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Sustainability Policy Research: A Review and Synthesis

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This paper reviews theoretical and empirical approaches drawn from influential journal articles and books on sustainability policy published over the last 10 years (2007 through 2017). Due to the widespread application of sustainability as a concept and space limitations, the paper more narrowly focuses on sustainability research in three critical policy areas: climate change, urban development, and agroecology and food systems. Drawing from information provided primarily by citation indexes, the study identifies and analyzes the research literature related to sustainability in these three fields. Future theoretical and empirical research approaches that can better integrate and connect the current diffuse and incongruent literature on sustainability are discussed in the paper. The findings of the literature review generate a number of possible future research directions that are discussed in the study.

KEY WORDS: sustainability policy, climate change, urban development, agroecology and food systems, environmental policy, environmental politics, multiple methods

本文检验了自*2008–18*年间发表的有关富裕国家中经济不平等的政策文献。本文聚焦于这十年的原因在于它以*2008–09*年经济大衰退为开端，以*2018*年经济复苏结束。在此期间，社会政策学者对不平等的关注大幅增加，笔者认为这反映了学者对不平等趋势和再分配社会政策的关注。笔者在文献中发现，为理解社会政策和经济不平等之间的关系，以及再分配社会政策变化的决定因素，相关努力仍在持续。笔者还注意到，研究传统、和用于应对实际的、方法论和理论空白的途径，这两个方面在文献中存在显著差异。本文总结了文献中提到的方法和结果，并探讨了研究结果对研究公共政策学术领域中经济不平等的意义。

关键词: 不平等, 经济不平等, 社会政策, 政策分析, 福利国家

Este ensayo revisa la literatura orientada a las políticas sobre la desigualdad económica en los países ricos publicada desde 2008–18. Nos centramos en esta década porque es un período que se debe tanto al comienzo de la Gran Recesión de 2008–09 como a la recuperación. Durante este período de tiempo, la atención a la desigualdad por parte de los académicos en política social creció sustancialmente, lo que argumentamos refleja un interés tanto en las tendencias de desigualdad como en la política social redistributiva. Observamos en la literatura los esfuerzos sostenidos para comprender tanto la relación entre la política social y la desigualdad económica, como los determinantes de los cambios en la política social redistributiva. También observamos variaciones sustanciales en las tradiciones de investigación, así como oportunidades para abordar brechas sustanciales, metodológicas y teóricas. Nuestra revisión resume los enfoques y hallazgos de la literatura y discute las

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implicaciones de los hallazgos para el estudio de la desigualdad económica dentro del campo académico de la política pública.

PALABRAS CLAVE: desigualdad, desigualdad económica, política social, análisis de políticas, estados de bienestar

Introduction

Terms such as *sustainability*, *sustainable societies*, and *sustainable development*, among others, dominate the current literature on environmental politics and policy. Unfortunately, little attention is being paid to the precise definition of these terms, and much confusion surrounds their applications (Hempel, 2013; Portney, 2015). One challenge to developing an agreed upon understanding of the meaning of sustainability is whether researchers are focusing (or should focus) their attention on small, clearly defined jurisdictions at the local level (e.g., Mazmanian & Kraft, 2009; Portney, 2013), or whether they should analyze sustainability efforts at either the state, national, or global level (e.g., Mazmanian & Nijaki, 2013; Rabe, 2004, 2018; Sachs, 2015; Zaninetti, 2009). On the one hand, this reflects the healthy diversity of research and the fact that sustainability manifests itself in various ways depending on the analysis. On the other hand, the answer to this question has significant implications for the theories and variables investigators choose to examine and employ, how they structure their analysis and research, and the policy recommendations they generate (Hempel, 2013; Mazmanian & Nijaki, 2013). As this study shows, the literature on sustainability is poorly integrated, largely due to the substantial breadth of the topic, the varied disciplinary applications of the concept, and other factors (Hempel, 2013).

This paper begins by presenting a context for this research and an explanation of the methodology employed in the study. The paper then reviews the theoretical and empirical approaches drawn from the most influential journal articles and books on sustainability policy published over the last 10 years (2007 through 2017). The policy literature on sustainable development and sustainability has grown almost exponentially over the last three decades, producing an extraordinary number of journal articles, books, and other publications. The enormous amount of published work produced on the topic is also characterized by the wide breadth of policy issues that are explicitly and implicitly covered in recent publications. For these reasons, as well as limitations on space, this study more narrowly analyzes the sustainability literature in three critical areas of policy research: climate change, urban development, and agroecology and food systems. The findings of the study are then used to suggest potential future research avenues that can integrate and connect the current diffuse and incongruent literature on sustainability and that, in turn, can lead to fruitful policy recommendations.

In an effort to bridge and synthesize research on sustainability policy, this investigation identifies and reflects on recent trends in research based on citation indexes in each of the three separate but related policy areas. This approach provides insights into the various meanings of sustainability and serves as a foundation

for an assessment of the literature's lacunae, strengths and weaknesses, and possible paths for forthcoming research.

