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Avengers, assemble the literature! A multi-study review of consumption, environmental values, and planetary health research

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Abstract

Mother Earth is dying. Humanity needs to step up. Otherwise, the planet we call home will soon be uninhabitable. The destiny of our planet inarguably depends on consumers, as their choices have the power to turn them into eco-superheroes (sustainable consumption) or eco-villains (unsustainable consumption). This article aims to review the current progress of consumption research and propose strategies to inspire consumers to embrace their inner eco-warrior spirit, fostering sustainable behavior that protects the environment and supports human well-being. To achieve this, this article employs an integrative approach, merging a meta-perspective on theoretical development with a multi-study methodological approach. Harnessing the power of scientometrics, this article delivers meta-insights from a multi-study analysis on consumption trends in relation to environmental values (micro-perspective; Study 1) and planetary health (macro-perspective; Study 2). These findings pave the way for future research and intervention strategies designed to nurture ecological sustainability and unleash the eco-warrior in every consumer.

1 | INTRODUCTION

The World Commission on Environment and Development (1987) established sustainable development as a global agenda for change, encouraging the world to meet present needs without compromising the ability to meet future needs. The United Nations introduced eight Millennium Development Goals (MDGs) in 2000, which later expanded and transitioned into 17 Sustainable Development Goals (SDGs) in 2015, both striving to propel sustainable development towards a brighter future.

Despite most countries adopting well-intended international agendas for sustainable development, the harsh reality is that the state of the world continues to deteriorate rather than improve (Lim, 2022a). Noteworthily, the planet is dying faster than we can ever imagine, with climate change, biodiversity loss, and human overpopulation putting Mother Earth in an increasingly precarious position (Bradshaw et al., 2021), which, if left unaddressed, could trigger a Permian–Triassic Mass Extinction—or more popularly known as The Great Dying—which previously wiped out more than 90% of aquatic life (in the water) and 70% of terrestrial life (on land) over 250 million years ago (Dal Corso et al., 2020).

Contrary to popular belief, the lockdown measures imposed to curb the coronavirus disease 2019 (COVID-19) pandemic had a negligible effect on the global temperature (Weber et al., 2020). Similarly, the global population has grown rather than shrunk, surpassing eight billion people on November 15, 2022 (United Nations Department of Economic and Social Affairs, 2022). Humanity has also tried to outsmart nature by going digital, but this attempt could backfire if it is not well executed, as seen by a recent study by a group of researchers from the University of Massachusetts, who evidenced that the

training of a single artificial intelligence model can leave a carbon footprint that is nearly five times the lifetime emissions of the average American car or 315 round-trip flights between New York and San Francisco (Strubell et al., 2019).

The world has reached a stage where the existence of humanity is genuinely threatened. The grand international agendas for sustainable development are simply not working as intended, largely due to global inaction. The Social Progress Imperative (2020) forecasts that the world will not achieve the 2030 Agenda for Sustainable Development until at least 2092, whereas the United Nations Economic and Social Commission for Asia and the Pacific (2023) projects that the Asia-Pacific region is set to miss 90% of the measurable targets of the SDGs. To put it simply, nothing seems to be going right. This sentiment has been echoed by the United Nations Secretary-General, António Guterres, in his opening remarks at the 77th United Nations General Assembly: "As fractures deepen and trust evaporates, we need to come together around solutions. People need to see results in their everyday lives, or they will lose faith [and] hope in the future."

However, hope is not yet lost. The threats facing Mother Earth need to be taken seriously and the quest for game-changing solutions must commence immediately before it is too late. Embracing the spirit of Howard Schultz, who once said, "In times of adversity and change, we discover who we are and what we are made of," this article contends that the key to reversing the grim future of Mother Earth and ensuring humanity's survival could be found in the problem itself—that is, consumers and their consumption behavior.

Consumption, or the act of using a resource, is inherently a neutral consumer behavior (Lim, Kumar, Pandey, et al., 2022). However, consumption can turn into a serious problem when consumers consume more than what is available or needed (overconsumption), which could limit availability, and in turn, may result in other consumers not being able to consume what is required to meet their needs (underconsumption). Therefore, consumers need to be mindful in their consumption to avoid falling victim to mindless consumption and experiencing its dire consequences (Gupta et al., 2021, 2023; Lim, 2017).

Against this backdrop, this article posits that the onus is on consumers to protect and save Mother Earth, and by extension, their future. As superheroes inspire critical hope (Torres & Tayne, 2017), this article uses the terms "superheroes" and "villains" as metaphors to represent consumers whose consumption behavior instills optimism and pessimism regarding ecological sustainability, respectively. That is to say, consumers can either become superheroes (sustainable consumption) or villains (unsustainable consumption) in the quest to protect and save Mother Earth, much of which depends on their mindfulness in consumption (Gupta et al., 2021, 2023; Lim, 2017). Aiming to deliver profound insights that can empower and transform consumers into eco-superheroes on this quest, this article conducts a multi-study scientometrics analysis of research across two consumption domains/fields—that is, environmental values (micro) and planetary health (macro)—that are most pertinent to establishing a meta-understanding of consuming for ecological sustainability. As a result, this article makes a seminal contribution by assembling a meta-view of current progress and suggesting ways forward for consumption research to restore and safeguard the future and wellbeing of the planet and her people.

2 | THEORETICAL AND METHODOLOGICAL FOUNDATION

This article adopts an integrative approach, which combines different schools of thoughts, to inform its theoretical (meta-perspective) and methodological (multi-study) foundation for its scientometrics analysis of consumption research relating to ecological sustainability.

From a theoretical standpoint, this article embraces a meta-perspective of ecological sustainability, accounting for (i) the micro-perspective of the environmental values held by consumers and (ii) the macro-perspective of planetary health that reflects the health of human civilization and the natural systems that it depends on. Noteworthily, a review of environmental values remains elusive despite its empirical richness (Duff et al., 2022), and the same can be said about planetary health, which has only received review scrutiny from a public health perspective (Rossa-Roccor et al., 2020), but not from a consumption lens, which is inarguably key to making progress on sustainable development (Lim, 2017), especially when the demand in consumption shapes the supply from production (Lim, 2022a). Moreover, no study, to date, has attempted to connect these two key streams of consumption research, thereby indicating that the present study is the first of its kind in consumer and environmental sciences.[1] More importantly, the meta-perspective embraced herein avoids the fallacy of deriving implications with a partial understanding of the issue, which typically happens when the micro-perspective or macro-perspective is viewed independently without any reconciliation or synthesis, resulting in potentially misaligned narratives (e.g., solving one issue but raising another; Lim, 2022a). In this regard, the meta-perspective brings the benefit of establishing implications based on a holistic understanding of the issue, thereby improving the relevance and richness of recommendations as well as the chances of mitigating and resolving the issue (Lim, Ciasullo, Douglas, & Kumar, 2023).

From a methodological perspective, this article performs a multi-study analysis that leverages the power of scientometrics to unpack the trends of consumption in conjunction with environmental values and planetary health. Though multi-study analysis is most common in empirical studies, recent scholars have indicated its suitability for review studies (Kraus et al., 2022; Lim, Kumar, & Ali, 2022). Noteworthily, multi-study analysis provides the advantage of understanding the foundation and trajectory of each domain before establishing the implications of their synthesis. The alternative, which is to combine and analyze the domains upfront, will limit the development of such an understanding, and by extension, the ability to discern the contribution and progress of each domain. More importantly, the power of

[1]As evidenced by a search that synthesizes the keyword string involving environmental values and planetary health from Study 1 and Study 2 that returned no article on Scopus as of November 22, 2022.

scientometrics, which is relied upon in this article, represents a profound way for analyzing a large body of knowledge as it relies on statistical techniques to analyze the scientific components of relevant studies (Donthu et al., 2021), and thus, it is capable of objectively mapping the nomological network of major themes and revealing the topical trends in the intellectual structure of a given field (Mukherjee et al., 2022). The alternative to scientometrics is manual coding and content analysis, which would be inefficient and impractical for fields with a large number of articles/studies (e.g., hundreds to thousands or more) (Donthu et al., 2021; Kraus et al., 2022; Lim, Kumar, & Ali, 2022; Mukherjee et al., 2022).

3 | STUDY 1: ENVIRONMENTAL VALUES AND CONSUMPTION

3.1 | Goal

The goal of the first study was to explore consumption research relating to ecological sustainability from the micro-perspective, which is centered on the environmental values held by consumers and how they affect their consumption behavior. The value-belief-norm (VBN) theory (Stern et al., 1999), which integrates value theory (Schwartz, 1992) and norm activation theory (Schwartz, 1977), is a key theory of environmentalism (i.e., consumers' environmental concern and behavior; Stern, 2000) that grounds this focus and thus guides the exploration in this study. The VBN theory posits that *pro-environmental behavior* (i.e., actions that avoid harm to and/or protect the environment such as buying environmentally friendly products, willingness to make sacrifices to protect the environment, and environmental citizenship; Steg & Vlek, 2009) can be driven by personal *norms* (i.e., an internal sense of obligation to behave in certain way; Schwartz, 1977), which are shaped by the *beliefs* (e.g., awareness of consequences and ascription of responsibility; Stern, 2000; Stern et al., 1999) about the relationship between the planet and her people (i.e., the ecosystem worldview espoused by the new ecological paradigm; Dunlap et al., 2000) and the *values* (i.e., guiding principles of importance such as altruistic, biospheric, and egoistic orientations; Stern, 2000; Stern et al., 1999) held by the consumer.

3.2 | Methods

This study conducted a scientometrics analysis to unpack the trends in consumption and environmental values research. This analysis is suitable for identifying trends (Donthu et al., 2021) and mapping the nomological network (Mukherjee et al., 2022) of major themes in scientific research (Lim, Kumar, & Ali, 2022). Using a pragmatic approach focusing on detailing the review decisions in a transparent and replicable yet parsimonious way (Kraus et al., 2022), a two-stage process involving corpus curation and corpus analysis was adopted to perform and report the findings from the scientometrics analysis (Lim, 2022b).

