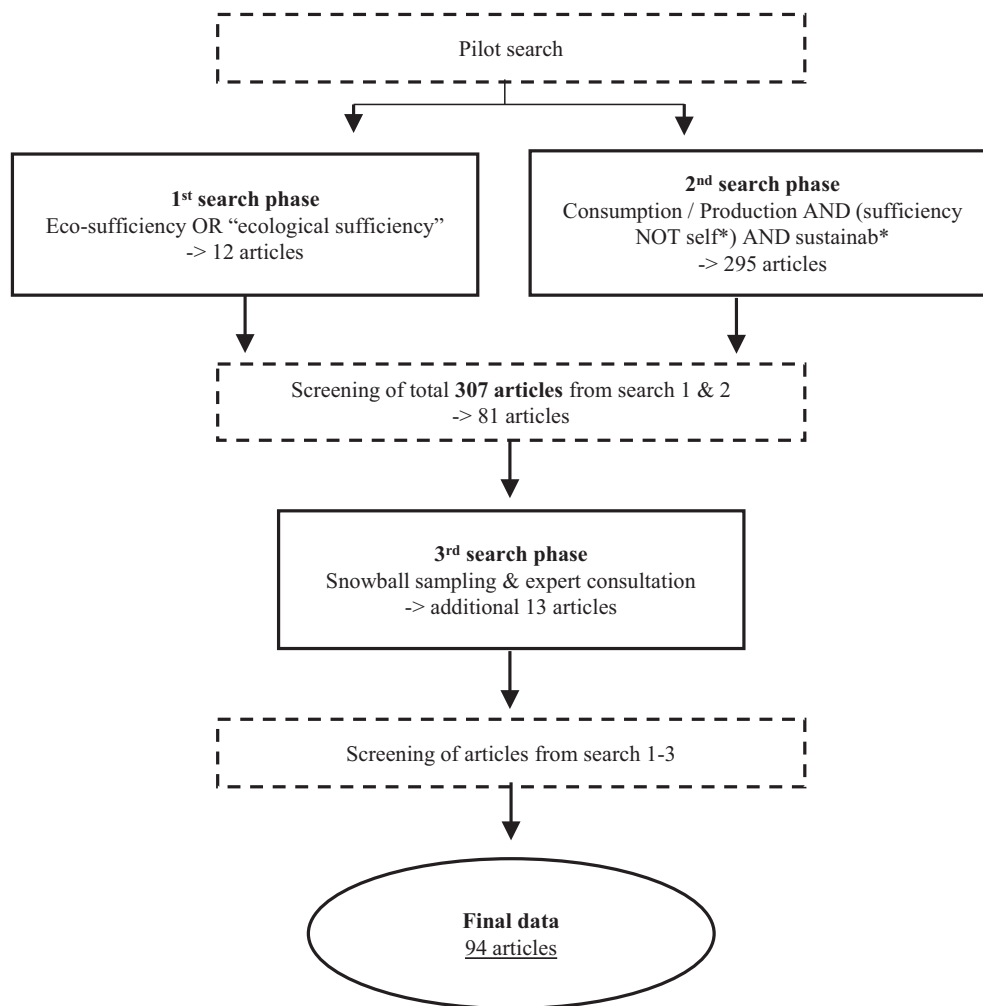


Fig. 1. Overview of the search and review process.

### 2.1.3. The third search phase

An additional third search was conducted by snowball sampling, in other words, using the references found in the screened literature as a basis for finding other relevant sources. Moreover, scholars with expertise closely related to sufficiency were also consulted to judge whether some essential publications, meeting the selection criteria of the data collection in this study, were still missing. The aim of this phase was to complement the final data set with publications not found in the database searches. Altogether 13 articles were added to the data in this phase, resulting in a total of 94 articles (see Appendix A). Finally, the data was reviewed once again to ensure their relevance.

## 2.2. Data analysis

This iterative way of proceeding is typical for SLRs in social sciences, where professional judgement and interpretation play an important role, instead of leaning on some specific hierarchy of evidence (Denyer and Tranfield, 2009; see also Pawson, 2006). As conducted in the search phases, the abstracts of the final articles were screened for a first overview and the relevance of each article was evaluated once again. Notes were taken to keep track of recurring topics and the central ideas of each article. Each paper was then read more thoroughly to gain a deeper understanding of the article's focus, its underlying assumptions, as well as the offered understanding of sufficiency in relation to a sustainable economy. Again, notes were taken to record the themes that occurred frequently and to clarify the article's positioning in the field. Ultimately, all articles, as well as the written notes, were overhauled once more to

compare individual accounts and to recognize patterns and main categories present in the literature. This contributed to the synthesis of the different definitions of sufficiency and expounded the general positioning of the debate so far.

Before proceeding to the findings, some general characteristics of the data should be noted. Firstly, most of the articles were published around 2010 and later, and the number of publications increased towards the end of the last decade, peaking in 2021 (see Figure 2). No articles published before 2000 that meet the selection criteria of this SLR were found. Secondly, the sufficiency debate is scattered. The 94 selected articles cover 54 different journals. The publication frequency is highest in *Journal of Cleaner Production*, followed by *Sustainability* and *Ecological Economics*. Some concentration in journals with an interdisciplinary sustainability and environmental policy focus can be detected, but in general, the debate is spread out across a wide range of academic fields (see Table 2). Thirdly, the term sufficiency is used more often than eco-sufficiency. Only 15 articles mentioned eco-sufficiency, or both eco-sufficiency and sufficiency, while 79 articles used only the term sufficiency.

## 3. Findings

The data revealed that sufficiency is a concept based on the recognition of ecological constraints. It is conceptualized as an idea, programme, doctrine, vision, worldview, paradigm, way of living, and strategy—among others. Authors using the concept both describe and prescribe a shift from increasing human wants to meeting basic needs. At