Theoretical and Empirical Issues

Niles and Lubell (2012) conduct an excellent analysis of the integration of environmental policy research concerning how synthetic theoretical perspectives and multidisciplinary strategies are being formulated to understand the connections between the social and ecological systems found in environmental issues. They observe that, "Environmental policy theory is now explicitly integrating a broader range of disciplines to better understand the linkages between human and natural systems" (2012, p. 42). They conclude that future environmental policy research will be driven by the surfacing of new environmental challenges, including the overall need to develop a sustainable society. Sustainability is mentioned as an example of a cross-cutting concept that will need to be increasingly addressed in funded research on global environmental problems.

In an impressive comprehensive study, Fahey and Pralle (2016) critically analyze a large sample of articles and books published between 2012 and 2015 to illuminate recent trends in environmental politics and policy research.[1] They find that the literature has taken on the challenge of investigating the complexity of environmental issues and problems. More specifically, the authors show how scholars have addressed "multilayer and network governance, public participation and mobilization, the role and influence of interest groups and business interests, and policy convergence," along with "climate change and natural resources management" in their publications (Fahey & Pralle, 2016, p. 44). During the period of time examined, researchers also have tackled critical questions concerning how to increase mobilization and participation for various actors, the role local governments play in addressing global issues, and how business interests influence policy.[2]

Methodological Approach

Markard, Raven, and Truffer (2012) have conducted an exhaustive analysis of a new field dealing with "sustainability transitions," which is the study of "how to promote and govern a transition toward sustainability, i.e., a fundamental transformation toward more sustainable modes of production and consumption" (p. 955). Such transitions "are long-term, multi-dimensional, and fundamental transformation processes through which established socio-technical systems shift to more sustainable modes of production and consumption" (p. 956). Their study attempts to identify the intellectual elements of this emerging field by presenting a review of rudimentary conceptual frameworks, along with a bibliographical examination of 540 journal articles in the area. Their review of the literature focuses specifically on "socio-technical transitions," a set of processes that lead to an important shift in socio-technical systems (e.g., energy supply, water supply, and transportation).

Markard et al. (2012) correctly note that the analysis of an emerging strand of inquiry by searching literature databases by key words is subject to interpretation

because results will be influenced by the selection criteria used. According to them, one must therefore be careful to choose key words that reflect the core meaning of the concept and at the same time do not lead to the inclusion of works that are significantly distant from the core meaning, even if this means that fewer publications are included in the analysis. This important challenge was kept in mind for the present analysis. An added difficulty is that the terms *sustainable* and *sustainability* are significantly broad and are open to very different interpretations, often reflecting the specific field of the investigator(s). This was kept in mind as well.

In an effort to address the challenges posed by the many varied approaches to sustainability policy employed in previous research, a decision was made to limit the analysis to three specific policy issue areas that are central components of sustainable/sustainability policy concern: climate change, urban development, and agroecology and food systems. Due to the ubiquitous causes of the problem and its widespread global effects, much of climate change policy research deals directly with questions of sustainability and involves efforts to limit greenhouse gas (GHG) emissions by various levels of government. Urban development policy, including transportation and housing, is critical to studies of sustainability given increased urbanization and population growth in cities in affluent and less affluent countries. Finally, agroecology and food systems are central to research on sustainability due to the inherent resource-use and pollution problems concerning current (e.g., commercial agriculture) and changing agriculture practices (e.g., organic farming) in developed and developing nations and the projected growth of the Earth's population by 2050 to about 9.9 billion people (Population Reference Bureau, 2018). This study synthesizes the research and policy developments in these three selected issue areas related to sustainability.

In terms of selecting the best citation indexes for this research, the study first experimented with using Google Scholar, JSTOR, Nexus Uni, Science Direct, Web of Science, and SCOPUS. After an exhaustive analysis of results using different publication databases and key word combinations, it was clear that employing the terms "sustainable" and "sustainability" with "climate change," "urban development," and "agroecology" and "agriculture" generated citation outcomes that were sufficiently large in number and that tended to identify publications (journals and books) that proved to be most topically related within each of the three fields. Google Scholar and Nexus Uni were unable to sort results for the purpose of the analysis and were excluded from the inquiry. Citations generated by JSTOR and Science Direct were extremely varied and often too limited, and these two citation indexes also were eliminated from the investigation. In contrast, Web of Science and SCOPUS produced a great deal of meaningful results and were used to identify citations concerning sustainability.

To account for variation in article titles and research trends over the selected 10-year period of 2007–17, "sustainable" and "sustainability" were also paired with the terms "global warming," "climate policy," "urban," and "food systems." It is noteworthy that while the term s*ustainable agriculture* tended to flag an acceptable large number of highly cited publications, many of them dealt with narrow, technical issues involving such things as specific agricultural intensification processes rather

than issues directly related to sustainability policy more generally. The key word *agroecology* was important in identifying publications directly connected to sustainability, but most of those articles did not include either "sustainable" or "sustainability" in the title. Along with the substance of their works, this suggests that agroecology researchers think of sustainability as being inherent in the concept "agroecology," and they therefore hardly ever include either term in the titles of their publications. *Agroecology* was therefore included as a key term in the search and analysis by itself.