In terms of *corpus curation*, a search for "final" (*publication stage*)[2] "article" (*document type*)[3] published in "English" (*language*)[4] "journal" (*source type*)[5] up to "2022" (*search period*)[6] using the *keyword string*[7] "("environment" AND "value*-belief*-norm*") OR ("environmental value*") AND ("consum*")" was conducted within the "article title, abstract, keywords" (*search field*)[8] in Scopus (*search database*),[9] which returned a result of 539 documents. The rationales for these decisions, as indicated in the footnotes, were guided by Donthu et al. (2021), Kraus et al. (2022), and Paul et al. (2021).

In terms of *corpus analysis*, a *performance analysis* was conducted using Scopus analytics and a science mapping was conducted in VOSviewer using *bibliographic coupling*, wherein documents are clustered based on their referencing similarity (Donthu et al., 2021; Van Eck & Waltman, 2010). This enables the study to reveal the publication trend, most prolific journals, most impactful articles, top contributors, as well as major themes for consumption and environmental values research.

3.3 | Findings

3.3.1 | Performance analysis of consumption and environmental values research

The *publication trend* of consumption and environmental values research is illustrated in Figure 1. The first publication in the domain, which emerged after the Brundtland Commission report in 1989, is by Kempton (1991), who conducted ethnographic interviews to explain how consumers conceptualize global climate change (i.e., plant photosynthesis, personally experienced temperature variation, stratospheric ozone depletion, and tropospheric pollution) and make value judgments about it (i.e., preserving the environment for descendants). The productivity of the domain is generally on an upward trajectory, with the introduction of international sustainability agendas such as the MDGs igniting a small but stable flow of publications between 2000 and 2015 and the SDGs sparking an

[2]*Publication stage*: Only finalized publications were included, as they possess assigned volume and/or issue numbers, as well as article and/or page numbers, unlike in-press publications that have not yet reached this stage.
[3]*Document type*: Only articles were included due to their peer-reviewed status and representation of new knowledge, whether conceptual or empirical. This differs from documents such as editorials, notes, or reviews, which may not meet the same criteria for comprehensiveness, novelty, or rigor.
[4]*Language*: English was the sole language considered, given its status as the global research lingua franca, as opposed to languages limited to local or regional communities.
[5]*Source type*: Only journals were selected because they typically involve multiple peer-review rounds and emphasize exploratory and confirmatory research. In contrast, sources like books, book chapters, and conference proceedings may not receive equivalent scrutiny and often serve explanatory or work-in-progress purposes.
[6]*Search period*: A start date was not specified to maximize the number of relevant articles or studies included up to the search date (November 22, 2022).
[7]*Keyword string*: A keyword string was formulated based on the 3Es—that is, expertise, experience, and exposure—acquired through studying the relevant literature.
[8]*Search field*: The "article title, abstract, keywords" field was chosen as these sections should contain the search keywords if they are central or critical to the articles or studies.
[9]*Search database*: Scopus was utilized, as it offers one of the largest collections of scientific articles or studies while encompassing most, if not all, records available in its main competitor, Web of Science, and more.

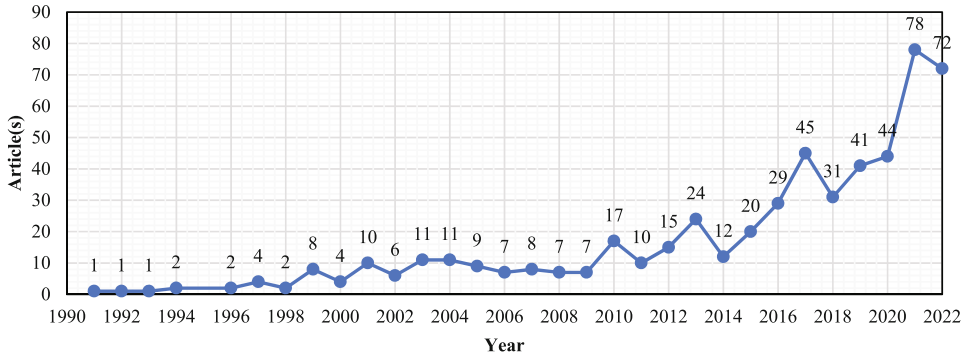

FIGURE 1 Publication trend of consumption and environmental values research.

TABLE 1 Most prolific journals publishing consumption and environmental values research.

Rank	Journal(s)	Article(s)
1	Sustainability	27
2	Ecological Economics	19
3	Journal of Cleaner Production	17
4	International Journal of Environmental Research and Public Health	16
5	Business Strategy and the Environment; Environmental Values	9
6	International Journal of Consumer Studies	8
7	Energy Policy; Environmental and Resource Economics; Frontiers in Psychology; Journal of Environmental Protection and Ecology; Journal of Retailing and Consumer Services; Journal of Sustainable Tourism; Resources Conservation and Recycling	7
8	Environment and Behavior; Environmental Science and Pollution Research; Journal of Environmental Management	6
9	Energy; Journal of Agricultural and Environmental Ethics; Journal of Agricultural and Environmental Ethics; Sustainable Development; Waste Management	5
10	Energy Research and Social Science; Journal of Business Research; Journal of Consumer Marketing; Journal of Marketing Management; Journal of Travel Research; Land Economics; Science of the Total Environment	4

exponential rise in publications from 2015 onwards, with 2021 and 2022 soaring above the 70 articles mark and thus representing the most productive years of the domain.

The *most prolific journals* publishing consumption and environmental values research are presented in Table 1. The top three most prolific journals are *Sustainability* (*n*: 27), *Ecological Economics* (*n*: 19), and *Journal of Cleaner Production* (*n*: 17). Noteworthily, most journals focused on the environment, indicating that much room avails for business, consumer, and marketing journals such as *International Journal of Consumer Studies* (*n*: 8), *Journal of Retailing and Consumer Services* (*n*: 7), *Journal of Business Research* (*n*: 4), *Journal of Consumer Marketing* (*n*: 4), and *Journal of Marketing Management* (*n*: 4) to contribute more given that consumer behavior is a core focus of these journals.

The *most impactful articles* on consumption and environmental values research are shown in Table 2. The most impactful article is Verplanken and Holland (2002), which evidenced that priming environmental values central to consumers' self-concept can enhance their attention to and the weight they give to information related to those values, resulting in environmentally friendly choices (734 citations). This is followed by Hanley et al. (2001), which demonstrated that choice modeling is consistent with consumer theory and offers a powerful way to understand environmental valuation among consumers (700 citations), and Steg et al. (2005), which extended the theoretical generalizability of the VBN theory to explain consumer acceptance of energy policies aimed to reduce carbon emissions by households (670 citations). Noteworthily, several of the most impactful articles have been published in journals without a core focus on the environment (e.g., *Journal of Personality and Social Psychology*, *Journal of Economic Surveys*, and *Journal of Consumer Marketing*), which reaffirms the suggestion for these journals to contribute more given the impact that they can make in the field.

The *top contributors* of consumption and environmental values research are recognized in Table 3. First, the *top author* is John Thøgersen (four articles), whose recent works have contributed insights on how to make energy efficiency labels more effective using discrete choice experiments (Kuhn et al., 2022) and how behavioral motivations and awareness can catalyze behavioral spillover effects in environmentally responsible actions (Nash et al., 2019). Second, the *top affiliations* are Aarhus Universitet in Denmark with eight articles, The University of Queensland in Australia with six articles, and Wageningen University and Research in the Netherlands, Rensselaer Polytechnic Institute in the United States, and Griffith University in Australia with five articles each. Third, the *top countries* are the United States with 114 articles, followed by China (excluding Hong Kong and Taiwan) with 70 articles, and the United Kingdom with 54 articles. Fourth, the *top funding sponsors* are the National Natural Science Foundation of China in Asia with 30 articles, the European Commission in Europe with 10 articles, and the Economic and Social Research Council in the United Kingdom with eight articles. Fifth and finally, the *top subject*

TABLE 2 Most impactful articles on consumption and environmental values research.

Rank	Author(s) and year	Article	Journal	Citations
1	Verplanken and Holland (2002)	Motivated decision making: Effects of activation and self-centrality of values on choices and behavior	Journal of Personality and Social Psychology	734
2	Hanley et al. (2001)	Choice modelling approaches: A superior alternative for environmental valuation?	Journal of Economic Surveys	700
3	Steg et al. (2005)	Factors influencing the acceptability of energy policies: A test of VBN theory	Journal of Environmental Psychology	670
4	Kosoy and Corbera (2010)	Payments for ecosystem services as commodity fetishism	Ecological Economics	562
5	Seyfang (2006)	Ecological citizenship and sustainable consumption: Examining local organic food networks	Journal of Rural Studies	474
6	Gallagher and Muehlegger (2011)	Giving green to get green? Incentives and consumer adoption of hybrid vehicle technology	Journal of Environmental Economics and Management	424
7	den Hollander et al. (2017)	Product design in a circular economy: Development of a typology of key concepts and terms	Journal of Industrial Ecology	268
8	Wang et al. (2014)	Factors influencing sustainable consumption behaviors: A survey of the rural residents in China	Journal of Cleaner Production	249
9	Fraj and Martinez (2006)	Environmental values and lifestyles as determining factors of ecological consumer behaviour: An empirical analysis	Journal of Consumer Marketing	249
10	Bryant and Goodman (2004)	Consuming narratives: The political ecology of 'alternative' consumption	Transactions of the Institute of British Geographers	248

areas are "Environmental Science" with 295 articles, followed by "Social Sciences" with 177 articles, and "Business, Management and Accounting" with 138 articles based on the Scopus subject area classification. Overall, the top contributors are fairly diverse and inclusive across their respective constituencies.

3.3.2 | Science mapping of consumption and environmental values research

The bibliographic coupling of consumption and environmental values research revealed a nomological network of 14 major clusters (themes), encapsulating 462 documents or 85.7% of the entire corpus. This network is visualized in Figure 2 and a summary of key information is provided in Table 4.