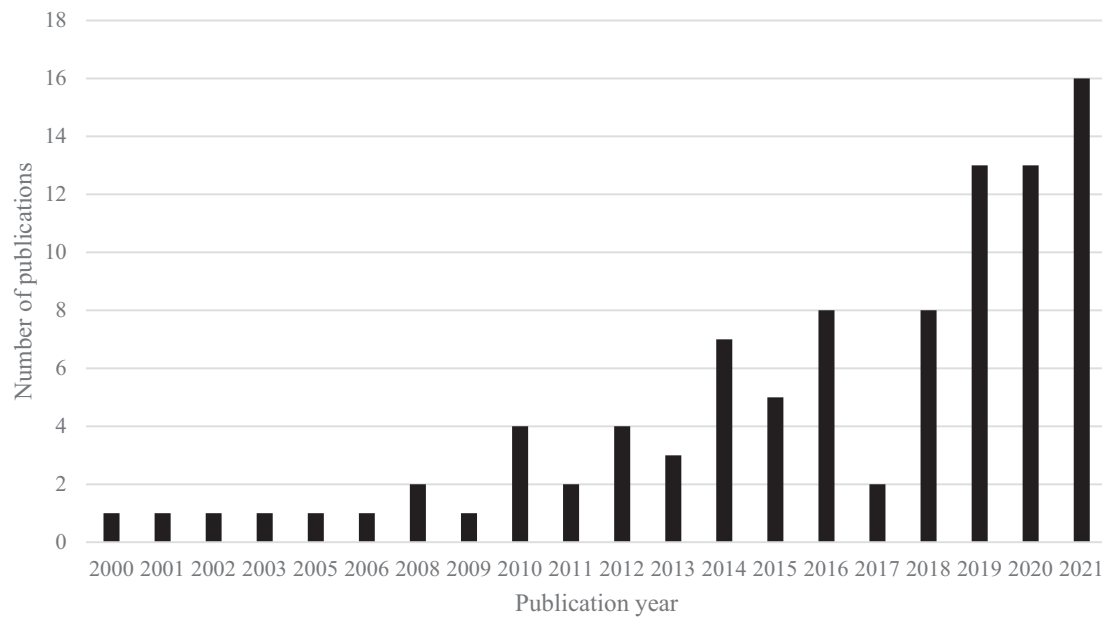


Fig. 2. Yearly distribution of articles.

the core of the concept is the idea that reaching a state of ‘enough’ is desirable both from the perspective of ecosystems, as well as from the point of view of social and economic systems. In addition to this core premise of the field, we identified three main disciplinary roots in the debate, namely ecological economics, political ecology, and ecological philosophy. The different disciplinary roots all feed the sufficiency debate with focal assumptions, which accordingly are *complimentary of capital* (Premise 1), *social metabolism* (Premise 2), *altruism* (Premise 3). In the literature, sufficiency is deemed important since according to the first premise, humans can only complement non-human or natural capital. To avoid losing critical stocks of non-human capital, the second premise suggests that social metabolism must slow down. To engage in this task, an ethos not limited to self-interest but encompassing a degree of altruism—care of others (including non-humans)—is warranted. After describing the different conceptualizations and the identified premises in more detail (summarized in Table 3), the article will proceed to analyzing the links between sufficiency and different economic scales (with a focus on the micro- and macroeconomics divide), as well as the connection to different economic actors (with a focus on consumers and producers) (see Table 4).

### 3.1. Conceptualizations of sufficiency

Huber (2000) provides the earliest explicit discussion on sufficiency by connecting it to sustainable development. He states: “the sufficiency version of sustainable development is a programme for the conservation of nature” (ibid: 281). Although sufficiency is seldom explained as a program in later publications, the clear connection to the environment and the natural limits of the planet is crucial in the general understanding of it (Lehtonen and Heikkurinen, 2021). Other early contributions to the debate (e.g., Dyllick and Hockerts (2002); Young and Tilley (2006)) conceptualize sufficiency as part of the ‘natural case’ of corporate sustainability, meaning business organizations should acknowledge that natural capital is not always substitutable with economic capital and that sustainability requires considerations beyond the pure business case. Around the same time, Princen (2003) set the starting point for a broader understanding of the concept, presenting sufficiency as a commonsensical idea, that “under certain conditions, especially ecological constraint, can lead to major social organizing principles [...]” (ibid: 43). Later, sufficiency has been referred to as a sustainability “doctrine” (Kanschik, 2016: 556–557) as well as a “world-

view” and a “paradigm” (Vita et al., 2019). Thus, it seems that sufficiency has a rather abstract role of influencing sustainability thinking in the broad sense attributed to it, leaving the more tangible meaning of the concept undefined.

The literature also reveals that the concept is presented in a more sociological and even behaviorist manner. That is, sufficiency is portrayed as a certain way of living that dissociates from the currently dominating consumerist values. For example, the concept is frequently related to various social movements such as voluntary simplicity (e.g., Boulanger, 2010; Alexander, 2013 (O’Sullivan and Kraisornsuthasinee, 2020)), anti-consumption (e.g., Bocken, 2017; Ziesemer et al., 2019), slow consumption (Cooper, 2005; Bocken et al., 2018), and downshifting (Geels et al., 2015). Accordingly, sufficiency is demonstrated by a normative shift and a value transition from more and faster to less and slower, implying a reassessment of needs (Gorge et al., 2015; Chamberlin and Callmer, 2021). The understanding seems to be that sufficiency is primarily a consumer-based concept, putting emphasis on individual responsibility (e.g., Haake and Jolivet, 2001; Alcott, 2008; Allievi et al., 2015; Schmidt and Matthies, 2018). However, opposite arguments can also be found, such as the one by Lorek and Spangenberg (2019: 293), who put forward that sufficiency should be recognized “as a field of action instead of referring to individual decisions and lifestyles as today”.

Indeed, the conceptualization of sufficiency can be seen to have taken a more pragmatic or strategic turn. For example, sufficiency has been defined as a “strategy for sustainable development” (Verfurth et al., 2019: 374), a strategy for sustainable consumption (Crivits et al., 2010; Bocken and Short, 2016; Tunn et al., 2019), a strategy for sustainable food systems (Allievi et al., 2015), as well as an “environmental strategy” to lower affluence (Alcott, 2008). Recently, sufficiency has been presented as a business strategy to promote and enable sustainable consumption (Tunn et al., 2019; Niessen and Bocken, 2021), mainly by marketing means (Frick et al., 2021; Gossen and Heinrich, 2021; Kelleci and Yildiz, 2021). Sufficiency is also frequently referred to as the “third sustainability strategy,” in addition to efficiency and consistency, which are seen as the other two main strategies (Huber, 2000; Schöpke and Rauschmayer, 2014; Loy et al., 2021; Tröger and Reese, 2021).