To identify and analyze recent patterns in research on sustainability in climate change, urban development, and agroecology and food systems, a total of 45 publications were selected through a systematic search of citation indexes for articles, books, and sections of books. The authors read the abstracts of the 25 most frequently cited publications in each field. Then 12 journal articles and 3 books and/or book chapters from each field were selected based on their high citation count, broad scope, and geographic focus. This allowed exclusion of several highly technical studies that turned up in the database search but did not address sustainability more broadly. It is noteworthy that the database search yielded publications from a broad spectrum of journals and fields, including several that may not be considered commonly by scholars focused on sustainability policy. This is a strength of the cross-disciplinary approach given the increasing importance of moving beyond disciplinary boundaries and addressing sustainability challenges in a multidisciplinary manner in politics and public policy.

The first authors of these publications were included in a survey of 15 distinguished scholars in each of the three selected issue areas (for a total of 45 respondents). This generated valuable information about the literature's lacunae, strengths and weaknesses, geographical and disciplinary focus, methodological orientation, and areas of improvement, as well as the overall research trajectory of the three fields and potential topics for future inquiry. In addition to the 45 highly cited publications identified through the database search, another 19 works were classified by respondents as most important between 2007 and 2017 in the three policy areas, for a total of 64 publications.[3] All of these publications were carefully read. There was a small amount of overlap in results across climate change, urban development, and agroecology and food systems. However, no single publication was included in more than one issue area.

General Overview of the Sustainability Literature

By combining the publications identified in the analysis of the citation counts with the publications identified as most important over the last 10 years (2007–17) by respondents (how respondents were chosen is explained in endnote 3), it was possible to compile a deep and broad reservoir of prominent research on sustainability in the fields of climate change, urban development, and agroecology and food systems. In the end a total of 64 writings were closely analyzed in order to obtain information about research foci within and between the three policy areas. Before reviewing the findings of this analysis, it is useful to present a general overview of the selected publications examined in this study.

Table 1 shows the particular level of geographic focus of sustainability research by continent focus of the 64 selected prominent contributions to the literature on climate change, urban development, and agroecology and food systems between 2007 and 2017. Applying Fahey and Pralle's (2016) categories, global under continent focus and geographic (scale) focus means that the publications examine either international relationships or include three or more continents in their study. Analyses that have a truly global focus, such as those examining United Nations meetings, are coded as globally centered as well. International under geographic focus represents research that addresses issues that are more than regional but do not involve the entire planet. Articles that explore multiple nations without a regional approach are coded as multiple nations. As readers can see, scholars who write about agroecology and food systems tend to vary more in the geographic focus and continent focus of their work compared to those who study climate change and, even more so, urban development. Those who conduct research on urban development and sustainability appear to concentrate their efforts at the subnational level in North America more than contributors on the subjects of climate change and agroecology and food systems. Overall, sustainability scholars pay less attention to Africa and South America than other continents.

Table 2 reports the different primary methodological approaches used by sustainability researchers in climate change, urban development, and agroecology and food systems. In general, those who study sustainability issues in the three policy areas tend to vary in the methodologies employed in their research. While those who analyze urban development demonstrate a preference for writing literature reviews, those who conduct research on agroecology and food systems are likely to pursue quantitative approaches in their work. The high number of literature reviews in urban development are found in widely cited books and book chapters as well as in journal articles and reflects the nature of the field.

Table 3 reveals the primary academic discipline orientation by those who conduct research on sustainability in the three policy fields. Researchers who focus on climate change and agroecology and food systems are more varied in the discipline orientation of their work than those who focus on urban development. Clearly, those in the area of urban development tend to adopt a social science perspective in their research more than those who study climate change or agroecology and food systems. Based on the literature review conducted for this paper, studies that equally integrate social science and natural science approaches are most likely to involve multidisciplinary teams of scholars.

In-Depth Analysis of the Literature

Climate Change

Research on climate change and sustainability policy over the last 10 years reflects the sweeping nature of the problem, with some of the greatest variation in methodological focus, discipline orientation, and issues studied. Topics range from the science and modeling of effects, to questions of adaptation versus mitigation, to social and cultural implications, to issues of fairness and equality, and to the myriad policy dilemmas climate change poses. Not surprisingly, the literature on climate

Table 1. Geographic Focus and Continent Focus of Selected Sustainability Research, 2007–17

	Continent Focus						
Geographic Focus	Global	North America	South America	Europe	Asia	Australia-Oceania	Africa
Climate Change:							
Subnational				1			
National		1		1	1	1	
Multiple nations	1			4		1	1
Regional		1				1	
International	1						
Global	2						
Urban Development:							
Subnational	5	8		2	3		
National				1			
Multiple nations							
Regional	1						
International	1						
Global	2						
Agroecology and Food Systems:							
Subnational	1			1	1	1	1
National							
Multiple nations	3	2	1	2	2		1
Regional				1			
International	3			1			
Global	3						

Note: Numbers in the table represent how many publications fall into each geographic focus and continent focus category. Total *N*: 64. Climate change *N*: 17. Urban development *N*: 23. Agroecology and food systems *N*: 24.