Cluster 1 concentrates on the *new ecological paradigm* and is the largest, oldest, and most impactful cluster, comprising 94 articles with an average publication year of 2008.9 that have accumulated 5152 citations. Hanley et al. (2001), which is the most cited article in this cluster with 700 citations, advocate the use of choice modeling for environmental valuation, whereas Kosoy and Corbera (2010) and Seyfang (2006) are the second and third most cited articles in this cluster with 562 and 474 citations, shedding light on ecosystem services and ecological citizenship, respectively.

Cluster 2 centers on *green product innovation, adoption, and consumption* and is the second largest and third most impactful cluster, containing 76 articles with an average publication year of 2016.6 that have acquired 2368 citations. Gallagher and Muehlegger (2011), which is the most cited article in this cluster with 424 citations, examine consumer adoption of hybrid vehicles, whereas Polonsky (2011) and Werner and Richter (2007) are the second and third most cited articles in this cluster with 172 and 139 citations, illuminating insights on transformative green marketing and comparative life cycle analysis of wooden building products, respectively.

Cluster 3 facilitates understanding on *green product choices, preferences, and purchases* and is the joint third largest cluster that is more recent than its other cluster counterpart (Cluster 4), consisting of 58 articles with an average publication year of 2018.9 that have amassed 1250 citations. Khan and Mohsin (2017), which is the most cited article in this cluster with 145 citations, explore the effects of emotional values on green product consumer choice behavior, whereas Orth et al. (2005) and Lin and Niu (2018) are the second and third most cited articles in this cluster with 110 and 98 citations, providing both focused and generic insights on consumer green preferences and purchasing behavior, respectively.

Cluster 4 encapsulates research on *green consumer values, beliefs, and norms* and is the second most impactful and joint third largest cluster that is older than its other cluster counterpart (Cluster 3), comprising

TABLE 3 Top contributors of consumption and environmental values research.

Panel A. Top authors			Panel B. Top affiliations		Panel C. Top countries/territories		Panel D. Top funding sponsors		Panel E. Top subject areas	
Rank	Author(s)	Articles	Affiliation(s)	Articles	Country/territory	Articles	Funding sponsor	Articles	Subject area	Articles
1	Thøgersen, J.	4	Aarhus Universitet	8	United States	114	National Natural Science Foundation of China	30	Environmental Science	295
2	Abrahamse, W.; Eagle, L.; Gowdy, J.M.; Hanley, N.; Low, D.; Parras-Rosa, M.; Rahnama, H.; Saleem, M.A.; Seebauer, S.; Torres-Ruiz, F.J.; Vega-Zamora, M.	3	The University of Queensland	6	China (excluding Hong Kong and Taiwan)	70	European Commission	10	Social Sciences	177
3	Adnan, N.; Al Mamun, A.; Alves, H.; Badola, R.; Boley, B.B.; Budijati, S.M.; Chen, F.; Cook, A.; Dangelico, R.M.; Dolnicar, S.; Escribano, M.; Filho, W.L.; Gaspar, P.; Grønhøj, A.; Grün, B.; Guo, L.; Guo, S.; Hameed, I.; Han, H.; Harun, A.B.; Hayat, N.; Hoffmann, S.; Hong, T.; Hussain, S.A.; Irwin, J.R.; Kim, J.; Knezevic Cvelbar, L.; Landon, A.C.; Loebnitz, N.; Mesias, F.J.; Murgado-Armenteros, E.M.; Nyborg, K.; Ogiemwonyi, O.; Price, C.; Qi, Y.; Qu, Y.; Rahman, I.; Riera, P.; Sadiq, M.; Salameh, A.A.; Segev, S.; Shiel, C.; Steg, L.; Sun, X.; Thiangtam, S.; Waris, I.; Woosnam, K.M.; Zhao, H.; Zhao, H.; Zhu, Q.	2	Wageningen University and Research; Rensselaer Polytechnic Institute; Griffith University	5	United Kingdom	54	Economic and Social Research Council	8	Business, Management and Accounting	138

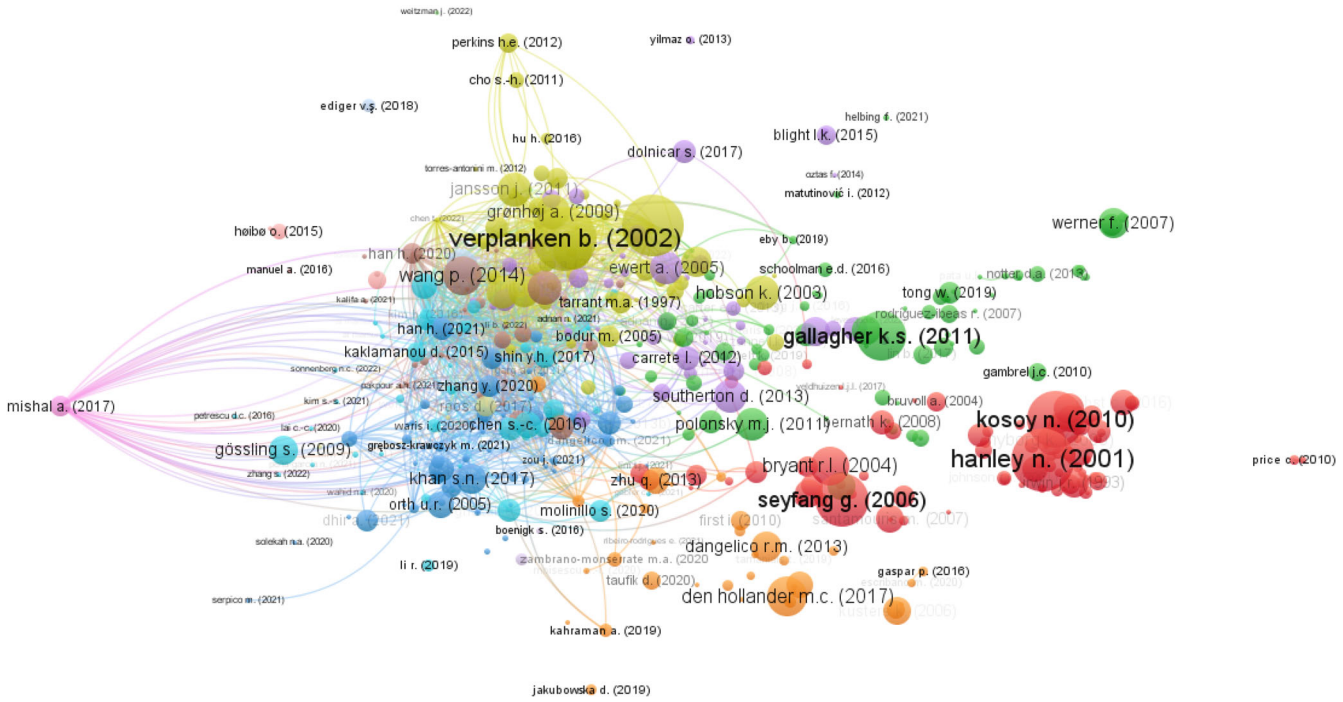

FIGURE 2 Network of major clusters (themes) on consumption and environmental values research. Cluster 1: New ecological paradigm (Red). Cluster 2: Green product innovation, adoption, and consumption (Dark purple). Cluster 3: Green product choices, preferences, and purchases (Dark blue). Cluster 4: Green consumer values, beliefs, and norms (Dark yellow). Cluster 5: Green leisure, outdoor experiences, and everyday practices (Purple). Cluster 6: Green hospitality and tourism (Light blue). Cluster 7: Green product development (Orange). Cluster 8: Green market segmentation (Brown). Cluster 9: Environmental value stream evaluation (Dark pink). Cluster 10: Environmental product assessments (Light pink). Cluster 11: Natural resource consumption (Light green). Cluster 12: Pro-environmental behavior motivation (Blue). Cluster 13: Circular economy (Light yellow). Cluster 14: Environmental social governance (Light purple).

58 articles with an average publication year of 2014.2 that have attracted 3835 citations. Verplanken and Holland (2002), which is the most cited article in this cluster with 734 citations, explore the effects of activation and self-centrality of values on consumer pro-environmental choices and behavior, whereas Steg et al. (2005) and Fraj and Martinez (2006) are the second and third most cited articles in this cluster with 670 and 249 citations, reaffirming the theoretical generalizability of the VBN theory and the importance of environmental values and lifestyles in shaping ecological consumer behavior, respectively.

Cluster 5 focuses on *green leisure, outdoor experiences, and everyday practices* and is the fourth largest cluster with a total of 45 articles that have garnered 1673 citations. The cluster is also the second oldest with an average publication year of 2013.4. Southerton (2013), which is the most cited article in this cluster with 174 citations, concentrates on consumers' everyday consumption practices in terms of habits, routines, and temporalities, whereas Ewert et al. (2005) and Swanwick (2009) are the second and third most cited articles in this cluster with 168 and 138 citations, revealing insights into consumers' leisure and outdoor experiences alongside their environmental attitudes, respectively.

Cluster 6 involves the context of *green hospitality and tourism* and is one of the most recent clusters with an average publication year of 2019.2 for 43 articles that have received 1124 citations. Gössling et al. (2009), which is the most cited article in this cluster with 137 citations, advocate for the co-creation of environmental value involving air travelers and voluntary carbon offsets, whereas Chen and Hung (2016) and Landon et al. (2018) are the second and third most cited articles in this cluster with 115 and 100 citations, employing the theory of planned behavior (TPB) and the VBN theory to understand pro-environmental behaviors among consumers and tourists, respectively.

Cluster 7 pertains to *green product development* and contains 36 articles with an average publication year of 2016.6 that have acquired 1262 citations. den Hollander et al. (2017), which is the most cited article in this cluster with 268 citations, develop a typology of key concepts and terms for product design in a circularly economy, whereas Dangelico et al. (2013) and Kusters et al. (2006) are the second and third most cited articles in this cluster with 146 and 126 citations, shedding light into green product development involving textile and upholstered furniture as well as nontimber forest products, respectively.

Cluster 8 relates to *green market segmentation* and is fairly recent, consisting of 30 articles with an average publication year of 2019.6 that have amassed 865 citations. Wang et al. (2014), which is the most cited article in this cluster with 249 citations, examine sustainable consumption behaviors among rural consumers in China, whereas Pothitou et al. (2016) and de Maya et al. (2011) are the second and

TABLE 4 Summary of major clusters (themes) on consumption and environmental values research.