Despite the multiple conceptualizations of sufficiency found in the literature, the common denominator in the articles seems to be that the concept is understood as both a means and an end. When sufficiency is discussed as an idea, worldview, vision, or a way of life, it seems to get a



**Table 2**  
Distribution of articles per journal.

Journal	Frequency
Journal of Cleaner Production	14
Sustainability	9
Ecological Economics	6
Gaia-Ecological Perspectives for Science and Society	4
Sustainability: Science, Practice, and Policy	4
Energy Policy	3
Journal of Macromarketing	3
Business Strategy and the Environment	2
Environmental Values	2
Sustainable Development	2
Sustainable Production and Consumption	2
Administrative Sciences	1
Basic Income Studies	1
Cleaner and Responsible Consumption	1
Energies	1
Energy	1
Energy Research & Social Science	1
Environmental Innovation and Societal Transitions	1
Environmental Politics	1
European Review	1
Frontiers in Psychology	1
Futura	1
Futures	1
Global Environmental Change	1
Global Environmental Politics	1
Housing Theory & Society	1
International Journal of Sociology and Social Policy	1
International Journal of Sustainability Policy and Practice	1
International Journal of Sustainable Development	1
Journal of Consumer Behaviour	1
Journal of Consumer Culture	1
Journal of Consumer Policy	1
Journal of Environment & Development	1
Journal of Environmental Policy & Planning	1
Journal of Environmental Psychology	1
Journal of Housing and the Built Environment	1
Journal of Industrial Ecology	1
Journal of Management Development	1
Journal of Public Policy & Marketing	1
Journal of Sustainability Research	1
Landscape Research	1
Nature Sustainability	1
Organization & Environment	1
Plos One	1
Resources, Conservation and Recycling	1
Rural Society	1
SAPIENS	1
Science of The Total Environment	1
Social Dynamics-a Journal of African Studies	1
Sustainability Accounting Management and Policy Journal	1
Sustainability Science	1
Sustainable Futures	1
Travel Behaviour and Society	1
Urban Studies	1

role of an end in itself. As a means, again, it is often employed to bringing production and consumption systems within natural limits and striving for a state of enough in terms of the planet's carrying capacity. Additionally, it is worth noting that there does not seem to be any significant difference in the use of eco-sufficiency and sufficiency in the literature. Eco-sufficiency, which is used more seldomly, semantically accentuates the ecological elements of the concept. Still, both wordings clearly refer to the same idea when used in the context of sustainability, namely that a reassessment of consumption and production is needed to stay within the ecological limits (a maximum level) and secure a good life for all (a minimum level).

### 3.2. Premises of sufficiency

Based on the data, we were able to identify three main disciplinary roots to the sufficiency debate, namely ecological economics, political

ecology, and ecological philosophy, which further provide the concept with three focal premises. Within ecological economics, the discussion of sufficiency is embedded in the critique of the present heavy reliance on efficiency measures, which have been found to lead to considerable rebounds (e.g., [Alcott, 2008](#); [Schanes et al., 2019](#)). These discussions build on the works by prominent ecological economists, such as [Georgescu-Roegen \(1975\)](#) and [Daly \(1974, 1991, 1996\)](#), who argued for steady-state economic models implying limitations to economic growth and reductions in matter-energy throughput. Additionally, sufficiency is related to the economic ideas of degrowth ([Alexander, 2013](#); [Kanschik, 2016](#); [Kropfeld et al., 2018](#); [Tröger and Reese, 2021](#)). The disciplinary root of ecological economics brings forward the concept as a solution to the ecological problems created by contemporary growth-focused economies and consumerist lifestyles (e.g., [Boulanger, 2010](#); [O'Neill et al., 2018](#); [Spengler, 2016](#)). Furthermore, within this root it is acknowledged that natural capital cannot always be substituted by human-made or economic capital, but that different forms of capital are merely complementary. This is the *complementarity of capital premise* (*Premise 1*) behind sufficiency theorizing (e.g., [Dyllick and Hockerts, 2002](#)).

The second root is derived from the discipline of political ecology. This gives the sufficiency debate a more social and political undertone, raising questions related to social justice, provisioning, and labor (e.g., [Salleh, 2010](#); [Spengler, 2016](#); [Spangenberg and Lorek, 2019](#)). Globalization, urbanization, and the ecological modernization pursued by many countries are seen as problematic and sufficiency is presented as an ecologically and socially more sustainable alternative to these global developments ([Swilling, 2011](#); [Masterman-Smith, 2013](#); [Osti, 2012](#)). Sufficiency would, for example, involve a redistribution of the limited natural resources between the global South and North ([Hayden, 2015](#); [Gladkykh, 2021](#)). Furthermore, a central idea stemming from this context is the notion of social metabolism—a term describing the throughput of matter and energy caused by human activities. According to this perspective, a slowdown of the social metabolism is necessary due to the ecological damage caused by current capitalist modes of production, sometimes called the 'metabolic rift' ([Salleh, 2010](#)). Sufficiency is viewed as an approach that could repair this rift and improve both ecological and social sustainability, by shifting focus to more just distributions and local modes of production ([Salleh, 2010](#); [Masterman-Smith, 2013](#)). This can be considered as the *social metabolism premise* of sufficiency (*Premise 2*).

The third root seems to be represented by ecological philosophy, bringing ethical considerations of sufficiency to the fore. Within this disciplinary root, sufficiency entails a shift to non-material values to enhance wellbeing and simultaneously support a more just distribution of the scarce resources provided by the Earth ([Schäpke and Rauschmayer, 2014](#); [Muller and Huppenbauer, 2016](#); [Gossen et al., 2019](#); [Tröger et al., 2021](#)). This adds a focus on distributive justice to the debate, also referred to as sufficientarianism in line with the works by [Frankfurt \(1987\)](#). The emphasis is on the minimum level of resources that should be secured for all (e.g., [Kanschik, 2016](#); [Spengler, 2016](#)). The notion of sufficiency is particularly linked to questions about human needs and wants and the balance between these two that is just enough for a good life (e.g., [Di Giulio and Fuchs, 2014](#); [Gorge et al., 2015](#); [Callmer and Bradley, 2021](#)). Thus, the concept entails both ecological concerns as well as philosophical ideas of frugality and self-limitation as a path to increased wellbeing ([Lehtonen and Heikkurinen, 2021](#)). However, these studies imply a stance not limited to egoistic gains, like pleasure and wealth, but seem to relate altruistic elements to sufficiency ([Crivits et al., 2010](#); [Schäpke and Rauschmayer, 2014](#); [Heindl and Kanschik, 2016](#); [Gossen and Heinrich, 2021](#)). Hence, the third focal premise in the literature could be described as the *altruism premise* (*Premise 3*), in other words, people engage in sufficiency largely, or at least partly, for the sake of others and nature ([Table 3](#)).

The identified three disciplinary roots and focal premises naturally represent a simplification of the field. The concept of sufficiency has

**Table 3**

The main disciplinary roots, premises, and definition of sufficiency based on the systematic literature review (SLR).