Table 2. Sustainability Issue Focus by Primary Methodology Employed, 2007–17

Sustainability Issue Focus	Primary Methodology Employed			
	Literature	Mixed Methods	Qualitative	Quantitative
Climate change	1	6	5	5
Urban development	10	5	4	4
Agroecology and food systems	2	7	5	10

Note: Numbers in the table represent how many publications fall into each geographic focus and continent focus category. Total *N*: 64. Climate change *N*: 17. Urban development *N*: 23. Agroecology and food systems *N*: 24.

change and sustainability contains a fair amount of overlap with urban development, agroecology and food systems, and other related policies (e.g., energy production and use). Climate change effects tend to exacerbate other challenges to sustainability such as feeding a growing global population without increasing GHG-intensive inputs (Khan, Zaidi, & Wani, 2007; Pretty, 2008) and rapid urbanization without additional carbon-intensive practices (Zeng, Ding, Pan, Wang, & Gregg, 2017).

Of the three topics examined in this paper, climate researchers tend to take the most encompassing view of sustainability, although they rarely define it. Applications of the concept of sustainability are on a gradient ranging from reduction of emissions associated with one process to addressing effects on all facets of society. While most of the studies focus on one issue area, many researchers note broader social, economic, environmental, and cultural implications, part of a growing recognition that the field needs to address sustainability in a more coherent and comprehensive manner.

In a positive direction worthy of significantly more research, some scholars are approaching the challenge by identifying opportunities to create win–win solutions that mitigate GHG emissions and yield social and economic benefits at the same time. Mbow, Smith, Skole, Duguma, and Bustamante (2014), for instance, examine how sustainable agroforestry practices in Africa could be developed to achieve climate mitigation and adaptation goals and simultaneously enhance food security and the livelihood of smallholder farmers. At a broader level, von Stechow

Table 3. Sustainability Issue Focus by Primary Academic Discipline Orientation, 2007–17

Sustainability Issue Focus	Primary Academic Discipline Orientation		
	Social Science	Natural Science	Both Equally
Climate change	8	6	3
Urban development	17	0	6
Agroecology and food systems	8	11	5

Note: Numbers in the table represent how many publications fall into each geographic focus and continent focus category. Total *N*: 64. Climate change *N*: 17. Urban development *N*: 23. Agroecology and food systems *N*: 24.

et al. (2015) provide a synthesis of disparate literatures (drawing in part from the Intergovernmental Panel on Climate Change's *Fifth Assessment Report* 2014) to show the potential for significant co-benefits of climate mitigation efforts with other sustainability objectives, such as human health and energy security. Hatfield-Dodds et al. (2015) examine future economic and environmental scenarios for Australia and find that "sustainable prosperity" is possible, with significant reductions in GHG emissions and other environmental impacts, in conjunction with economic growth and increased living standards.

An important part of the literature addresses the challenges of climate vulnerability and adaptation. Even if the nations of the world take major action to reduce GHG emissions, there will be significant impacts this century and beyond that require a great deal of research and policy changes to address new and ever more challenging environmental, social, economic, and equity issues (Sachs, 2015). In an insightful study, Eriksen et al. (2011) point out that adaptation efforts themselves can exacerbate vulnerability and increase GHG emissions, calling for "sustainable adaptation" that "contributes to socially and environmentally sustainable development pathways, including both social justice and environmental integrity" (p. 8).

Climate vulnerability and sustainable adaptation are dependent on specific conditions and capacities given local contexts and development processes (Eakin, Lemos, & Nelson, 2014). Additionally, tensions can arise between climate mitigation and adaptation, especially if citizen participation is not prioritized in determining sustainable futures (Larsen & Gunnarsson-Östling, 2009). Given the immediate implications of climate change for many people's lives, greater research efforts should be directed toward adaptation effects and strategies.

Questions about social organization and responsibility permeate parts of the literature. Should growth be limited, and by how much (Rockström et al., 2009)? What are effective systems of governance to achieve sustainable social-ecological systems (Ostrom, 2009)? What are the effects of household dynamics in consumption and production, and how can they become sustainable (Gibson, Head, Gill, & Waitt, 2011)? Similarly, there are long-standing questions about corporate responsibility and how to make corporations truly sustainable (Kolk & Pinkse, 2007), and to ensure they do not greenwash the term at the cost of achieving actual sustainability (Greenberg, 2015).

The Paris Climate Agreement of 2015, of course, is the most significant global climate policy framework. It is spawning research regarding its effectiveness, implementation, governance, and how to build on it to achieve the greatest gains. While the Agreement is an important breakthrough in beginning to set up a global framework to reduce GHG emissions and climate impacts, it also lacks a blueprint for its objectives (Clémençon, 2016). This is a familiar problem to many national, state, and local climate policies and goals (Betsill & Rabe, 2009; Charbit & Michalun, 2009), underscoring how important it is that future research and policy frameworks seek to construct clear and detailed plans with specific policy and governance systems (in spite of President Donald Trump's decision to pull out of the Agreement). Further research should also examine how to foster effective coordination among levels of government.

Addressing the scope of environmental, social, economic, and other effects stemming from any one major climate policy (e.g., energy system changes) is a daunting task, no less from multiple policies and issue areas. This is reflected in the general dearth of comprehensive policy assessments, frameworks, and recommendations accompanying most studies. The complicated and far-reaching challenges of climate change will require scholars and policymakers to address many issue areas (e.g., energy and food demands) in a new, holistic fashion rather than if they were technical problems isolated from climate impacts. Political institutions and economic and cultural systems lend themselves to incremental changes, but achieving broader sustainability goals, especially in light of climate change, will likely require abandoning the status quo in favor of transformational change. Researchers are making some strides in these directions, but there is a pressing need for truly comprehensive approaches.

