Sustainable Development and Participatory Action Research: A Systematic Review

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Abstract

Sustainable development scholars are employing participatory action research to establish platforms for collaborative inquiry and knowledge integration. While this action research tradition supports the revitalization of scholarly influence in sustainability policy and practice, its recent expansion into new topics and disciplines suggests the need for broad-based evaluation. To fulfill this task, I conduct a systematic review of the last decade of peer-reviewed research. The results of this study advance scholarly knowledge in three critical ways. By mapping the field, I identify global patterns of engagement and assemble an interdisciplinary toolbox of methods for research and action. By interrogating descriptions of methodology and lessons learned, I uncover key issues with research and practice, including threats to methodological integrity. By connecting empirical insights with the discourse on ethics, I clarify research standards and suggest strategies for improving engagement. This article brings coherence to an emergent and potentially transformative field that is located at the crossroads of sustainability and participation.

Keywords: sustainable development, participatory action research, interdisciplinary methods, development ethics

Introduction

Participatory action research (PAR) supports sustainable development by providing the means to establish transformative frameworks for engagement. This methodological tradition is part of a broader action research paradigm that complements qualitative and quantitative research through the delivery of problem-solving methods. With its origins in Global South scholarship, PAR centers marginalized communities and knowledges in critically reflexive cycles of research, learning, and action (Cordeiro et al. 2017). Conceptually, PAR is rooted in the postcolonial, postmarxist, and postmodern critiques of power informing Freirean pedagogy and emancipatory social science. According to PAR theory, oppressive systems are perpetuated through 'the polarization of control' over the means of production; thus, scholars should transform the social relations of knowledge production by shifting research control to local stakeholders who have situated understanding of the issue at hand (Rahman 1991:14). Power sharing is achieved through a socially reconstructive methodology of participatory inquiry and democratic decision making (Godden 2017). Within sustainability studies, scholars mobilize PAR partnerships to integrate scientific and grassroots knowledge, empowering marginalized communities to develop practical solutions to sustainability problems (Parkes and Panelli 2001).

Grassroots studies suggest that PAR is an effective methodology for transitioning to sustainability, but there is a need for broad-based inquiry into outcomes. The emerging field of sustainable development and participatory action research (SDPAR) ranges across disciplines, topics, and world regions where grassroots efforts are embedded. The divergent yet localized terrain of SDPAR inquiry may be hindering the diffusion of knowledge regarding methods, challenges, and prospects. Likewise, methodological integrity may be threatened by the expansion of participatory research into disciplines historically unassociated with critical social

theory and action research. Formative PAR scholars have cautioned that this methodology is vulnerable to elite cooptation in cases where scientists claim its use without demonstrating their commitment to participation through published reflections (Fals Borda 1996).

This article responds to these concerns by providing the first broad-based analysis of SDPAR in practice. Presenting findings from a systematic review of the last decade of peer-reviewed studies, I uncover the emergence of a highly interdisciplinary field; one marked by innovation and potential, but also fraught with challenges that include social and disciplinary clashes as well as organizational and institutional barriers. I begin the review by mapping the field to determine the parameters of engagement and identify methods for research and action. Next, I problematize research and practice to assess methodological integrity and analyze identified challenges. Finally, I bring empirical findings into dialogue with the discourse on participatory and sustainability ethics to consider strategies for strengthening engagement.

My analysis indicates that some degree of intellectual cohesion is needed to strengthen outcomes and collectively advance the field. On one hand, SDPAR studies are actively combining different knowledge systems and research practices, leading to a more sophisticated understanding of socio-ecological complexities. On the other hand, methodological integrity is being threatened by a widespread lack of awareness of PAR standards, and there is a need to problematize the linkages between participation, knowledge, and sustainability. To ensure robust and transparent practice, I conclude by arguing that published accounts should include critical reflections of three interrelated aspects of the SDPAR process; namely efforts to: (1) shift control to grassroots co-investigators; (2) integrate differential knowledges; and (3) transition to sustainability. As the studies in this review encompass the breadth of SDPAR scholarship, these findings deliver actionable knowledge to scholars working in a range of contexts.

SDPAR in Theory and Practice

Sustainable development is a theory and practice of social change in which meaning is contested. Common definitions call for societies to balance environmental, social, and economic objectives in order to meet basic needs and achieve well-being through sustainable growth (Zaccai 2012). Critical social theorists have advanced understanding by articulating the role of power structures in constraining the levels of human agency needed to establish transformative practice (Fuchs 2017). The critical sustainability discourse also has identified strategies for grassroots action. For example, scholars have employed Freirean pedagogy to develop a model for 'socio-ecological conscientization' that challenges the colonial-capitalist arrangements fueling environmental devastation and social inequities around the world (Ferreira 2017).