Description of sufficiency			
Disciplinary roots	Ecological economics	Political ecology	Ecological philosophy
Main premises	Complementarity of capital (Premise 1)	Social metabolism (Premise 2)	Altruism (Premise 3)
Conceptualizations	Sufficiency as an end (e.g., vision, idea, paradigm, way of living) and a means (e.g., strategy, field of action)		
Definition	Sufficiency is a transdisciplinary concept about ‘enoughness’ of human doings in relation to ecosystems—an end in itself and a means for sustainable consumption and production comprising three main premises, namely the complementarity of capital (from ecological economics), social metabolism (from political ecology), and altruism towards human and non-human beings (from ecological philosophy).		

roots also in other disciplines and more premises relevant to the debate might be found. Nevertheless, these preliminary, broad observations made through the literature review, enables a discussion on the lowest common denominators of the field. To carve out the more specific meaning of sufficiency, the data is next analyzed in relation to producers and consumers, both on the two conventional scales of economic theory.

### 3.3. Economic scales and actors of sufficiency

#### 3.3.1. Sufficiency and consumers

**3.3.1.1. Microeconomics.** That sufficiency is to be understood as a matter of consumption, or a household issue, receives widespread support in the literature. On the microeconomic scale, sufficiency is described as consumers' self-imposed restriction, implying conscious behavioral change and a shift of values and norms (Crivits et al., 2010; Allievi et al., 2015; Sandberg, 2018; Tröger et al., 2021). Some specific consumption changes that have been identified are absolute reductions, modal shifts, product longevity, and sharing practices (Sandberg, 2021). Sometimes referred to as simply “strong sustainable consumption” (Spangenberg and Lorek, 2019: 1070), sufficiency entails the idea of “living well on less” (Figge et al., 2014: 217). The emphasis is often placed on the individual consumer's responsibility to voluntarily reduce consumption quantities (Frick et al., 2021; Gossen and Heinrich, 2021; Tröger et al., 2021). Consequently, aspects of human needs versus wants, as well as individual wellbeing, are frequently included in the discussion (e.g., ; Liedtke et al., 2013; Yan and Spangenberg, 2018; Callmer and Bradley, 2021). On this micro scale, sufficiency is demonstrated through consumer lifestyle changes towards consumption moderation, in line with alternative routines such as downshifting (Geels et al., 2015) or anti-consumption (Bocken, 2017). While such changes often are motivated by ecological concerns (Heindl and Kanschik, 2016), Lettenmeier et al. (2014) suggest that aspects of social sustainability are equally important, that is, the lower limit of consumption needed for a decent life.

**3.3.1.2. Macroeconomics.** On the macro scale, consumer sufficiency is presented as a changed social and institutional environment in which the role of consumption for welfare is reassessed. Sufficiency is concerned with the affluence factor (A) in the I=PAT equation, which implies a focus on distribution and intragenerational equity (Huber, 2000; Alcott, 2008) by aiming for lower consumption in already affluent parts of the world and increased welfare in poorer areas (Boulanger, 2010; Swilling, 2011; Heindl and Kanschik, 2016). Articles concerned with this scale emphasize social structures, public steering mechanisms, and the role of politics, and also acknowledge that substantial societal learning is required for sufficiency to become mainstream (e.g., ; (Petersen, 2016) Lorek and Spangenberg, 2019; Hotta et al., 2021). It is

often argued that sufficiency entails questioning the ability of the current capitalistic system to create social and environmental benefits, and that alternative models, such as degrowth or “sufficiency economies” (Hettiarachchi, 2012; Kasem and Thapa, 2012), are dependent on the embracement of sufficiency in consumption (Alexander, 2013; Geels et al., 2015; Persson and Klintman, 2021).

The literature that presents sufficiency as an issue on the consumer side is often rather conceptual, but some empirical studies of the concept can be found in more recent publications. Specific domains such as clothing (Kleinhueckelkotten and Neitzke, 2019; Freudenreich and Schaltegger, 2020; Frick et al., 2021), online shopping (Frick and Matthies, 2020; Frick et al., 2020), travelling (Waygood et al., 2019), and housing (e.g., Lorek and Spangenberg, 2019; Bohnenberger, 2020; Cohen, 2020) have been investigated. Calculations of household material footprints have also been offered in relation to sufficiency (Lettenmeier et al., 2012; Cibulka and Giljum, 2020; Nyfors et al., 2020). Furthermore, food policy (Brunori and Di Iacovo, 2014) and food waste (Schmidt and Matthies, 2018; Hagedorn and Wilts, 2019), as well as energy consumption (Nadimi and Tokimatsu, 2018; Seidl et al., 2017) have been addressed empirically from a macro-consumption perspective.

#### 3.3.2. Sufficiency and producers

**3.3.2.1. Microeconomics.** While the view of sufficiency as a demand-side issue is rather unequivocal and dominating in the literature, the picture of the concept as a matter of production is less clear. On the micro scale, sufficiency seems to be understood as having both indirect and direct implications for commercial producers. Indirectly, it is the responsibility of business organizations to influence consumers and to implement strategies that aim at actively moderating consumption (e.g., Bocken et al., 2014; Bocken et al., 2020; Frick et al., 2021). This would imply a focus on business model innovation through circular economy models (Tunn et al., 2019), product-service-systems (Rynkiewicz, 2008; Bocken et al., 2018), lifecycle thinking (Cooper, 2005), or more regional value chains and slower innovation cycles (Augenstein and Palzkill, 2016: 2). It would also require a fundamental shift in sales tactics and marketing, (Bocken and Short, 2016; Siqueira and Pitassi, 2016; Bauwens et al., 2020) and a new understanding of corporate value creation (Gunarathne and Lee, 2019; Gossen and Heinrich, 2021).

The more direct understandings of sufficiency for producers seems to go beyond influencing consumers and include production per se. Examples include Heikkurinen et al. (2019), who depict sufficiency as both a way to influence consumers, as well as to directly restrict production. Figge et al. (2014: 219) again conclude that sufficiency involves the decision to limit demand or supply irrespective of market considerations. As sufficiency would at this level of understanding mean that production is restricted both qualitatively and quantitatively, it is acknowledged that there needs to be a willingness to sacrifice potential profits and growth (Robra et al., 2020). Thus, sufficiency is understood as requiring a paradigm shift towards limited or no growth of profits, which is why sufficiency strategies and equivalents are argued to be found primarily in NGO's and not-for-profit organizations (Huber, 2000).