Urban Development

Cities, the heart of the world's rapid urbanization shift, are simultaneously examples of intense resource use, pollution, and hubs of sustainability initiatives, climate action, and innovative solutions. As Ahern (2011) astutely notes, how sustainable the twenty-first century world will be depends in large part on the sustainability of cities. Some of the most important questions are: How effective are the sustainability policies of cities, what do they leave out, how do they affect different people, and what else can be done and how? These are difficult and complicated questions, with tremendous variation in different parts of the world given the effects of diverse social, economic, political, and environmental factors and their interactions, not to mention in which nations they reside (Li et al., 2009).

The literature struggles with a lack of clarity in defining urban development sustainability, and there is a spectrum of what is included and what characterizes successful practices and outcomes. While some scholars point to widespread acknowledgement of social and economic dimensions within urban sustainability, there exists significant ambiguity. Seto et al. (2012) point out that it is not even clear where to draw the lines of urban sustainability. Should analysts concentrate their efforts within a city's boundaries, or should they include the land changes wrought by urbanization and the extraction of resources from surrounding locations? They suggest that the concept of urban land teleconnection offers an effective framework to examine such impacts (Seto et al., 2012). Given the far reach of urban centers for resources, ignoring those effects would likely lead to an underidentified explanatory model.

One of the most important directions for urban development work is for researchers, policymakers, and managers to develop and agree on a consistent set of concrete sustainability indicators (Li et al., 2009; Shen, Ochoa, Shah, & Zhang, 2011). As part of their environmental and sustainability plans, many cities have developed indicators, but they are inconsistent and vary in effectiveness and methodology, making comparisons—and thus research, refinement, and improvement—difficult (Li

et al., 2009; Shen et al., 2011). There is also a need for more quantitative studies (see Table 2), which would complement explicit indicators and associated methodological assessments. Drawing from the natural sciences (see Table 3) would strengthen the field, especially in integrating environmental and ecological issues with social and economic effects.

A strength of the literature is a focus on the social sustainability aspects of urban development, which entails social equity issues and sustainability of community. This includes elements, such as social justice and networks, community stability, engaged governance, and safety and security (Bramley & Power, 2009; Cuthill, 2010; Dempsey, Bramley, Power, & Brown, 2011). This area of inquiry takes urban development sustainability into important new directions that directly address people's lived experiences. At the same time, Dempsey et al. (2011) caution that a balance between dimensions of sustainability may be necessary to ensure social sustainability does not come at the expense of other sustainability components. Future research should seek to maintain this balance and to develop innovative systems to achieve many aspects of urban development sustainability together. Doing so will require policy frameworks that tackle sustainability comprehensively rather than a piecemeal approach that isolates environmental, social, and economic issues.

The question of sustainability policy effectiveness must be at the forefront of research and government management. If goals are not defined and assessed clearly, urban development sustainability risks becoming more rhetoric than being at the leading edge of sustainability as one might hope. In an important critique of the field, Greenberg (2015) documents an exponential increase in use of the term *sustainability*, first by corporations but more recently by cities and their policymakers. Moreover, she notes how sustainability is used in entrepreneurial branding without altering unsustainable models of urbanization and growth. Instead of acting as a challenge to the growth-oriented global economy, Greenberg (2015) sees sustainability being seized upon as a marketing tool— much as "nature" has been—to instead become a "powerful engine of economic growth" (p. 107). Indeed, several distinct discourses exist around sustainability that put it at risk of co-option and also losing sight of the fact that sustainability needs vary by location, class, and culture (Redclift, 2005). For example, Checker (2011) has found that environmental justice issues can be contradicted by market-based approaches to sustainability.

Despite challenges, there is a proliferation of good urbanization practices around the world and sincere efforts to make meaningful and significant progress (Shen, Ochoa, Zhang, & Yi, 2013). Urban development (and, similarly, climate policies) can benefit from using cities as affordable and valuable laboratories to innovate and test new approaches (Ahern, 2013; Wu, 2014). Yet this should not be taken for granted; cities may not organically look to or share best practices, particularly across nations and continents. Furthermore, whether and, if so, to what extent results from such research can be scaled up to the global level is uncertain. At the same time, the investigation of remote, critical areas of biodiversity on the planet (such as deserts, rain forests, and ice caps) will still need to take place.

Recognizing this dilemma, Shen et al. (2013) and Shen, Shuai, Jiao, Tan, and Song (2016) have developed a system for extracting, databasing, and sharing urban

development and sustainability practices. Specifically, Shen and his colleagues produce and analyze a sophisticated measure of sustainable performance of urbanization across 111 nations. Adopting an ambitious global perspective, they find that the best performers in terms of overall sustainable urbanization are Sweden, Norway, Germany, the Netherlands, and Denmark (mainly developed nations in Europe). Poor performers are primarily located in Africa and Asia. Future scholarship should build on this excellent work—and draw from political science and public policy theoretical and empirical work—to determine how to best facilitate policy learning, sharing, and collaboration, including accounting for local differences when considering the adoption of competing policies (Shen, Yan, Zhang, & Shuai, 2017).