Despite these critical contributions, the concept of social sustainability has been sidelined in mainstream research and practice. According to Vallance and colleagues (2011), conventional sustainability studies either focus entirely on bio-physical matters or reduce the social pillar to mere economic growth. Conducting research on international environmental governance, Okereke (2008) likewise finds that neoliberal governance structures conflate social sustainability with economic growth while more broadly treating sustainable development as a technocratic add-on to conventional practice.

The Earth Charter augments understanding by offering an ethical framework for action. In response to calls for international cooperation at the Rio de Janeiro Earth Summit of 1992, a consortium of international scientists, lawyers, and religious leaders adopted an inclusive and participatory process to draft the Charter. Launched in 2000, this document represents 'an international declaration of common values and principles for building a just, sustainable, and peaceful global society in the 21st century' (Earth Charter Initiative 2015). The Earth Charter has

yet to inform mainstream environmental governance, but it has achieved status as a soft law document, providing a common moral foundation for the advancement of international environmental law (Robinson 2011). Transformative social objectives are clearly articulated in the Charter's 16 principles. Grouped into four broad categories, these principles emphasize commitments to: (1) respect and care for the community of life; (2) ecological integrity; (3) social and economic justice; and (4) democracy, nonviolence, and peace (Waas et al. 2011).

Action researchers have an important role to play in putting sustainable development commitments into practice. This research modality emerged in the 1940s as a means to align scientific inquiry with development and transformation (Adelman 1993). At that time, social and behavioral scientists worked with industry to improve institutional practices by bringing marginalized groups into platforms for collaborative inquiry, leadership training, and organizational planning. Action research has matured into several traditions, but the field as a whole is aligned by its commitment to a 'philosophy of practical knowing' (Coghlan 2016:84). This philosophy calls for researchers to identify and solve problems by bringing stakeholders into in cycles of action and reflection.

As a problem-solving modality, action research does not rely upon value neutrality to demonstrate research validity, but rather engages a validity-in-action approach that emphasizes stakeholder relevance and outcomes (Brydon-Miller et al. 2003). The production of locally relevant and culturally accurate knowledge is realized through multi-investigator triangulation with co-investigators (Edwards and Brannelly 2017). Taken from the qualitative research tradition, critical reflexivity also is a prime measure of quality control, meaning that researchers are tasked with developing 'reflexive ethical guidelines and decision-making principles that

depend on continual reflexivity concerning the relationships between researchers and participants' (Cordner et al. 2012:161).

Within this terrain, PAR is a social justice methodology that calls for intensive grassroots participation in the pursuit of knowledge democratization and emancipatory social change. It is closely informed by Global South theories of power. These range from Freire's (1985) work on conscientization, which theorizes social change as a process of critical dialogue and cultural action, to Rahman's (1985) work on knowledge validity, which challenges universal claims to objectivity. According to Rahman, research standards are collectively agreed upon within intellectual schools, meaning that disciplinary paradigms inform knowledge verification systems. As logic systems are socially constructed, Rahman posits that collective consensus building may be used to develop appropriate verification standards for emergent schools. Extending this work, Santos (2014) documents the intellectual and cultural plurality of knowledge systems, laying an 'ecologies of knowledges' foundation for interscientific dialogue and the advancement of intercultural reason (188). Indeed, Santos states that innovative scientific breakthroughs tend to occur at the epistemological borders, where different knowledge systems overlap.

PAR is suitable for alternative globalization contexts where the power of participation may be harnessed to foster transitions to democracy (Rowell and Hong 2017). However, this research tradition is vulnerable to elite cooptation through superficial and power-insensitive applications. PAR scholars emphasize the need to replace passive participatory methods, such as information gathering activities and consultancy processes with more genuine participatory methods, including interactive research design and analysis workshops, democratic decision-making processes, and reflection meetings where co-investigators meet to revisit research standards and explore issues related to participation and power (Godden 2017). For the purposes

of this article, the question is whether these more intensive methods are being implemented in SDPAR studies.

Systematic Review Methods

As an interdisciplinary sustainability scholar with expertise in development ethics and PAR methodology, I am well positioned to address this question. In terms of study design, I employed PRISMA[1] standards to conduct a systematic review of the last decade of SDPAR studies. Initially developed in healthcare studies, PRISMA (2015) encourages transparent reporting by providing clear guidelines for designing, conducting, reporting, and evaluating systematic reviews and meta-analyses. I finalized the search in January of 2019 using the academic databases of three large search engines: Web of Science Core Collection, Proquest, and EBSCO Host.[2] This strategy enabled me to capture the breadth of scholarship involved in sustainable development studies, including those deriving from the arts and humanities, social and behavioral sciences, natural sciences, and applied sciences.