**3.3.2.2. Macroeconomics.** In the literature, producer-initiated sufficiency is also a matter of macro level changes. Sufficiency is demonstrated through new organizing principles aimed at bringing both production and consumption within natural limits (Princen, 2003; Berg, 2011). Pesch (2018: 1138) states that sufficiency is about “‘capping’ economic growth so that it will protect the ecosystem and support social justice.” Thus, the concept relates to discussions about the need to move beyond GDP and non-growth-based measures of production progress (Kasem and Thapa, 2012; O'Neill et al., 2018; Hicke, 2020), which again calls for changes in economic policy. Articles addressing the

macro-production scale of organizing emphasize the need for alternative production approaches that are a better fit with the metabolism of nature than the current socio-economic system (Salleh, 2010; Masterman-Smith, 2013). Sufficiency is seen as a way to shift the focus from quantity to quality in production and complement the weaknesses of efficiency approaches (e.g., Dyllick and Hockerts, 2002; (Udovyk and Hedren, 2014). The possibility of sufficiency strategies also leading to rebounds is still debated (Alcott, 2008; Alcott, 2010; Boulanger, 2009; Figge et al., 2014; Bauwens et al., 2020).

Except for energy production policies and strategies (e.g., Arabindoo, 2019; Gunarathne and Lee, 2021; Erba and Pagliano, 2021; Gladkykh, 2021), domain specific investigations of sufficiency for producers are rare. A few more empirically oriented examples can be found, such as Niessen and Bocken (2021) who studied sufficiency strategies in business organizations, and Allievi et al. (2015) who examined sufficiency in meat production and consumption. However, most contributions at this level are not empirical (Table 4).

#### 4. Discussion

The findings illustrate sufficiency as a multifaceted and complex concept, which potentially could provide a comprehensive alternative approach to complement, or even challenge, current efforts to build sustainable economies. At the same time, the complexity of the concept puts it at risk of remaining vague and ambiguous, and consequently, difficult to adopt on a larger societal scale. In this section, we will discuss the conceivable theoretical and practical contributions, propose future research avenues based on the identified gaps in the literature, and reflect on the limitations of the study.

##### 4.1. Theoretical and practical contributions

This paper contributes to the field of sufficiency studies by providing it the first systematic literature review conducted. While previous articles have provided insightful conceptualizations of sufficiency (e.g., Heindl and Kanschik, 2016; Spengler, 2016; Sandberg, 2021), none of them have done so following a systematic review technique or without making latent assumptions about the nature of sufficiency. For example, Sandberg (2021) recently conducted a semi-systematic review and defined sufficiency according to specific consumption categories, presupposing that sufficiency is primarily a consumption-based issue. By way of contrast, our review has taken a further step back in exploring the disciplinary roots of sufficiency and examined the data as a both consumer and producer issue. In addition, we also reviewed the literature in terms of the two conventional economics scales. Such an extensive study, we argue, is important for setting a common ground for future research and practical implementation.

Our iterative approach revealed that sufficiency is often understood as more than an issue of consumers and consumption. Based on the data, sufficiency concerns both demand and supply. More precisely, sufficiency in sustainable consumption is manifested in individual

consumption moderation and behavioral change (microeconomics), supported by a transition in the socio-economic environment towards a more just intra- and intergenerational distribution of affluence (macroeconomics). In the latter, public governance mechanism plays a crucial role. For producers again, sufficiency signifies a paradigm shift in business logics (microeconomics) as well as in alternative ways of organizing economic activity in society (macroeconomics). This addition and clarification of nuances to the definition of sufficiency is another important contribution of this study.

Furthermore, our findings also point to some critical issues and contradictions in the literature, which are important to recognize for future development of sufficiency theorizing and practice. Firstly, sufficiency is still regarded as a niche phenomenon and a radical approach to sustainability (Speck and Hasselkuss, 2015). In the current growth focused socio-economic system, an approach that implies absolute reductions is indeed radical and is perhaps the reason for sufficiency seldom being described in direct terms in production. A few scholars suggest that sufficiency could mean restricting production irrespective of demand side considerations (e.g., Figge et al., 2014; Heikkurinen et al., 2019), while several others depict it mainly as a strategy for supporting consumers to reduce material consumption (e.g., Bocken, 2017; Bocken et al., 2014, 2020). Ostensibly, there are contradictory views of how sufficiency can be understood in terms of sustainable production and the adoption of sufficiency on the supply side would benefit from further elaboration on this topic. For instance, does sufficiency imply capping production quantities and thus, possibly sacrificing growth and profits? Or should producer-side organizations consider sufficiency simply as a part of their extended responsibility to redirect consumers towards consumption moderation?

Secondly, the underlying premises of sufficiency point out that the concept also challenges mainstream economic theory and policy. Speck and Hasselkuss (2015) state that sufficiency does not constitute a very popular sustainability policy because of the fear that sufficiency might interfere with the material quality of life. However, the aspiration of the sufficiency scholars seems to be the opposite: by reducing material dependency and shifting to non-material values, quality of life might in fact be enhanced while supporting a more just distribution of the resources provided by the planet. Thus, the concept seems to entail the ambition of combining both sincere ecological caring, while at the same time trying to deal with social injustices, marked by the focus on both maximum and minimum levels found in the literature. This is undoubtedly a demanding task if adopted simply as an individual lifestyle change or a business strategy and requires a major paradigm shift, as frequently noted in the literature (Gorge et al., 2015; Gossen et al., 2019; Freudenreich and Schaltegger, 2020). However, if the understanding of sufficiency is not limited to a means but is also embraced as an end in itself, the concept could perhaps have a larger societal impact. How sufficiency can be incorporated into the dominant social paradigm, and how a turn from growthism to ‘enoughness’ could be done, is something that requires further analysis.

**Table 4**  
Summary of sufficiency according to different economic scales and actors.

Sufficiency	Sustainable consumption		Sustainable production	
Scales	Micro	Macro	Micro	Macro
Manifestations	Individual consumption moderation and behavioral change	Socio-economic transition towards intra- and intergenerationally just distribution of affluence	Paradigm shift in business logic (towards non-consumerism and less profit maximization)	Alternative ways of organizing economic activity in society
Number of articles addressing the category	46	61	23	21
Examples of articles	Haake and Jolivet (2001); Rynikiewicz (2008); Lettenmeier et al. (2012); Speck and Hasselkuss (2015); Vita et al. (2019); Frick et al. (2020); Tröger et al., 2021	Princen (2003); Alcott (2008); Schäpke and Rauschmayer (2014); Geels et al. (2015); Kanschik (2016); Lorek and Spangenberg (2019); Callmer and Bradley, 2021	Dyllick and Hockerts (2002); Osti (2012); Bocken et al. (2014); Augenstein and Palzkill (2016); Bocken et al. (2018); Heikkurinen et al. (2019); Gossen and Heinrich, 2021	Princen (2003); Salleh (2010); Berg (2011); Figge et al. (2014); O'Neill et al. (2018); Tröger and Reese, 2021