Author(s)	Article	Journal	Citations
Cluster 1. New ecological paradigm (Cluster color: Red; Total publications: 94 articles; Total citations: 5152 citations; Average publication year: 2008.9)			
Hanley et al. (2001)	Choice modelling approaches: A superior alternative for environmental valuation?	Journal of Economic Surveys	700
Kosoy and Corbera (2010)	Payments for ecosystem services as commodity fetishism	Ecological Economics	562
Seyfang (2006)	Ecological citizenship and sustainable consumption: Examining local organic food networks	Journal of Rural Studies	474
Cluster 2. Green product innovation, adoption, and consumption (Cluster color: Dark purple; Total publications: 76 articles; Total citations: 2368 citations; Average publication year: 2016.6)			
Gallagher and Muehlegger (2011)	Giving green to get green? Incentives and consumer adoption of hybrid vehicle technology	Journal of Environmental Economics and Management	424
Polonsky (2011)	Transformative green marketing: Impediments and opportunities	Journal of Business Research	172
Werner and Richter (2007)	Wooden building products in comparative LCA: A literature review	International Journal of Life Cycle Assessment	139
Cluster 3. Green product choices, preferences, and purchases (Cluster color: Dark blue; Total publications: 58 articles; Total citations: 1250 citations; Average publication year: 2018.9)			
Khan and Mohsin (2017)	The power of emotional value: Exploring the effects of values on green product consumer choice behavior	Journal of Cleaner Production	145
Orth et al. (2005)	Dimensions of wine region equity and their impact on consumer preferences	Journal of Product and Brand Management	110
Lin and Niu (2018)	Green consumption: Environmental knowledge, environmental consciousness, social norms, and purchasing behavior	Business Strategy and the Environment	98
Cluster 4. Green consumer values, beliefs, and norms (Cluster color: Dark yellow; Total publications: 58 articles; Total citations: 3835 citations; Average publication year: 2014.2)			
Verplanken and Holland (2002)	Motivated decision making: Effects of activation and self-centrality of values on choices and behavior	Journal of Personality and Social Psychology	734
Steg et al. (2005)	Factors influencing the acceptability of energy policies: A test of VBN theory	Journal of Environmental Psychology	670
Fraj and Martinez (2006)	Environmental values and lifestyles as determining factors of ecological consumer behaviour: An empirical analysis	Journal of Consumer Marketing	249
Cluster 5. Green leisure, outdoor experiences, and everyday practices (Cluster color: Purple; Total publications: 45 articles; Total citations: 1673 citations; Average publication year: 2013.4)			
Southerton (2013)	Habits, routines and temporalities of consumption: From individual behaviours to the reproduction of everyday practices	Time & Society	174
Ewert et al. (2005)	Early-life outdoor experiences and an individual's environmental attitudes	Leisure Sciences	168
Swanwick (2009)	Society's attitudes to and preferences for land and landscape	Land Use Policy	138
Cluster 6. Green hospitality and tourism (Cluster color: Light blue; Total publications: 43 articles; Total citations: 1124 citations; Average publication year: 2019.2)			
Gössling et al. (2009)	Swedish air travellers and voluntary carbon offsets: Towards the co-creation of environmental value?	Current Issues in Tourism	137
Chen and Hung (2016)	Elucidating the factors influencing the acceptance of green products: An extension of theory of planned behavior	Technological Forecasting and Social Change	115

TABLE 4 (Continued)

Author(s)	Article	Journal	Citations
Landon et al. (2018)	Modeling the psychological antecedents to tourists' pro-sustainable behaviors: An application of the value-belief-norm model	Journal of Sustainable Tourism	100
Cluster 7. Green product development (Cluster color: Orange; Total publications: 36 articles; Total citations: 1262 citations; Average publication year: 2016.6)			
den Hollander et al. (2017)	Product design in a circular economy: Development of a typology of key concepts and terms	Journal of Industrial Ecology	268
Dangelico et al. (2013)	Developing sustainable new products in the textile and upholstered furniture industries: Role of external integrative capabilities	Journal of Product Innovation Management	146
Kusters et al. (2006)	Balancing development and conservation? An assessment of livelihood and environmental outcomes of nontimber forest product trade in Asia, Africa, and Latin America	Ecology and Society	126
Cluster 8. Green market segmentation (Cluster color: Brown; Total publications: 30 articles; Total citations: 865 citations; Average publication year: 2019.6)			
Wang et al. (2014)	Factors influencing sustainable consumption behaviors: A survey of the rural residents in China	Journal of Cleaner Production	249
Pothitou et al. (2016)	Environmental knowledge, pro-environmental behaviour and energy savings in households: An empirical study	Applied Energy	182
de Maya et al. (2011)	Organic food consumption in Europe: International segmentation based on value system differences	Ecological Economics	93
Cluster 9. Environmental value stream evaluation (Cluster color: Dark pink; Total publications: 5 articles; Total citations: 206 citations; Average publication year: 2018.6)			
Garza-Reyes et al. (2018)	A PDCA-based approach to environmental value stream mapping (E-VSM)	Journal of Cleaner Production	74
Mishal et al. (2017)	Dynamics of environmental consciousness and green purchase behaviour: An empirical study	International Journal of Climate Change Strategies and Management	63
Alvandi et al. (2016)	Economic and environmental value stream map (E2VSM) simulation for multi-product manufacturing systems	International Journal of Sustainable Engineering	33
Cluster 10. Environmental product assessments (Cluster color: Light pink; Total publications: 4 articles; Total citations: 91 citations; Average publication year: 2016.8)			
Jacobs et al. (2015)	Consumers' health risk–benefit perception of seafood and attitude toward the marine environment: Insights from five European countries	Environmental Research	48
Høibø et al. (2015)	Building material preferences with a focus on wood in urban housing: Durability and environmental impacts	Canadian Journal of Forest Research	38
Manuel et al. (2016)	How do consumers express their appreciation of wood surfaces? Norway spruce floors in Germany as an example	Annals of Forest Science	4
Cluster 11. Natural resource consumption (Cluster color: Light green; Total publications: 4 articles; Total citations: 18 citations; Average publication year: 2019.0)			
Pawson and Perkins (2013)	Worlds of wool: Recreating value off the sheep's back	New Zealand Geographer	12
Saurí and Arahuetes (2019)	Water reuse: A review of recent international contributions and an agenda for future research	Documents d'Analisi Geografica	6

(Continues)

TABLE 4 (Continued)

Author(s)	Article	Journal	Citations
Sarpong and Amankwaa (2022)	Household behavioral intention, environmental habit and attitude related to efficient water management: An empirical analysis on pro-environmental behavior among urban residents	H2Open Journal	0
Cluster 12. Pro-environmental behavior motivation (Cluster color: Blue; Total publications: 4 articles; Total citations: 185 citations; Average publication year: 2019.0)			
Nguyen et al. (2016)	Pro-environmental purchase behaviour: The role of consumers' biospheric values	Journal of Retailing and Consumer Services	150
Ediger et al. (2018)	Turkish public preferences for energy	Energy Policy	26
Mahmoodi et al. (2021)	Using rewards and penalties to promote sustainability: Who chooses incentive-based electricity products and why?	Journal of Consumer Behaviour	5
Cluster 13. Circular economy (Cluster color: Light yellow; Total publications: 3 articles; Total citations: 64 citations; Average publication year: 2020.0)			
Roos and Hahn (2017)	Does shared consumption affect consumers' values, attitudes, and norms? A panel study	Journal of Business Research	63
Bieniek (2021)	Bartering: Price-setting newsvendor problem with barter exchange	Sustainability	1
Arias et al. (2022)	Pro-circular consumer profile: An approach to their identification and characterization based on the components of the value-belief-norm theory	Sustainability	0
Cluster 14. Environmental social governance (Cluster color: Light purple; Total publications: 2 articles; Total citations: 24 citations; Average publication year: 2018.0)			
Braulio-Gonzalo and Bovea (2020)	Criteria analysis of green public procurement in the Spanish furniture sector	Journal of Cleaner Production	19
Boenigk and Möhlmann (2016)	A public sector marketing model to measure the social and environmental values of public strategies: An empirical study on a green public service	Journal of Nonprofit and Public Sector Marketing	5

third most cited articles in this cluster with 182 and 93 citations, providing insights on energy consumption among households and organic food consumption in Europe, respectively.

Cluster 9 and Cluster 10 are interested in *environmental value stream evaluation* and *environmental product assessments*, and they are made up of five and four articles with an average publication year of 2018.6 and 2016.8 that have been cited 206 and 91 times, respectively. These clusters reaffirm the importance of ensuring that green products are indeed environmentally friendly and sustainable as consumers are environmentally conscious (Mishal et al., 2017), genuinely care for natural resource and the environment (Manuel et al., 2016), have a keen interest in holding companies accountable to their green claims (Alvandi et al., 2016; Garza-Reyes et al., 2018), and thus, engage in environmental product assessments as part of their consumption decision-making (Høibø et al., 2015; Jacobs et al., 2015).

Cluster 11, Cluster 12, Cluster 13, and Cluster 14 represent the most recent and trending themes on consumption and environmental values research, namely *natural resource consumption*, *pro-environmental behavior motivation*, *circular economy*, and *environmental social governance*. These clusters make up a total of 13 articles with an average publication year range between 2018 and 2020 and have received a total of 291 citations. Studies on natural resource consumption have examined value recreation of wool (Pawson & Perkins, 2013) as well as efficient water management (Sarpong & Amankwaa, 2022) and reuse (Saurí & Arahuetes, 2019), whereas studies that seek to motivate pro-environmental behavior have explored consumer preferences for energy (Ediger et al., 2018) and investigated the role of biospheric values (Nguyen et al., 2016) and rewards versus penalties (Mahmoodi et al., 2021) in shaping pro-environmental behavior. Last but not least, studies have also shed light on barter exchanges (Bieniek, 2021), consumer profile (Arias et al., 2022), and shared consumption (Roos & Hahn, 2017) that transpire in the circular economy, as well as the criteria analysis of green public procurement (Braulio-Gonzalo & Bovea, 2020) and the public sector marketing model (Boenigk & Möhlmann, 2016) that enable consumers to hold public and private stakeholders accountable for their environmental impact.