A number of parameters limited the search. First, I only selected peer-reviewed publications to focus specifically on scholarly engagement with SDPAR. Second, I limited the review to studies published between 2008-2018 in order to center my analysis on current trends and issues. Third, I excluded studies published in languages other than English due to an inability to systematically translate studies conducted in multiple other languages. Fourth, I only included studies that employed the terms 'participatory action research' and 'sustainable development' or 'sustainability' in the title, keywords, or abstract. While this strategy excluded work grounded in related action research traditions as well as studies that failed to clearly identify methodological and topical focus at article outset, it helped ensure that the review would

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[1] Preferred Reporting Items for Systematic Reviews and Meta-Analyses.
[2] The EBSCO Host search was limited to academic databases not included in Proquest.

cover scholarship that explicitly engaged PAR methodology and sustainability concepts. After creating a database using Endnote Reference software, I further filtered the database to only include published accounts of empirical research. My final review encompassed the 72 journal articles listed in Appendix A. These articles represented a variety of disciplines and were conducted across world regions.

My analysis of the data was reflexive. I began by conducting a light read of each article to develop initial understanding of topics, methods, and lessons learned. I then developed broad analytical categories via a series of spreadsheets that provided information for various units of observation.[3] For simple variables, I color-coded and categorized the units of observation. For more complex variables, such as 'coverage of methodology' or 'lessons learned', I began by inputting qualitative information, including quotes or comments derived from my initial read. After reviewing the qualitative data, I categorized the findings then revisited each article to systematically determine whether it had covered a particular concept or type of issue. As I had access to all of the articles in PDF format, I relied upon a combination of word searches, deep reading of relevant sections, and in a few cases the entire article, to gather information. My earlier read of the material provided me with the insight needed to conduct word searches using various related terms, as I found that the studies employed somewhat different language to express similar concepts. The following sections present and analyze my research findings.

Mapping the Field

Global engagement

Although SDPAR scholarship was most active in topics historically associated with action research or environmental studies, my review uncovered a diverse field of inquiry. As

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[3] Spreadsheets captured information on: (1) regions and topics; (2) lead author affiliations; (3) co-authorship and interdisciplinarity; (4) research methods and disciplines; (5) PAR methodology; and (6) lessons learned.

Table 1 shows, half of the published studies directly focused on sustainability issues pertaining to agriculture, education, or health where action research traditions are fairly well known. More broadly, sixty nine percent of the sample indicated either a direct or indirect connection to these topics. In a similar vein, about 30 percent of the studies directly assessed problems related to conservation, climate change, coasts and fisheries, disaster recovery, or forestry; and the majority of other studies addressed environmental issues to some degree as well. Yet several studies did not operate within these traditional topical boundaries. Notably, I found that SDPAR has expanded into urban, cultural, and tourism studies, where scholars largely focused on issues related to sociocultural or socioeconomic sustainability.

Table 1. SDPAR topics and world regions (N = 72).

Topics	Europe	Asia	Africa	Latin America & Caribbean	Oceania	US & Canada	Multi-regional	Total
Agriculture	3	4	4	1			3	15
Education & service learning	3		2		2	3	1	11
Health & well-being			2	2	2	4		10
Conservation & resource mgmt.	2	2		2	2			8
Cultural preservation & tourism	2	3	2				1	8
Urban sustainability	1	2					1	4
Climate change	2		1					3
Coasts & fisheries		1		2				3
Disaster & recovery		2		1				3
Forestry	1	1	1					3
Rural development	2	1						3
Sports	1							1
Total	17	16	12	8	7	7	6	72

Table 1 further illustrates the breadth of world regions where SDPAR studies have been conducted, although regional patterns and gaps did exist. About 60 percent of the studies were located in Europe, Africa, and Asia. In contrast, Latin and North American studies represented

less than a quarter of the field. Within the Eastern Hemisphere, none of the published studies were conducted in Russia or the Middle East and only a few studies were conducted in China or Japan. I uncovered a range of Eastern European studies, but no former Soviet satellite countries were represented in the review. Bearing in mind the language restrictions of my sample, these global patterns suggest that SDPAR studies were less likely to occur in societies with authoritarian impulses or a history of authoritarian rule, as well as in Global North nations outside of Europe. There also were regional variations in terms of sustainability topics, with North American and Oceanic[4] studies predominantly focused on education, community service learning, and health while European, Asian, and African studies encompassed a wider variety of topics, including agriculture, heritage, and conservation.

The institutional affiliation of lead authors provides additional insight. Approximately three-quarters of the studies were produced by scholars situated in Western Global North societies.[5] An additional 17 percent were produced by scholars located in Asia, with the remainder published by scholars in Africa, Latin America, and the Caribbean. Eighty five percent of the lead authors were located in academic departments or university-based research institutes, although some studies were produced by governmental or non-profit actors, particularly in Africa, where state agents were involved in conducting such work. Multi-regional studies were less common. Transnational organizations generally took the lead in generating these by publishing comparative case studies of country-specific projects.