#### 4.2. Research gaps

The first major gap concerns sustainable consumption. While studies of domain specific practices and empirical investigations of the implementation of sufficiency on a micro scale have been offered to some extent already (Sandberg, 2021), more could still be done to better understand what sufficiency means in practice in different cultural and domain specific contexts. Especially housing, food, and mobility—which account for a large part of the environmental footprint (Tukker et al., 2008)—could be investigated on a more quantitative level in terms of sufficiency. Another important discussion regarding sustainable consumption that could benefit from further examination is whether sufficiency implies voluntary or obligatory changes. For example, Heindl and Kanschik (2016) and Spengler (2016), underline the voluntariness connected to sufficiency, while Gorge et al. (2015) present the concept as being both voluntary and obligatory. Otherwise, this dual nature of sufficiency is seldom explicitly discussed. For practical implementation it would be valuable to understand, for example, if there are circumstances in which sufficiency could constitute obligatory changes or how voluntary reductions should be done in various consumption domains. Can sufficiency, which is a rather subjective and contextual matter, be described in an objective way and formed into general consumption guidelines?

The second gap relates to sustainable production. So far, the literature has only to a limited extent covered how sufficiency is to be distinguished in sustainable production. Bocken has made a significant contribution to developing the understanding of sufficiency as a business strategy (e.g., Bocken et al., 2014; Bocken, 2017; Bocken et al., 2020) and it has been concluded that sufficiency require fundamentally new approaches to doing business (e.g., Augenstein and Palzkill, 2016; Gossen and Heinrich, 2021). However, there is a need to understand sufficiency in production in more concrete terms. For instance, in what way are producers responsible for sufficiency? Beyond reassessing current business models on a general level, what does sufficiency mean in different sectors, for example, primary food production, heavy industries, or health care? Are there production domains that should put more emphasis on sufficiency than others, and how does the implementation of sufficiency differ between sectors? For example, the food industry has received some attention (e.g., Allievi et al., 2015; Bocken et al., 2020), but further investigation of this sectoral or ‘mesoeconomic’ scale in the light of sufficiency would be crucial as food represents an inevitable part of everyday life. In general, an increased focus on the supply side could potentially reduce some of the ambiguities related to the indirect or direct meaning of sufficiency for sustainable production and enhance the practical usability of the concept.

#### 4.3. Limitations

Tranfield et al. (2003) notes that SLRs are useful for synthesizing theories and providing collective insight, but the method does not come without limitations. One such limitation concerns the search strategy. To conduct a strictly systematic literature search, several restrictions had to be made regarding what kind of literature to include. Thus, relevant articles might have been excluded due to, for example, the use of another language than English or discussing sufficiency without mentioning it in the title, abstract or keywords. To manage this exclusion risk, we used three different citation databases (Scopus, Web of Science, and Science Direct), as well as Google Scholar, and made an additional snowball sampling, to get as broad literature coverage as possible considering the research questions.

Also, specific search word combinations were needed to limit the search to a manageable, and at the same time interesting, data set. We used sufficiency as the base search word combined with a few other words (eco-/ecological, sustainab\*, consumption and production), steered by the aim of the present study. However, we acknowledge the existence of other related terms that could have been relevant for the

analysis as well. For example, by their relation to ecosystem limits and the preference for less, concepts like voluntary simplicity, strong sustainability, and planetary boundaries also relate to sufficiency (cf. Lehtonen and Heikkurinen, 2021). On the one hand, using these or other similar terms in the literature search could have led to additional or different angles to understanding sufficiency. On the other hand, it could have influenced the rigor of the study. Moreover, the decision was made to include only peer-reviewed articles in scholarly journals. This enabled a strictly systematic and transparent search and limited the review to the most active part of the debate, but it excluded books, book chapters and other publication forms which might have been informative for the development of a common understanding of sufficiency.

These limitations somewhat inherent to SLRs provides an interesting avenue for future sufficiency research. Researchers continuing on this topic could, for instance, adopt a less restrictive data strategy and focus on specific contexts for implementing sufficiency, such as energy, food, or mobility. A narrower focus could make room for books and other publication types to also be included in the data set. Using another combination of search words, as discussed above, could also lead to interesting insights about sufficiency in relation to other established concept. In addition, it would be fruitful to complement theory-driven and literature-based research with in-depth empirical studies on what sufficiency signifies in practice.

#### 5. Conclusion

In this article we reviewed and analyzed the concept of sufficiency with a focus on the focal assumptions of sufficiency scholarship and the linkages of the concept to different economic scales and actors. In addition to the normative core premise of ‘enoughness’, we found three commonly shared assumptions, namely complementarity of capital, social metabolism, and altruism. In the literature on sufficiency, different forms of capital are assumed to be complementary (*Premise 1*), and since social or human capital cannot substitute natural capital, the human-induced metabolism must slow down (*Premise 2*). The enactment of such transformation is assumed to require an ethic not limited to egoism, in other words, a degree of altruism is needed in human organizing (*Premise 3*). The concept of sufficiency is also treated both as a means and an end in the transition towards more sustainable economies.

Moreover, the linkages of sufficiency to different economic scales and actors can be concluded as follows. On the one hand, the scholarship was found to be rather divided in considering the concept in connection to either the micro- or macroeconomic scale, and on the other hand, rather separated in terms of emphasizing the responsibility of either consumers or producers for sufficiency initiatives. In terms of consumption, sufficiency is conceptualized as individual consumption moderation and behavioral change and is claimed to require socio-economic transitioning towards more equitable intra- and intergenerational distribution of affluence. On the production side, sufficiency is demonstrated as calls for a paradigm shift in business logic, as well as in an abstract aspiration for alternative imaginaries to organize the economy.

As sufficiency might be difficult to operationalize due to its abstractness, producing organizations may need to choose a few aspects of the concept to focus on, while consumers naturally might adhere to other aspects. The impact of selected sufficiency initiatives on the dynamics between different economic actors will also be important to understand. Furthermore, sufficiency at the micro and macro scales of organizing need to complement one another and should perhaps be aligned for effective change. Absolute reductions of matter-energy throughput are an inevitable part of solving the socio-ecological crisis and will first and foremost require affluent economies to make radical consumption and production changes. In this task, the concept of sufficiency may serve as a source of inspiration, but the operationalization of the concept requires further research.