4 | STUDY 2: PLANETARY HEALTH AND CONSUMPTION

4.1 | Goal

The goal of the second study was to explore consumption research relating to ecological sustainability from the macro-perspective, which is focused on planetary health and how it interacts with consumers and their consumption behavior. The Report of the Rockefeller Foundation–Lancet Commission on Planetary Health defines the concept of planetary health as "the achievement of the highest attainable standard of health, wellbeing, and equity worldwide through judicious attention to the human systems—political, economic, and social—that shape the future of humanity and the Earth's natural systems that define the safe environmental limits within which humanity can flourish. Put simply, planetary health is the health of human civilization and the state of the natural systems on which it depends" (Whitmee et al., 2015 p. 1978). This emerging concept offers a systemic view of sustainability in line with the new ecological paradigm (Dunlap et al., 2000), wherein the health of Mother Earth and the wellbeing of her people are seen as interdependent. The novel concept also inculcates population responsibility and stimulates a rethink of how to approach ecological sustainability, encouraging stakeholders (e.g., consumers, organizations, governments) to reflect and redesign what is necessary (e.g., socio-economic structures) to provide favorable living conditions for current and future generations.

4.2 | Methods

This study performed a scientometrics analysis to reveal the trends in consumption and planetary health research using the same two-stage process (Lim, 2022b) for the same reasons as the previous study (Donthu et al., 2021; Kraus et al., 2022; Lim, Kumar, & Ali, 2022; Mukherjee et al., 2022).

In terms of *corpus curation*, a similar search was performed for "final" (*publication stage*) "article" (*document type*) published in "English" (*language*) "journal" (*source type*) up to "2022" (*search period*) but using the *keyword string* "(("planetary health") AND ("consum*"))" within the "article title, abstract, keywords" (*search field*) in Scopus (*search database*), which returned a result of 104 documents. Similarly, the rationales supporting these decisions were also shaped by Donthu et al. (2021), Kraus et al. (2022), and Paul et al. (2021) as in the case of the previous study.

In terms of *corpus analysis*, a *performance analysis* was performed using Scopus analytics and a science mapping was performed in VOSviewer using *bibliographic coupling* similar to the previous study (Donthu et al., 2021; Van Eck & Waltman, 2010). This enables the present study to shed light on the publication trend, most prolific journals, most impactful articles, top contributors, as well as major themes for consumption and planetary health research.

4.3 | Findings

4.3.1 | Performance analysis of consumption and planetary health research

The *publication trend* of consumption and planetary research is illustrated in Figure 3. The first publication in the domain is by Cannon (2002), who advocated for a global perspective on nutrition through the lens of planetary health, an ideology where humanity and nature are interconnected, implying that the world is best perceived as a whole. The productivity of the domain is generally on an upward trajectory, though most publications have only emerged recently, following the Report of the Rockefeller Foundation–Lancet Commission on Planetary Health (Whitmee et al., 2015). The COVID-19 pandemic has also sparked increased interest in consumption and planetary health research, as seen through the significant rise in publications from 2020 to 2022, implying that the connection between the health of the planet and her people's consumption behavior is increasingly evident.

The *most prolific journals* publishing consumption and planetary health research are presented in Table 5. The most prolific journal is *Nutrients* with seven articles, followed by *BMC Public Health*, *Environmental Research Letters*, *Frontiers in Sustainable Food Systems*, *Global Food Security*, and *The Lancet Planetary Health*, which have published five articles each. Many journals in this domain focus on food systems, signaling the importance of food consumption on the health of the planet. Moreover, it is encouraging to note that *The Lancet* has established a new journal in 2017 dedicated to planetary health research, which signals the importance and significance of the understanding of, and transition into, a safe and just space for humanity, respecting planetary boundaries and the social and economic foundations of a healthy life (The Lancet Planetary Health, 2022).

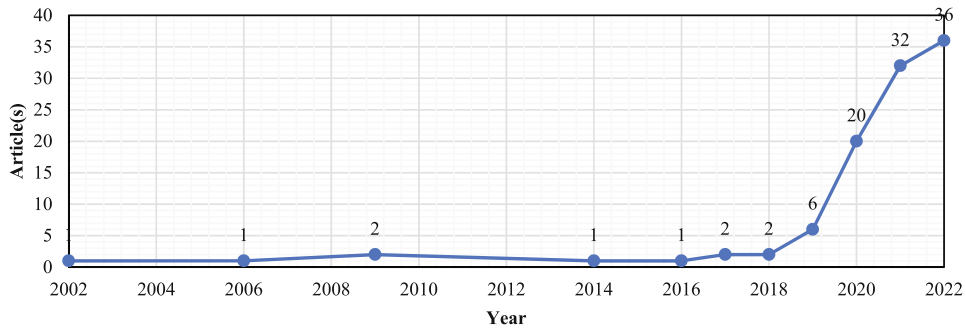

FIGURE 3 Publication trend of consumption and planetary health research.

TABLE 5 Most prolific journals publishing consumption and planetary health research.

Rank	Journal	Article (s)
1	Nutrients	7
2	BMC Public Health; Environmental Research Letters; Frontiers in Sustainable Food Systems; Global Food Security; The Lancet Planetary Health	5
3	American Journal of Clinical Nutrition; Frontiers in Nutrition; Social Science and Medicine; Sustainability	3
4	Advances in Nutrition; Appetite; Asia Pacific Journal of Clinical Nutrition; BMJ Open; European Journal of Nutrition; Foods; Sustainability Science Practice and Policy	2
5	African Journal of Food Agriculture Nutrition and Development; Agriculture and Human Values; Animal Production Science; BMJ; Biological Conservation; British Food Journal; Bulletin of the World Health Organization; Christian Journal for Global Health; Diabetes Care; Dialog; Ecological Economics; Environmental Health Perspectives; Food Policy; Food Quality and Preference; Frontiers in Energy Research; Frontiers in Psychology; Frontiers in Public Health; Global Environmental Change; Global Trade and Customs Journal; Globalization and Health; International Archives of Occupational and Environmental Health; International Journal of Behavioral Nutrition and Physical Activity; International Journal of Environmental Research and Public Health; International Journal of Gastronomy and Food Science; International Journal of Health Policy and Management; Journal of Cleaner Production; Journal of Contemporary Dental Practice; Journal of Human Behavior in the Social Environment; Journal of Hunger and Environmental Nutrition; Journal of Nutrition; Journal of Open Innovation Technology Market and Complexity; Journal of Paediatrics and Child Health; Meat Science; Medical Journal of Australia; Nursing Outlook; One Earth; People and Nature; PLoS One; Proceedings of the National Academy of Sciences of the United States of America; Proceedings of the Nutrition Society; Public Health Reviews; Risk Analysis; South Eastern European Journal of Public Health; Translational Behavioral Medicine; University of New South Wales Law Journal; Wellcome Open Research	1

TABLE 6 Most impactful articles on consumption and planetary health research.

Rank	Author(s) and year	Article	Journal	Citations
1	Downs et al. (2020)	Food environment typology: Advancing an expanded definition, framework, and methodological approach for improved characterization of wild, cultivated, and built food environments toward sustainable diets	Foods	107
2	Mason-D'Croz et al. (2019)	Gaps between fruit and vegetable production, demand, and recommended consumption at global and national levels: An integrated modelling study	The Lancet Planetary Health	106
3	Blackstone et al. (2018)	Linking sustainability to the healthy eating patterns of the dietary guidelines for Americans: A modelling study	The Lancet Planetary Health	69
4	Qian et al. (2020)	Red and processed meats and health risks: How strong is the evidence?	Diabetes Care	57
5	Hadjikakou (2017)	Trimming the excess: Environmental impacts of discretionary food consumption in Australia	Ecological Economics	54
6	Lang (2009)	Reshaping the food system for ecological public health	Journal of Hunger and Environmental Nutrition	50
7	Reynolds et al. (2019)	Public acceptability of nudging and taxing to reduce consumption of alcohol, tobacco, and food: A population-based survey experiment	Social Science and Medicine	43
8	Kadandale et al. (2019)	The palm oil industry and noncommunicable diseases	Bulletin of the World Health Organization	40
9	Geiger et al. (2018)	Mindfully green and healthy: An indirect path from mindfulness to ecological behavior	Frontiers in Psychology	32
10	Desmond et al. (2021)	Growth, body composition, and cardiovascular and nutritional risk of 5-to 10-y-old children consuming vegetarian, vegan, or omnivore diets	American Journal of Clinical Nutrition	31

The *most impactful articles* on consumption and planetary health research are shown in Table 6. The most impactful article is Downs et al. (2020), which contributed an expanded definition, framework, and methodological approach for improving the characterization of wild, cultivated, and built food environments to promote sustainable diets (107 citations). This is followed by Mason-D'Croz et al. (2019),

which modeled the gaps in food production, demand, and recommended consumption at global and national levels (106 citations), and Blackstone et al. (2018), which linked up healthy eating to sustainability (69 citations). Noteworthily, the 10 most cited articles in the domain are all related to food consumption, signaling its dominance in a domain where consumption traverses planetary health.

The *top contributors* of consumption and planetary health research are recognized in Table 7. First, the *top authors* are Selena Ahmed and Rosemary Green with four articles each. Their recent works have contributed insights on food security (Ahmed et al., 2022), food waste (Ahmed et al., 2021), and sustainable dietary practices (Patterson et al., 2021) such as the EAT–Lancet dietary recommendations for health and sustainability (Ali et al., 2022), among others. Second, the *top affiliations* are Harvard T. H. Chan School of Public Health with 12 articles, London School of Hygiene and Tropical Medicine with eight articles, and John Hopkins Bloomberg School of Public Health with five articles. Third, the *top countries* are the United States with 30 articles, followed by the United Kingdom with 25 articles, and Australia with 12 articles. Australia is the top country in the Global South with 12 articles while India is the top non-Western country with five articles. Fourth, the *top funding sponsors* are the Wellcome Trust in the United Kingdom with 12 articles, the National Science Foundation in the United States with eight articles, and the Bill and Melinda Gates Foundation in the United States with seven articles. Other notable funding sponsors include the European Commission in Europe and the Rockefeller Foundation in the United States, which have funded two articles each. Fifth and finally, the *top subject areas* are "Medicine" with 49 articles, followed by "Agricultural and Biological Sciences" with 34 articles, and "Social Sciences" with 31 articles based on the Scopus subject area classification. Only three articles fall under "Business, Management and Accounting" where the "Marketing" subfield resides, which signals immense scope for greater contributions in the domain from this subject area.