Agroecology and Food Systems

The Food and Agricultural Organization (FAO) of the United Nations has articulated the need for agriculture to be both highly productive and environmentally sustainable (Collette, Hodgkin, & Kassam, 2011). With language vague enough to allow for some interpretation, the FAO has called for "greening" the Green Revolution through an ecosystem approach, utilizing a relatively broad understanding of sustainability that incorporates social, economic, and other environmental effects, including climate change (Collette, Hodgkin, & Kassam, 2011). The literature on agriculture, agroecology, food systems, and sustainability tends to describe the challenges and goals in some variation of this theme. Consistent with the climate change and urban development literatures, however, there is fairly wide variation in use of sustainability (Binder, Feola, & Steinberger, 2010), and many scholars fail to provide a definition. One noteworthy strength of the literature is an increasing focus on the developing world. Also, more researchers are accounting for local conditions and economic needs and they are employing varied methodologies in their studies.

Three subtopics stand out in the food systems and sustainability literature: conservation agriculture, sustainable intensification, and agroecology. Although there is substantial overlap among them, it is worth expanding on the research and policy trends of each. Conservation agriculture, defined as an agricultural management system that is characterized by "minimal soil disturbance (no-till) and permanent soil cover (mulch) combined with rotations" (Hobbs, Sayre, & Gupta, 2008, p. 543), promises to enhance water and nutrient use efficiency, benefit biodiversity, reduce GHG emissions, and improve local environmental conditions (Collette et al., 2011; Kassam, Friedrich, Shaxson, & Pretty, 2009). Scholars point to how conservation agriculture marks a change in production system thinking—practiced on about 11 percent of total crop land worldwide as of 2013 (Kassam, Friedrich, Derpsch, & Kienzle, 2015)—requiring knowledge-intensive practices that are harder to implement than a simple technology (Kassam et al., 2009). As a result, scaling up conservation agriculture will require more research along with new policy frameworks and institutional support (Hobbs et al., 2008; Kassam et al., 2009, 2015).

Sustainable intensification, which can also be an outcome of conservation agriculture, refers to "increasing food production on existing farmland in ways that place far less pressure on the environment and do not undermine our capacity to continue producing food in the future" (Garnett et al., 2013, p. 33). Its goals include minimizing land use, reducing GHG emissions, and achieving greater food security (Garnett et al., 2013; Khan et al., 2007; Tilman, Balzer, Hill, & Befort, 2011). Researchers point to the dilemma of closing the "yield gap"—the difference between realized and maximum productivity—in a sustainable fashion (Godfray et al., 2016). A growing research focus is how to achieve sustainable intensification in a manner that also fosters economic benefits, which is especially important in developing nations but is dependent on supportive policy frameworks (Khan, Zaidi, & Wani, 2007; Pretty, Toulmin, & Williams, 2011). For example, Pretty et al. (2011) examine projects in 20 African countries and find that sustainable intensification practices could provide significant production, environmental, and economic benefits but instead have been hampered by largely unhelpful domestic and international policy.

Agroecology is receiving greater attention throughout the world as a scientific discipline, movement, and practice (Wezel et al., 2009). In its broader uses related to sustainability, agroecology applies knowledge-intensive, ecological principles to increase agrobiodiversity (Altieri, 2009; Tomich et al., 2011; Wezel et al., 2009). It is on the other end of the spectrum from a push toward globalization and industrial agriculture that is reliant on high input, chemical-intensive practices (Altieri, 2009; Gliessman, 2006). Agroecology emphasizes the benefits of smaller family farms and blending agroecological science with indigenous knowledge systems to achieve a broad variety of sustainability objectives including food security and better social and economic conditions (Gliessman 2006; Ostrom, 2009; Tomich et al., 2011; Wezel et al., 2009). Future research should expand on inquiries about larger-scale transitions from industrial practices to agroecological systems as well as developing common indicators and methodologies to facilitate sharing of data, assessments, and the level of success of varying policy approaches.

Research on conservation agriculture, sustainable intensification, and agroecology offer hopeful solutions to the grave challenges of increasing production and making food systems sustainable. While there are significant differences, a full discussion of which are beyond the space limitations of this paper, there are also many similarities. One common call among several of the agroecology studies reviewed is for more interdisciplinary and transdisciplinary research. This applies both within the realm of food systems approaches as well as with broader issues of social effects, economic implications, and policy and global change. Binder et al. (2010), for instance, point to how traditional agricultural sustainability assessments focus on environmental and technical issues while neglecting social and economic aspects of sustainability. Reynolds et al. (2017) raise the inadequacy of research and data sharing, and discuss a system and potential benefits of a successful Global Crop Improvement Network.

Many scholars have recognized that major changes to global food systems are needed and that they will have far-reaching effects. While some scholars point to the need for different policy approaches, most of the literature spends little time addressing what policy frameworks would facilitate the greatest sustainability gains. Policy research will need to accompany future sustainable food systems studies, especially given the wide variety of policy changes that will be necessary in different regions of the world and at different levels of government. The confluence of challenges to food systems from rapid population growth, resource use, climate change, and related social and economic conditions guarantee that incremental progress will be inadequate; transformational change will be paramount to achieve sustainability objectives. To address adequately those implications, researchers, funding entities, and governments should aim to create ambitious transdisciplinary research teams and science-policy frameworks.