With this article we aim to establish a more common ground for the

sufficiency scholarship. Based on an examination of the various descriptions obtainable in the literature we clarified sufficiency and its relevance for sustainable consumption and production, which hopefully can serve as a springboard for operationalizing the concept in the future. Owing to the concept's emphasis on the amount of goods and services produced and consumed, sufficiency is still considered to represent a radical approach to sustainability. However, increased focus on understanding sufficiency and other marginal concepts might be crucial considering the urgency of the environmental crisis.

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## Declaration of Competing Interest

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

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## Appendix A. Final data from the systematic literature review

Authors	Publication year	Journal	Article title
Huber	2000	Journal of Environmental Policy & Planning	Towards industrial ecology: sustainable development as a concept of ecological modernization
Haake & Jolivet	2001	International Journal of Sustainable Development Business Strategy and the Environment	Some reflections on the link between production and consumption for sustainable development
Dylick & Hockerts	2002	Global Environmental Politics	Beyond the business case for corporate sustainability
Princen	2003	Journal of Industrial Ecology	Principles for sustainability: from cooperation and efficiency to sufficiency
Cooper	2005	Business Strategy and the Environment	Slower consumption - Reflections on product life spans and the "throwaway society"
Young & Tilley	2006	Ecological Economics	Can businesses move beyond efficiency? The shift toward effectiveness and equity in the corporate sustainability debate
Alcott	2008	Journal of Cleaner Production	The sufficiency strategy: would rich-world frugality lower environmental impact?
Rynikiewicz	2008	Basic Income Studies	The climate change challenge and transitions for radical changes in the European steel industry
Boulanger	2009	Journal of Cleaner Production	Basic income and sustainable consumption strategies
Alcott	2010	SAPIENS	Impact caps: why population, affluence and technology strategies should be abandoned
Boulanger	2010	Futures	Three strategies for sustainable consumption
Crivits et al.	2010	Organization & Environment	Scenarios based on sustainability discourses: constructing alternative consumption and consumer perspectives
Salleh	2010	Journal of Consumer Policy	From metabolic rift to "metabolic value": reflections on environmental sociology and the alternative globalization movement
Berg	2011	Social Dynamics-a Journal of African Studies	Not roadmaps but toolboxes: analysing pioneering national programmes for sustainable consumption and production
Swilling	2011	European Review	Reconceptualising urbanism, ecology and networked infrastructures
Hettiarachchi	2012	Sustainable Development	Sufficiency and material development: a post-secular reflection in the light of Buddhist thought
Kasem & Thapa	2012	Sustainable Development	Sustainable development policies and achievements in the context of the agriculture sector in Thailand
Lettenmeier et al.	2012	Sustainability	Material footprint of low-income households in Finland—Consequences for the sustainability debate
Osti	2012	Sustainability: Science, Practice, and Policy	Green social cooperatives in Italy: a practical way to cover the three pillars of sustainability?
Alexander	2013	Environmental Values	Voluntary simplicity and the social reconstruction of law: degrowth from the grassroots up
Liedtke et al.	2013	Sustainability	Microfoundations for sustainable growth with eco-intelligent product service-arrangements
Masterman-Smith	2013	Rural Society	Rural workers and environmentally sustainable livelihoods in Australia
Bocken et al.	2014	Journal of Cleaner Production	A literature and practice review to develop sustainable business model archetypes
Brunori & Di Iacovo	2014	Landscape Research	Urban food security and landscape change: a demand-side approach
Di Giulio & Fuchs	2014	Gaia-Ecological Perspectives for Science and Society	Urban food security and landscape change: a demand-side approach
Figge et al.	2014	Journal of Cleaner Production	Sustainable consumption corridors: concept, objections, and responses
Lettenmeier et al.	2014	Science of The Total Environment	Sufficiency or efficiency to achieve lower resource consumption and emissions? The role of the rebound effect
Schäpke & Rauschmayer	2014	Sustainability: Science, Practice, and Policy	Resource use of low-income households—Approach for defining a decent lifestyle?
Udoviyk & Hedren	2014	International Journal of Sustainability Policy and Practice	Going beyond efficiency: including altruistic motives in behavioral models for sustainability transitions to address sufficiency
Allievi et al.	2015	Journal of Cleaner Production	Utopian ideas about sustainability? The case of chemical management in the EU
Geels et al.	2015	Global Environmental Change	Meat consumption and production - analysis of efficiency, sufficiency and consistency of global trends