4.3.2 | Science mapping of consumption and planetary health research

The bibliographic coupling of consumption and planetary health research revealed a nomological network of eight major clusters (themes), encapsulating 74 documents or 71.2% of the entire corpus. This network is visualized in Figure 4 and a summary of key information is provided in Table 8.

Cluster 1 highlights the *heterogeneity in planet health diet* and is the largest cluster, comprising 23 articles with an average publication year of 2021.2 that have accumulated 105 citations. Wertheim-Heck and Raneri (2020), which is the most cited article in this cluster with 19 citations, adopt an intergenerational social practice approach to elucidate the transformation of food consumption in a developing country, whereas Vatanparast et al. (2020) and Konttinen et al. (2021) are the second and third most cited articles in this cluster with 16 and 10 citations, shedding light on diet and nutrition outcomes as a result of increasing intake of plant-based meat alternative and decreasing

TABLE 7 Top contributors of consumption and planetary health research.

Panel A. Top authors			Panel B. Top affiliations		Panel C. Top countries/territories		Panel D. Top funding sponsors		Panel E. Top subject areas	
Rank	Author(s)	Articles	Affiliation(s)	Articles	Country/territory	Articles	Funding sponsor	Articles	Subject area	Articles
1	Ahmed, S.; Green, R.	4	Harvard T.H. Chan School of Public Health	12	United States	30	Wellcome Trust	12	Medicine	49
2	Byker Shanks, C.; Demont, M.; Golden, C.D.; Hollands, G.J.; Marteau, T.M.; Milner, J.; Warne, T.	3	London School of Hygiene and Tropical Medicine	8	United Kingdom	25	National Science Foundation	8	Agricultural and Biological Sciences	34
3	Baker, P.; Beal, T.; Bogard, J.R.; Cacau, L.T.; Chang, H.Y.; Cuevas, R.P.; Custodio, M.C.; Dangour, A.D.; Elinder, L.S.; Erkkola, M.; Eustachio Colombo, P.; Fanzo, J.; Friel, S.; Graça, J.; Haines, A.; Herforth, A.; Jebb, S.A.; Koehn, J.Z.; Korkalo, L.; Marchioni, D.M.; Mohanty, S.K.; Nevalainen, J.; Raneri, J.E.; Ray (Chakravarti), A.; Reynolds, J.P.; Samaddar, A.; Scheelbeek, P.F.D.; Stewart, A.; Temme, E.H.M.; Vellinga, R.E.; Ynion, J.	2	Johns Hopkins Bloomberg School of Public Health	5	Australia	12	Bill and Melinda Gates Foundation	7	Social Sciences	31

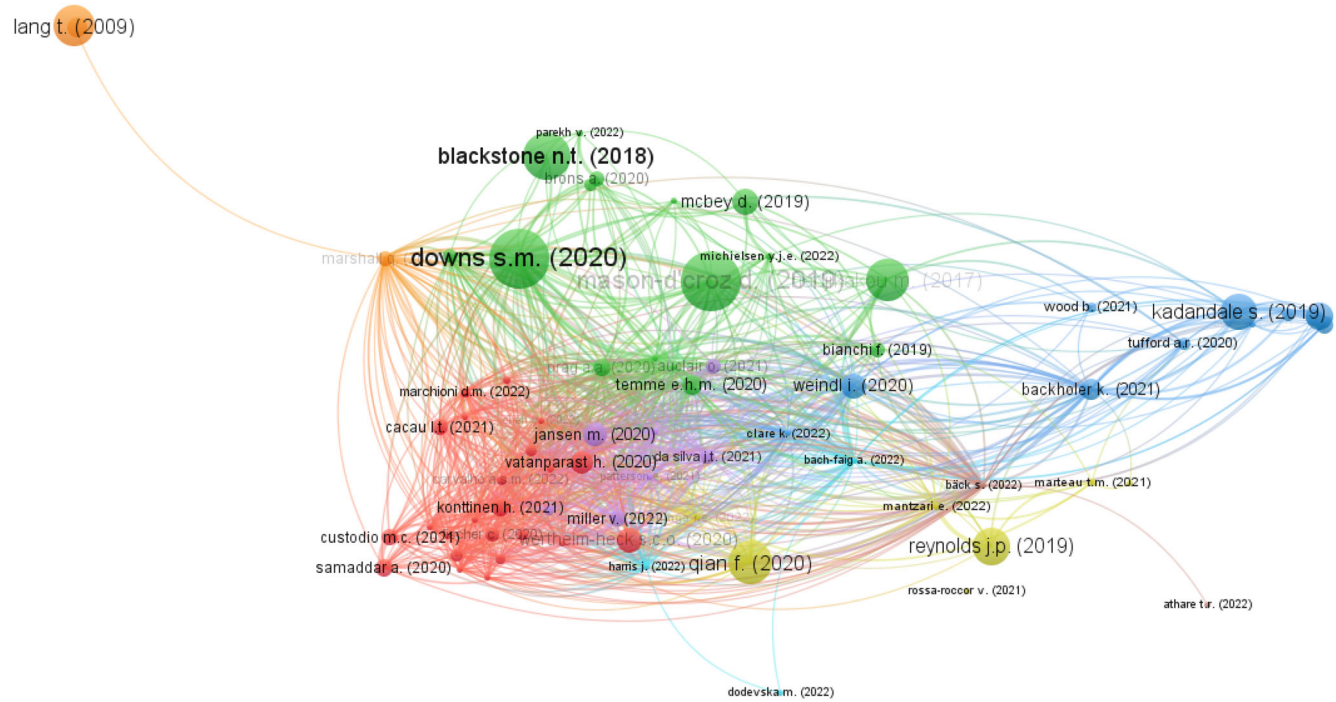

FIGURE 4 Network of major clusters (themes) on consumption and planetary health research. Cluster 1: Heterogeneity in planetary health diet (Red). Cluster 2: Food consumption modeling for planetary health (Green). Cluster 3: Advocacy for planetary health (Dark blue). Cluster 4: Evidence and support for planetary health (Yellow). Cluster 5: Consumption choices for planetary health (Purple). Cluster 6: Advocacy for planetary health diet (Light blue). Cluster 7: Food systems for planetary health (Orange). Cluster 8: Targets for planetary health (Brown).

red and processed meat as well as the sociodemographic differences in motives for food selection, respectively.

Cluster 2 focuses on *food consumption modeling for planetary health* and is the second largest but most impactful cluster, containing 16 articles with an average publication year of 2020.3 that have acquired 408 citations. Downs et al. (2020), which is the most cited article in this cluster with 107 citations, establish a novel food environment typology, whereas Mason-D'Croz et al. (2019) and Blackstone et al. (2018) are the second and third most cited articles in this cluster with 106 and 69 citations, illuminating insights on the differences in healthy eating and its linkages with sustainability, respectively. Noteworthily, these articles are also the most cited articles for consumption and planetary health research, thereby signaling the significance of this cluster in shaping extant knowledge in the domain.

Cluster 3 encapsulates insights on the *advocacy for planetary health* and is the second most impactful and third most productive cluster, consisting of 13 articles with an average publication year of 2020.3 that have amassed 135 citations. Kadandale et al. (2019), which is the most cited article in this cluster with 40 citations, advocate the need to address and mitigate the negative impacts of the palm oil industry on human and planetary health, whereas Rosa et al. (2019) and Weindl et al. (2020) are the second and third most cited articles in this cluster with 24 and 19 citations, embodying the salience of nursing and midwifery advocacy in SDG attainment as well as the Leibniz position on sustainable food protein supply chain in reconciling the health of the planet and her people, respectively.

Cluster 4 offers *evidence and support for planetary health* and produces the same impact as Cluster 1 despite having only one third of that cluster's articles. Noteworthily, this cluster comprises seven articles with an average publication year of 2021 that have attracted 105 citations. Qian et al. (2020), which is the most cited article in this cluster with 57 citations, provide evidence on the health risks of red and processed meats, whereas Reynolds et al. (2019) and Mantzari et al. (2022) are the second and third most cited articles in this cluster with 43 and two citations, shedding light on public acceptability of nudging and taxing to reduce consumption of alcohol, tobacco, and food as well as public support for policies to improve population and planetary health, respectively.

Cluster 5 explores the *consumption choices for planetary health* through seven articles with an average publication year of 2021 that have garnered 43 citations. Jansen et al. (2020), which is the most cited article in this cluster with 18 citations, highlight the underutilized potential of tropical tree-sourced foods for sustainable food systems, whereas Miller et al. (2022) and Auclair and Burgos (2021) are the second and third most cited articles in this cluster with eight and seven citations, respectively, revealing insights into global, regional, and national consumption of animal-source foods as well as the intake of foods, nutrients, and diet quality between low- and high-greenhouse gas emission diets, respectively.

TABLE 8 Summary of major clusters (themes) on consumption and planetary health research.