Overarching Themes

In addition to those already noted, several common themes emerge across the three areas of literature reviewed in this study. The publications reviewed illustrate that researchers are studying many facets of sustainability, from overarching to specific issues. Even within the three fields and the selection of works reviewed, there is a great deal of variety. The range of topics within climate change, not surprisingly, is most substantial, including everything from water availability; to technical solutions; to stakeholder engagement; to the role of households; to questions about broader goals, indicators, and policy strategies. The variation within urban development and agriculture is less but still considerable. Within urban development, along with broad policy approaches and sustainability indicators, areas of focus include urban ecology, resilience, density and housing types, cultural heritage, economics, and several social dimensions. In addition to the three subtopics of agroecology and food systems discussed previously, publications deal with issues varying from food demand, to food sovereignty, to nitrogen issues, to groundwater contamination, and soil organic matter. These and other topics reflect how broad the scope of work addressing sustainability is throughout the world. As several authors point out, research in these areas has important implications for regulation and policymaking.

Beyond the research included in this review, it is important to recognize that the public policy literature relating to sustainability is even broader. It includes work focusing on governance (e.g., Durant, Fiorino, & O'Leary, 2017), institutions (e.g., Beddoe et al., 2009), comparative and international development (e.g., Siche, Agostinho, Ortega, & Romeiro, 2008), behavior (e.g., Osbaldiston & Schott, 2012), economics (e.g., Pezzey & Toman, 2017), and inquiries specific to all manner of topics (e.g., Vig & Kraft, 2018). The fact that sustainability has become a pervasive topic across such a breadth of inquiry is encouraging.

With a few exceptions, most researchers view sustainability in a positive light with the core meaning being to preserve and manage resources in a way that will allow society to exist indefinitely. Uncertainties abound, however, about how specifically to use and understand the terms *sustainable* and *sustainability*. They invoke

an inherent sense of intuitive comprehension, but that breaks down in goal setting, theory development, and methodological assessments. This presents a challenge to policymakers who are tasked with implementing sustainability objectives. Beyond those for individual issues and practices, broader, advanced policy frameworks for sustainability are still in their infancy, partially due to the difficulty of addressing the issues in a comprehensive manner.

While many sustainability issues are large in scale, they are also inherently local. Small population centers and geographic scales, as well as cities and states in more ambitious cases, may present a wise starting place to develop and test comprehensive policy frameworks. Finally, throughout each area of the policy literature reviewed, the incredible passion of the researchers was particularly evident. This was readily apparent from the quality, vision, and often ambitious nature of their research along with their enthusiasm for developing solutions to some of the world's most important and pressing policy problems in the new century.

Conclusion

This paper examined the theoretical and empirical approaches drawn from influential journal articles and books on sustainability policy published over the last 10 years (2007 through 2017). Specifically, this investigation focused on sustainability policy research in three critical issue areas: climate change, urban development, and agroecology and food systems. Drawing from information provided by citation indexes and interviews of a small group of selected prominent scholars (see endnote 3), the study identified and synthesized the research literature related to sustainability in these three separate but related policy fields. A review of the theoretical and empirical literature led to important observations and insights as well as the identification of gaps in research on sustainability during the last 10 years. Potential fruitful avenues of future research were noted at appropriate points in the examination of the literature within each policy field. Based on the overall findings of this analysis, it is clear that most scholars tend to work within relatively limited geographical, theoretical, empirical, and disciplinary bands and only occasionally attempt to collaborate with those in other policy fields and incorporate that knowledge into their own work.

Given the complexity, breadth, and depth of sustainability as a concept, there is good reason and significant potential to study policy-related issues and government actions in multidisciplinary teams. Knowledge and awareness of scholarship in other disciplinary fields can lead to new understandings and findings that researchers would never have obtained had they operated only within their own specific analytic area. Working in strategically organized multidisciplinary groups can lead to more accurate and comprehensive definitions and conceptions of sustainability. Niles and Lubell (2012) are correct in suggesting that future scholars should make a stronger effort to conduct research on critical policy topics with those working in other complementary fields of inquiry.

The findings of this study point to a number of additional possible future lines of inquiry across all three issue areas. In reviewing the context of the research

conducted by sustainability researchers concerning climate change, urban development, and agroecology and food systems, it is apparent that too few scholars are investigating policy issues in developing countries. As noted, despite the serious sustainability challenges that Africa and South America face, a relatively small number of policy analysts are pursuing research involving these continents. Similarly, Fahey and Pralle's (2016) excellent, in-depth review of the environmental politics and policy literature yields a lack of research on developing nations, leading them to call for more analysis of less affluent countries. This study also calls for more analysis of sustainability issues in African, South American, and other developing nations around the world.