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Authors	Publication year	Journal	Article title
Gorge et al.	2015	Journal of Macromarketing	A critical appraisal of sustainable consumption and production research: the reformist, revolutionary and reconfiguration positions
Hayden	2015	Journal of Environment & Development	What do we really need? Questioning consumption through sufficiency
Speck & Hasselkuss	2015	Sustainability: Science, Practice, and Policy	Bhutan: blazing a trail to a postgrowth future? Or stepping on the treadmill of production?
Augenstein & Palzkill	2016	Administrative Sciences	Sufficiency in social practice: searching potentials for sufficient behavior in a consumerist culture
Bocken & Short	2016	Environmental Innovation and Societal Transitions	The dilemma of incumbents in sustainability transitions: a narrative approach
Heindl & Kanschik	2016	Ecological Economics	Towards a sufficiency-driven business model: experiences and opportunities
Kanschik	2016	Environmental Values	Ecological sufficiency, individual liberties, and distributive justice: implications for policy making
Muller & Huppenbauer	2016	Gaia-Ecological Perspectives for Science and Society	Eco-sufficiency and distributive sufficientarianism – friends or foes?
Pettersen	2016	Journal of Cleaner Production	Sufficiency, liberal societies and environmental policy in the face of planetary boundaries
Siqueira & Pitassi	2016	Journal of Cleaner Production	Fostering absolute reductions in resource use: the potential role and feasibility of practice-oriented design
Spengler	2016	Environmental Politics	Sustainability-oriented innovations: can mindfulness make a difference?
Bocken	2017	Journal of Management Development	Two types of ‘enough’: sufficiency as minimum and maximum
Seidl et al.	2017	Plos One	Business-led sustainable consumption initiatives: impacts and lessons learned
Bocken et al.	2018	Journal of Cleaner Production	Navigating behavioral energy sufficiency. Results from a survey in Swiss cities on potential behavior change
Kropfeld et al.	2018	Journal of Public Policy & Marketing	Pay-per-use business models as a driver for sustainable consumption: evidence from the case of HOMIE
Nadimi & Tokimatsu	2018	Energy	The ecological impact of anticonsumption lifestyles and environmental concern
O'Neill et al.	2018	Nature Sustainability	Energy use analysis in the presence of quality of life, poverty, health, and carbon dioxide emissions
Pesch	2018	International Journal of Sociology and Social Policy	A good life for all within planetary boundaries
Sandberg	2018	Journal of Macromarketing	Paradigms and paradoxes: the futures of growth and degrowth
Schmidt & Matthies	2018	Resources, Conservation and Recycling	Downsizing of housing: negotiating sufficiency and spatial norms
Yan & Spangenberg	2018	Sustainable Development	Where to start fighting the food waste problem? Identifying most promising entry points for intervention programs to reduce household food waste and overconsumption of food
Gossen et al.	2019	Journal of Macromarketing	Needs, wants and values in China: reducing physical wants for sustainable consumption
Gunarathne & Lee	2019	Journal of Cleaner Production	Why and how commercial marketing should promote sufficient consumption: a systematic literature review
Hagedorn & Wilts	2019	Gaia-Ecological Perspectives for Science and Society	Environmental and managerial information for cleaner production strategies: an environmental management development perspective
Heikkurinen et al.	2019	Journal of Cleaner Production	Who should waste less? Food waste prevention and rebound effects in the context of the Sustainable Development Goals
Kleinhueckelkotten & Neitzke	2019	Sustainability	Business for sustainable change: extending eco-efficiency and eco-sufficiency strategies to consumers
Lorek & Spangenberg	2019	Energy Policy	Social acceptability of more sustainable alternatives in clothing consumption
Schanes et al.	2019	Ecological Economics	Energy sufficiency through social innovation in housing
Spangenberg & Lorek	2019	Energy Policy	Three scenario narratives for a resource-efficient and low-carbon Europe in 2050
Tunn et al.	2019	Journal of Cleaner Production	Sufficiency and consumer behaviour: from theory to policy
Verfuert et al.	2019	Gaia-Ecological Perspectives for Science and Society	Business models for sustainable consumption in the circular economy: an expert study
Vita et al.	2019	Ecological Economics	Is it up to them? Individual levers for sufficiency
Waygood et al.	2019	Travel Behaviour and Society	The environmental impact of green consumption and sufficiency lifestyles scenarios in Europe: connecting local sustainability visions to global consequences
Ziesemer et al.	2019	Sustainability	Transport sufficiency: introduction & case study
Arabindoo	2020	Urban Studies	Pioneers' insights into governing social innovation for sustainable anti-consumption
Bauwens et al.	2020	Ecological Economics	Renewable energy, sustainability paradox and the post-urban question
Bocken et al.	2020	Sustainability	Circular futures: what will they look like?
Bohnenberger	2020	Journal of Housing and the Built Environment	Sufficiency business strategies in the food industry—the case of Oatly
Cibulka & Giljum	2020	Sustainability	Can ‘sufficiency’ reconcile social and environmental goals? A Q-methodological analysis of German housing policy
Cohen	2020	Housing Theory & Society	Towards a comprehensive framework of the relationships between resource footprints, quality of life, and economic development
Freudenreich & Schaltegger	2020	Journal of Cleaner Production	New conceptions of sufficient home size in high-income countries: are we approaching a sustainable consumption transition?
Frick et al.	2020	Journal of Consumer Behaviour	Developing sufficiency-oriented offerings for clothing users: business approaches to support consumption reduction
Frick & Matthies	2020	Sustainable Production and Consumption	Do online environments promote sufficiency or overconsumption? Online advertisement and social media effects on clothing, digital devices, and air travel consumption
Hickel	2020	Ecological Economics	Everything is just a click away. Online shopping efficiency and consumption levels in three consumption domains
Nyfors et al.	2020	Futura	The sustainable development index: measuring the ecological efficiency of human development in the Anthropocene
Robra et al.	2020	Sustainable Futures	Ecological sufficiency in climate policy: towards policies for recomposing consumption

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Authors	Publication year	Journal	Article title
O'Sullivan & Kraisornsuthasinee	2020	Sustainability Accounting Management and Policy Journal Sustainability: Science, Practice and Policy	Commons-based peer production for degrowth? The case for eco-sufficiency in economic organisations You earn as you live as you value. Consumption-work dialectic and its implications for sustainability
Callmer & Bradley	2021	Journal of Sustainability Research	In search of sufficiency politics: the case of Sweden
Chamberlin & Callmer	2021	Energies	Spark Joy and Slow Consumption: An Empirical Study of the Impact of the KonMari Method on Acquisition and Wellbeing
Erba & Pagliano	2021	Journal of Environmental Psychology	Combining Sufficiency, Efficiency and Flexibility to Achieve Positive Energy Districts Targets
Frick et al.	2021	Energy Research & Social Science	When your shop says #lessismore. Online communication interventions for clothing sufficiency
Gladkykh et al.	2021	Cleaner and Responsible Consumption	When justice narratives meet energy system models: Exploring energy sufficiency, sustainability, and universal access in Sub-Saharan Africa
Gossen & Heinrich	2021	Journal of Cleaner Production	Encouraging consumption reduction: Findings of a qualitative study with clothing companies on sufficiency-promoting communication
Gunarathne & Lee	2021	Sustainability	The link between corporate energy management and environmental strategy implementation: Efficiency, sufficiency and consistency strategy perspectives
Hotta et al.	2021	Sustainability	Expansion of Policy Domain of Sustainable Consumption and Production (SCP): Challenges and Opportunities for Policy Design
Kelleci & Yildiz	2021	Environmental Values	A Guiding Framework for Levels of Sustainability in Marketing
Lehtonen & Heikkurinen	2021	Frontiers in Psychology	Sufficiency and Sustainability: Conceptual Analysis and Ethical Considerations for Sustainable Organisations
Loy et al.	2021	Sustainable Production and Consumption	Global Citizens – Global Jet Setters? The Relation Between Global Identity, Sufficiency Orientation, Travelling, and a Socio-Ecological Transformation of the Mobility System
Niessen & Bocken	2021	Journal of Consumer Culture	How can businesses drive sufficiency? The business for sufficiency framework
Persson & Klintman	2021	Journal of Cleaner Production	Framing sufficiency: Strategies of environmental non-governmental organisations towards reduced material consumption
Sandberg	2021	Sustainability Science	Sufficiency transitions: A review of consumption changes for environmental sustainability
Tröger & Reese	2021	Sustainability	Talkin' bout a revolution: an expert interview study exploring barriers and keys to engender change towards societal sufficiency orientation
Tröger et al.	2021	Sustainability	Can Reflective Diary-Writing Increase Sufficiency-Oriented Consumption? A Longitudinal Intervention Addressing the Role of Basic Psychological Needs, Subjective Well-Being, and Time Affluence

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