Author(s) and year	Article	Journal	Citations
Cluster 1. Heterogeneity in planetary health diet (Cluster color: Red; Total publications: 23 articles; Total citations: 105 citations; Average publication year: 2021.2)			
Wertheim-Heck and Raneri (2020)	Food policy and the unruliness of consumption: An intergenerational social practice approach to uncover transforming food consumption in modernizing Hanoi, Vietnam.	Global Food Security	19
Vatanparast et al. (2020)	Increasing plant-based meat alternatives and decreasing red and processed meat in the diet differentially affect the diet quality and nutrient intakes of Canadians	Nutrients	16
Konttinen et al. (2021)	Sociodemographic differences in motives for food selection: Results from the LoCard cross-sectional survey	International Journal of Behavioral Nutrition and Physical Activity	10
Cluster 2. Food consumption modeling for planetary health (Cluster color: Green; Total publications: 16 articles; Total citations: 408 citations; Average publication year: 2020.3)			
Downs et al. (2020)	Food environment typology: Advancing an expanded definition, framework, and methodological approach for improved characterization of wild, cultivated, and built food environments toward sustainable diets	Foods	107
Mason-D'Croz et al. (2019)	Gaps between fruit and vegetable production, demand, and recommended consumption at global and national levels: An integrated modelling study	The Lancet Planetary Health	106
Blackstone et al. (2018)	Linking sustainability to the healthy eating patterns of the dietary guidelines for Americans: A modelling study	The Lancet Planetary Health	69
Cluster 3. Advocacy for planetary health (Cluster color: Dark blue; Total publications: 13 articles; Total citations: 135 citations; Average publication year: 2020.3)			
Kadandale et al. (2019)	The palm oil industry and noncommunicable diseases	Bulletin of the World Health Organization	40
Rosa et al. (2019)	Nursing and midwifery advocacy to lead the United Nations Sustainable Development Agenda	Nursing Outlook	24
Weindl et al. (2020)	Sustainable food protein supply reconciling human and ecosystem health: A Leibniz position	Global Food Security	19
Cluster 4. Evidence and support for planetary health (Cluster color: Yellow; Total publications: 7 articles; Total citations: 105 citations; Average publication year: 2021.0)			
Qian et al. (2020)	Red and processed meats and health risks: How strong is the evidence?	Diabetes Care	57
Reynolds et al. (2019)	Public acceptability of nudging and taxing to reduce consumption of alcohol, tobacco, and food: A population-based survey experiment	Social Science and Medicine	43
Mantzari et al. (2022)	Public support for policies to improve population and planetary health: A population-based online experiment assessing impact of communicating evidence of multiple versus single benefits	Social Science and Medicine	2
Cluster 5. Consumption choices for planetary health (Cluster color: Purple; Total publications: 7 articles; Total citations: 43 citations; Average publication year: 2021.0)			
Jansen et al. (2020)	Food for thought: The underutilized potential of tropical tree-sourced foods for 21st century sustainable food systems	People and Nature	18

(Continues)

TABLE 8 (Continued)

Author(s) and year	Article	Journal	Citations
Miller et al. (2022)	Global, regional, and national consumption of animal-source foods between 1990 and 2018: Findings from the Global Dietary Database	The Lancet Planetary Health	8
Auclair and Burgos (2021)	Carbon footprint of Canadian self-selected diets: Comparing intake of foods, nutrients, and diet quality between low- and high-greenhouse gas emission diets	Journal of Cleaner Production	7
Cluster 6. Advocacy for planetary health diet (Cluster color: Light blue; Total publications: 3 articles; Total citations: 0 citations; Average publication year: 2022.0)			
Bach-Faig et al. (2022)	Consensus-building around the conceptualisation and implementation of sustainable healthy diets: A foundation for policymakers	BMC Public Health	0
Dodevska et al. (2022)	Similarities and differences in the nutritional composition of nuts and seeds in Serbia	Frontiers in Nutrition	0
Harris et al. (2022)	Fruit and vegetable biodiversity for nutritionally diverse diets: Challenges, opportunities, and knowledge gaps	Global Food Security	0
Cluster 7. Food systems for planetary health (Cluster color: Orange; Total publications: 3 articles; Total citations: 70 citations; Average publication year: 2015.7)			
Lang (2009)	Reshaping the food system for ecological public health	Journal of Hunger and Environmental Nutrition	50
Rideout and Kosatsky (2017)	Fish for dinner? Balancing risks, benefits, and values in formulating food consumption advice	Risk Analysis	13
Marshall et al. (2021)	Building a global food systems typology: A new tool for reducing complexity in food systems analysis	Frontiers in Sustainable Food Systems	7
Cluster 8. Targets for planetary health (Cluster color: Brown; Total publications: 2 articles; Total citations: 0 citations; Average publication year: 2022.0)			
Athare et al. (2022)	India consists of multiple food systems with scoioeconomic and environmental variations	PLoS ONE	0
Bäck et al. (2022)	Sustainability analysis of Finnish pre-schoolers' diet based on targets of the EAT-Lancet reference diet	European Journal of Nutrition	0

Cluster 6 involves the *advocacy for planetary health diet*. Alongside Cluster 8, this cluster is one of the most recent clusters, with an average publication year of 2022 for three articles: Bach-Faig et al. (2022) engage in consensus-building around the conceptualization and implementation of sustainable healthy diets, whereas Dodevska et al. (2022) set the record on the similarities and differences in the nutritional composition of nuts and seeds while Harris et al. (2022) reveal the challenges, opportunities, and knowledge gaps in fruit and vegetable biodiversity for nutritionally diverse diets.

Cluster 7 relates to *food systems for planetary health* and is the oldest cluster with an average publication year of 2015.7 for three articles that have garnered 70 citations. Lang (2009), which is the most cited article in this cluster with 50 citations, documents the reshaping of food systems for ecological public health, whereas Rideout and Kosatsky (2017) and Marshall et al. (2021) are the second and third most cited articles in this cluster with 13 and seven citations, providing food consumption advice and a new tool for reducing complexity in food systems analysis, respectively.

Cluster 8 represents research that examines the *targets for planetary health*. This cluster is one of the most recent clusters alongside Cluster 6, with an average publication year of 2022 for two articles: Athare et al. (2022) highlight the socioeconomic and environmental variations across multiple food systems in India, whereas Bäck et al. (2022) provide a sustainability analysis of diets grounded in the EAT-Lancet diet targets.

Achieving sustainability targets like the SDGs appears increasingly unlikely (Lim, 2022a; Social Progress Imperative, 2020; United Nations Economic and Social Commission for Asia and the Pacific, 2023), and the consequences of falling short could adversely impact billions of people globally (Filho et al., 2020). If history repeats itself, as seen with the MDGs and the SDGs, new goals and targets may be introduced by 2030 (e.g., 50 goals for 2050). Nonetheless, setting targets remains vital; without them, we risk losing a unifying objective to work toward, potentially leading to stagnation or regression in global

progress. In light of the pressing nature of numerous ecological challenges, particularly climate change's "code red" urgency, it is imperative that we not only establish and revise targets as needed, but also demonstrate unwavering dedication and concerted global action to address these targets. This steadfast commitment is the cornerstone to safeguarding our planet and guaranteeing a future that surpasses our present circumstances.

5 | DISCUSSION AND CONCLUSION

To this end, this article has delivered a state-of-the-art understanding of consumption and ecological sustainability (meta-perspective) from a multi-study analysis that leverages the power of scientometrics to unpack the trends of consumption research that deals with environmental values (micro-perspective) and planetary health (macro-perspective). To conclude, this article will discuss the *key takeaways* and *future research directions* emerging from this scientometrics-powered endeavor. Specifically, there are three key takeaways from the multi-study review of consumption research dealing with environmental values and planetary health that would be relevant for the advancement of both theory (academic scholars) and practice (industry professionals and policymakers) toward greater ecological sustainability. These key takeaways are organized using the 3Ps of productivity, presence, and profoundness of research in the field, which is an original organizing framework developed herein to present the key takeaways of this article. The future directions build upon these key takeaways, whose target audience and role are spelled out accordingly.

First, the *productivity* of consumption research addressing environmental values is greater than that dealing with planetary health. This observation could be explained by the launch of international agendas on sustainable development (e.g., the Brundtland commission report, the MDGs, and the SDGs by the United Nations), which emphasize the importance of ecological sustainability and ignite consumption research that is geared toward encouraging pro-environmental behavior, and by extension, the environmental values that would drive this desired behavior. This rationale is in line with the VBN theory of environmentalism, which postulates that pro-environmental behavior is guided by personal norms, which in turn, is shaped by the beliefs of environmental action and the values of importance held by consumers (Stern, 2000; Stern et al., 1999). In contrast, planetary health is a relatively new concept that only gained exponential interest following the Report of the Rockefeller Foundation–Lancet Commission on Planetary Health, where the concept of planetary health was clearly defined and established (Whitmee et al., 2015). In this regard, there is much room for exploring and expanding the scope of consumption and planetary health research, and given that consumption research that considers both environmental values and planetary health remains absent at the time of study, future research at this meta-intersection is highly encouraged. New theories such as the theory of behavioral control, which offers a guiding lens to study covert and overt controls that could impede the performance of desired behavior (Lim & Weissmann, 2023), and the sustainability pyramid, which provides a basis for scaffolding marketing strategies toward ecological sustainability (Lim, 2022a), should be explored to enrich and strengthen the theoretical foundation and extrapolation of such research. This key takeaway is mainly directed to *academic scholars*, though the equivalent demand and support for such research should be rallied among *industry professionals* and *policymakers* in order to grow the meta-perspective of consuming for ecological sustainability.

Second, the *presence* of consumption research on environmental values (*n*: 138) and/or planetary health (*n*: 3) that is published in "Business, Management and Accounting" journals (i.e., where consumer and marketing journals reside) remains relatively small as compared to those published in "Environmental Science" (*n*: 295) and "Medicine" (*n*: 49) journals, respectively. Consumer behavior insights derived from consumption research empowers marketing strategies that attract, shape, and solidify desired consumer behavior (Lim, Kumar, Pandey, et al., 2022), particularly those that make a positive impact or reduce any negative impact on the environment, and by extension, the actions contributing to restoring, improving, and/or safeguarding the health of the planet and her people. In this regard, both consumer behavior and marketing journals and scholars are highly encouraged to demonstrate greater research appetite and stronger political will to drive and publish new consumption research that deals with environmental values and/or planetary health. Academic institutions and funding sponsors that make this agenda a top priority in their calls for grants and sponsorships could do the field a huge favor in stimulating an exponential increase of research interest in this direction, thereby enabling consumption research in underresearched subject areas such as "Business, Management and Accounting" to obtain the boost it requires to deliver fundamental insights on consumer behavior with translational impact in consumption and related marketing practices. In addition, industry professionals are also highly encouraged to collaborate and support the research endeavors by academic scholars in this space, wherein the empirical insights established can be used to inform strategies and investments aiming to promote greater demand for environmentally friendly products and consumption practices. This key takeaway should be noted by *academic scholars*, *industry professionals*, and *policymakers* to realize the said ambition.