Given the complexity and already serious nature of many of the environmental and natural resource problems the planet is facing today (e.g., climate change, expanding urban populations, and the need to grow more food to feed a larger global population), it is becoming increasingly necessary for government at all levels to move from incremental change to transformative change. It will take too long to achieve a sustainable society if government leaders continue to follow the current meandering, incremental approach to solving complex and difficult environmental and natural resource problems. Instead, leaders will need to adopt bold, innovative, and ambitious approaches to addressing this new century's multifaceted and most serious problems if they hope to achieve a desired level of sustainability. Theoretical and empirical policy frameworks must both be developed to provide roadmaps for leaders to bring about meaningful transformative change within the context of present democratic and global economic systems. This study found little evidence that such efforts are being pursued in the three policy fields examined. The next generation of policy scholars should be encouraged to investigate theoretically and empirically various alternative approaches to transformative change.

How government currently pursues policy change through the legislative process, for example, deserves serious reconsideration. Reflecting the conditions and constraints of different political contexts, nearly all governments at different levels tend to solve problems in isolation of one another despite the fact that most environmental and natural resource issues are multifaceted, interwoven, and require action on multiple fronts at the same time. The literature reviewed across the three policy areas did not contain a discussion of how future leaders, legislators, and policymakers working together could establish a process that will allow them to develop laws, policies, and programs in bundles with the goal of attacking the most difficult obstacles simultaneously. Needless to say, citizens will also need to be actively involved in these efforts. Such an overall approach will be necessary to form a sustainable society.

Among other things, this will require researchers and policymakers to agree upon and create a list of common indicators of sustainability, something that is currently lacking. A set of common indicators will permit us to measure where we are now and how far away we are from forming a sustainable society. (Of course, this assumes that we can agree on what is a sustainable society.) A combined set of measures will help reveal where exactly the most serious difficulties lie and allow policymakers to track progress to ameliorating those difficulties. Moreover, a set of

common indicators will permit researchers to make comparisons of conditions in different parts of the world and inform leaders how to maintain a sustainable society once that is achieved. Clearly, inquiry along all these lines is sorely needed.

The existing environmental policy literature offers ideas for future research on sustainability from a variety of angles more generally. Kraft and Mazmanian (2009), for instance, provide several possible avenues for future research that focus on sustainable communities (e.g., exploring the extent to which findings at the subnational level can be scaled up to state, national, and international levels). Kraft and Kamieniecki (2013) argue that more work also needs to be done on theory development, especially in the areas of issue definition, framing, and agenda building, as well as on the politics of policymaking and policy change. In yet another work, Meadowcroft and Fiorino (2017) discuss the need for future researchers to reconceptualize established environmental policy ideas (e.g., environmental risk, environmental security, and environmental assessment) in their attempts to design effective government policies that substantially advance efforts to create a sustainable society.

Another vital area of research should address exactly what future sustainable societies will look like and determine how they will be maintained. Will it be possible to develop and maintain future sustainable societies under existing political and economic systems, or will new political and economic systems be required for various nations around the world? More generally, as Milbrath (1989) examines, will our current understanding, values, and practice of democracy in the United States and around the world be able to exist, or will democracy and public participation and representation have to be rethought and new governing frameworks be developed? In order to smooth the way to the establishment of a truly sustainable society, it would be fruitful for scholars to address these and other similar theoretical and policy-related questions in their studies.

Finally, given the complex interconnections and interrelationships between the social, economic, political, environmental, and natural resource impediments that must be effectively addressed if a sustainable society is to be established and maintained, future investigators will need to explore and determine globally the set of variables that affect sustainability the most. However, conducting research on a truly global scale is very complicated, time consuming, labor intensive, and extremely costly. This is quite evident in the area of climate science and policy where sophisticated and advanced computer hardware and software are being developed and constantly improved upon over time as suggested in the literature examined for this study.

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Notes

We thank the scholars who responded to our survey for their time and for their insightful perspectives. Thanks also to the anonymous reviewers for their thoughtful input and recommendations.

1. The authors likely chose a narrow band of time in which to conduct their research because of the impressive broad nature of the many topical categories they chose to include in their study. Also see Kamieniecki and Kraft (2013) for an extensive analysis of the evolution of the environmental policy literature over time.
2. Researchers interested in the influence of business over environmental policy should consult: Kamieniecki (2006) and Kraft and Kamieniecki (2007).
3. During spring 2018, the 15 first authors of the highest cited works in each of the issue areas were contacted and interviewed through email and Skype and on the telephone. They were asked four specific questions about the sustainability literature. The first question requested respondents to provide a definition of sustainability. They were then asked to identify the three most important journal articles and then similarly the three most important books published on sustainability within the last 10 years (beginning January 1, 2007). Finally, they were asked to characterize specific gaps in the sustainability literature and explain what are the most important questions that future scholars should explore and why. In total, nine completed questionnaires (five in climate change, three in urban development, and one in agroecology) and nine refusals were received. Unfortunately, 27 people did not respond after they were contacted three times between May 24 and June 18, 2018. The fact that many colleges and universities had completed their academic year (or were close to completing their academic year) during this time probably explains the lower than expected response rate. While such a low response rate prevents us from drawing any definitive conclusions about the views of researchers concerning sustainability scholarship, there is enough feedback to permit us to use the input received as a valuable secondary source of background information. The contents of the works cited most frequently and the survey responses of the authors of those works together generated important insights into research on the three policy areas examined in this study.

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