Third, the *profoundness* of consumption research is generally stronger for environmental values than planetary health, as there were more major themes revealed for the former (*n*: 14) than the latter (*n*: 8). Moreover, the latter has many overlaps revolving around food systems and planetary health diet. Nevertheless, the value of the multi-study becomes apparent when the major themes from both the micro-perspective and macro-perspective are synthesized through sensemaking, resulting in *a meta-perspective of ecological sustainability through the lens of consumption, environmental values, and planetary health*, as illustrated in Figure 5, which should serve as a valuable conceptual framework for *academic scholars* to gain a one-stop understanding of the field, as well as for *industry professionals* and *policymakers* to understand how they can play a role in navigating in this complex system.

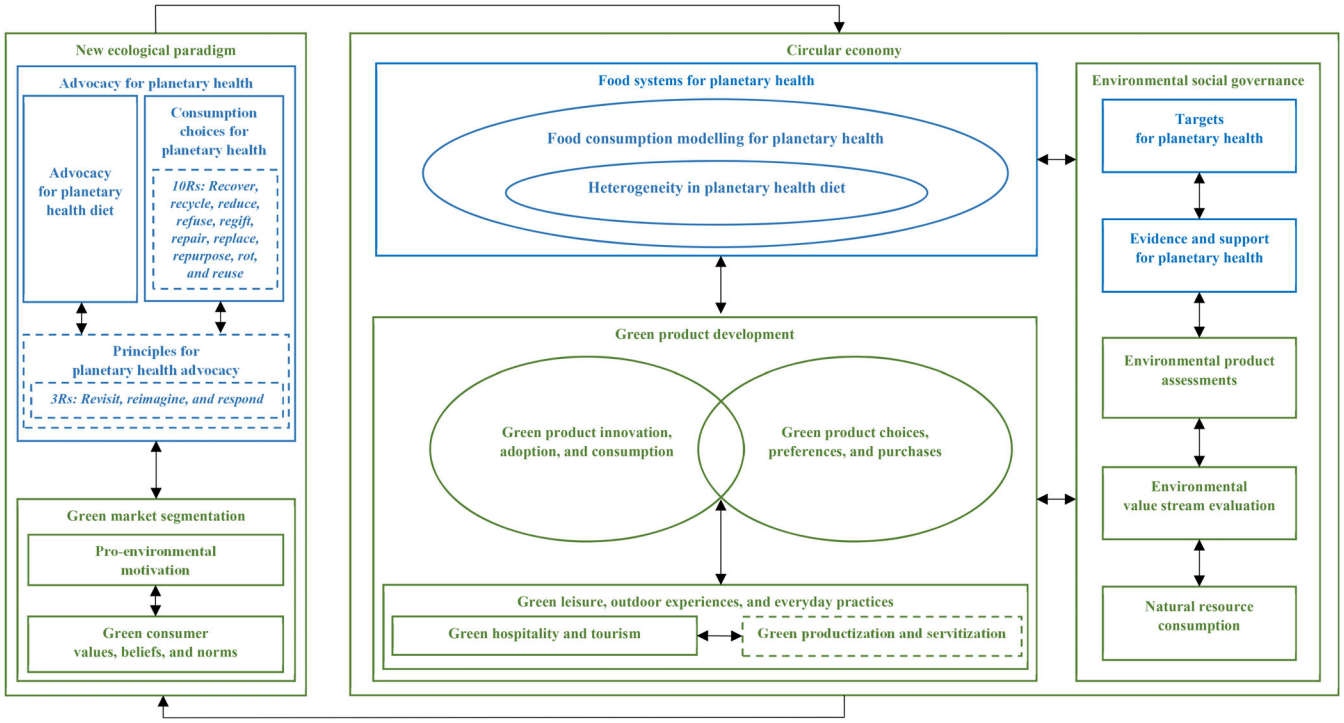

FIGURE 5 A meta-perspective of ecological sustainability through the lens of consumption, environmental values, and planetary health. Elements in solid green are the (14) major themes of consumption and environmental values research (micro-perspective) derived from Study 1. Elements in solid blue are (eight) major themes of consumption and planetary health research (macro-perspective) revealed in Study 2. Elements in dotted green (1) and dotted blue (3) are future directions for respective streams. Elements in both streams of research and their systemic relationships are synthesized using sensemaking (meta-perspective).

To begin, the conceptual framework posits that the circular economy—that is, an economic model that focuses on maximizing resource efficiency, reducing waste, and promoting overall sustainability—is a system that can serve as a suitable platform to facilitate understanding of how consumption, environmental values, and planetary health manifest and interact. This system, to date, remains emerging or new yet highly relevant, though its evolution should not be discounted and thus always kept in mind in order to always maintain theoretical and practical relevance.

Next, the new ecological paradigm, which empowers the circular economy, fosters and shapes consumer values, beliefs, and norms related to ecological sustainability, which, in turn, instills pro-environmental motivation. This emphasizes the significance of a grand paradigm in uniting consumers under a common understanding and shared purpose. When this paradigm is applied in conjunction with a green market segmentation lens, it is clear that different consumer segments may emerge, for example, consumers who are convinced, unconvinced, or remain ambivalent, which, in turn, may demonstrate different levels of advocacy for the larger cause like planetary health and/or specific aspects within it such as planetary health diet. This advocacy can create a ripple effect, transforming consumers—even those with unsustainable habits—into eco-superheroes advocating for sustainable consumption. These consumers can then influence other consumers, altering their values, beliefs, norms, and pro-environmental motivations regarding consumption choices for planetary health. To ensure the ongoing relevance of the new ecological paradigm and the sustainability of planetary health advocacy, collaboration among academic scholars, industry professionals, and policymakers is crucial. Together, they can develop meaningful advocacy principles such as the 3Rs of *revisiting* and *reimagining* current practices and *responding* with improved practices. Additionally, they can encourage a range of mindful consumption choices, including the 10Rs:

1. *Recovering* energy and valuable materials.
2. *Recycling* waste into new products.
3. *Reducing* resource consumption through efficient energy and material use.
4. *Refusing* to purchase or use products detrimental to the ecosystem.
5. *Regifting* products no longer needed.
6. *Repairing* instead of replacing products to extend their lifespan.
7. *Replacing* ecologically harmful products with eco-friendly alternatives.
8. *Repurposing* products for a wider variety of uses.
9. *Rotting* organic waste to replenish soil nutrients and minimize landfill waste.
10. *Reusing* products multiple times to prolong their lifecycle.

Moving on, the development of green or environmentally friendly products can be understood through the lens of green product innovation, adoption, and consumption, as well as consumers' choices,

preferences, and purchase decisions for green products in the marketplace. Some products might focus on planetary health, such as those adhering to the planetary health diet, while others may simply be marketed as green or eco-friendly. In this regard, branding research that examines the message conveyed through such positioning and the subsequent impact can be highly valuable. This research could expand the scope of consumption contexts beyond food systems, green leisure, outdoor experiences, and everyday practices, encompassing sectors like hospitality and tourism. Furthermore, such research could explore new frontiers like productization and servitization, both of which can be linked to ecological sustainability and planetary health. In particular, productization entails the process of transforming an intangible (e.g., concept, idea, service) into a standardized, tangible, and marketable product, for example, eco-friendly goods that contribute to preserving the planet's health. In contrast, servitization relates to the process of transforming a product-based offering into a service-oriented one, which can be connected to ecological sustainability and planetary health by shifting the focus from producing physical goods to delivering services that promote sustainable practices and reduce negative ecological impacts.

Last but not least, environmental, social, and governance (ESG) practices have become a mainstream expectation in driving accountability and responsibility for sustainable development. Noteworthily, the impact of products in the marketplace on natural resource consumption can be minimized through the 10Rs: recovery, recycling, reduction, refusal, regifting, repair, replacement, repurpose, rot, and reuse. Organizations that genuinely care for the environment and the impact of their products and operations can engage in and communicate their environmental value stream mapping, which consumers can evaluate alongside environmental product assessments. This presents an opportunity to provide evidence and gain consumer support for initiatives promoting planetary health, setting the stage for ongoing evaluation, revision, and improvement, ultimately benefiting current and future generations.

Notwithstanding the aforementioned contributions and insights, this article remains limited in two major ways. First, this article offers only an overview of consumption research relating to environmental values and planetary health, thereby offering breadth rather than depth, which is the tradeoff between reviewing a large versus small domain and a single versus multi-study research endeavor. In this regard, this article should be treated as a starting point, which could inspire deeper scrutiny into the knowledge in each major stream of research, for example, using the theory, context, characteristics (e.g., antecedents, mediators, moderators, and consequences), and methods (TCCM) framework as an organizing framework for a detailed content analysis (Kraus et al., 2022; Paul & Rosado-Serrano, 2019). Second, the conceptual framework emerging from the synthesis of consumption research on environmental values and planetary health remains limited to the logic and support rendered through the sensemaking of multi-study scientometrics findings. Although this contribution and practice are both the first of its kind and thus seminal, it should be noted that first-hand empirical validation remains absent. In this regard, future research is highly encouraged to adopt, if not adapt and extend, this conceptual framework and test it out with consumer samples, be it qualitatively, quantitatively, or both, in order to support or refute the stipulated sensemaking logic herein. Taken collectively, this article should serve as a useful starting point and reference to gain a meta-understanding of consumption and ecological sustainability research through the micro-lens of environmental values and macro-perspective of planetary health. The insights herein should also equip academic scholars, industry professionals, and policymakers with a systemic view of consumption and ecological sustainability, thereby providing a roadmap for transforming consumers into eco-superheroes.

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CONFLICT OF INTEREST STATEMENT

The author declares no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available in Scopus at https://www.scopus.com.

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