Finally, I uncovered an intellectually diverse field. Nearly all studies were published in interdisciplinary journals, and about half of the studies mentioned a transdisciplinary, interdisciplinary, multidisciplinary, or cross-disciplinary research team, contribution, or

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[4] Nearly all Oceanic studies were conducted in Australia, with the remainder in New Zealand.
[5] The United States, Canada, Europe, Australia, and New Zealand

perspective. Whereas these terms connote different levels of disciplinarity,[6] in most instances the use of terminology was muddled. Some studies employed the language of interdisciplinarity to refer to the involvement of local actors, for example by counting farming as a discipline in communication with that of the scholar. Other studies used it to refer to the intellectual diversity of the scholars involved in a grassroots sustainability project. Indeed, most articles were multi-authored by scholars operating across disciplines, pointing to the collaborative nature of PAR.[7] Yet relatively few studies were coauthored with local participants, suggesting a reassertion of scholarly control at higher-levels of knowledge production and distribution.

SDPAR methods

The disciplinary orientation of SDPAR scholars informed the use of methods, resulting in problems as well as innovations. To begin, Table 2 indicates a remarkable breadth of disciplinary involvement among lead authors: with the exception of the arts and humanities, studies were fairly evenly spread across the major branches of knowledge. The degree of interdisciplinarity was high as well. More than a fourth of the lead authors professed a transdisciplinary degree or interdisciplinary foundation, and those from more disciplinary backgrounds often made note of interdisciplinary qualifications on research websites. The information presented in Table 2 also indicates the movement of SDPAR into disciplines well removed from critical social theory and Freirean pedagogy. Despite PAR's rootedness in critical epistemology, only 17 percent of SDPAR studies were conducted by social or behavioral scientists and only four lead authors possessed degrees in education or pedagogy.

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[6]In accordance with the standards set forth by Stember (1990), cross-disciplinary involves perceiving one discipline through the lens of another; multidisciplinary denotes scholars from different disciplines who are in collaboration; interdisciplinary signals the integration of two or more disciplinary knowledge systems; and transdisciplinary indicates the rise of a new discipline that has synthesized different disciplinary knowledges into a unified intellectual framework.

[7] Only 15 percent of the published studies were single authored and 55 percent had three or more authors.

Table 2. SDPAR disciplines and methods (N = 72)

Lead Author Discipline	Methods					Total
	Conventional Qual/Quant	Action Research Alone	Action/ Qual	Action/ Quant	Action/ Mixed	
Arts & Humanities[a]	--	1	2	--	--	3 (4%)
Social & Behavioral[b]	--	--	7	--	5	12 (17%)
Natural Sciences[c]	--	1	5	3	5	14 (19%)
Applied Sciences[d]	1	3	8	3	6	21 (29%)
Interdisciplinary[e]	2	1	12	--	5	20 (28%)
Unknown	--	--	--	2	--	2 (3%)
Total	3 (4%)	6 (8%)	34 (47%)	8 (11%)	21 (29%)	72 (100%)[f]

Notes:

a. Graphic design and music.
b. Agricultural economics, geography, psychology, sociology, and social work.
c. Includes botany, environmental science, forestry, geoscience, marine science, and science education.
d. Includes agriculture, architecture, business, health, education technology, and urban planning.
e. Transdisciplinary fields like development studies and interdisciplinary specializations such as environmental science and sociology.
f. Percentages have been rounded.

Generally speaking, the further removed the lead author's discipline from PAR's epistemological roots, the more likely I was to find problems with the described methods. For example, three business and/or natural science studies claimed the use of PAR methodology but reported wholly conventional research. In one case, the study simply described quantitative methods with a participant observation add-on, thereby conflating PAR with the use of a qualitative method. While most studies did employ some variation of action research methods, several of these failed to demonstrate awareness of PAR methodology, for example by conducting top-down research with a minor action research component like participatory rural appraisal, and calling it PAR. This problem was more apparent in studies that lacked a qualitative research dimension.

The disciplinary breadth also engendered research innovation. PAR studies historically have employed a combination of action research and qualitative research methods to connect differential knowledges, critically reflect on the power dynamics informing the research process, and equalize the social relations of knowledge production. Whether or not they achieved this agenda, about half of the SDPAR studies employed this combination of methods. Yet 29 percent of the studies expanded upon this traditional practice by using action research as a pathway for bridging the qualitative and quantitative paradigms.

Participatory Research Methods
- Photovoice
- Participatory video
- Participatory lesson development
- Transect walks
- Participatory rural appraisal
- Participatory mapping
- Participatory indicator development
- Small group assessment
- Participatory data analysis

Qualitative Methods
- Participant observation
- Focus group discussions
- Informal interviews
- Semi-structured interviews
- Field diaries
- Narrative journals
- Photographic documentation
- Documentary analysis
- Peer exchanges
- Shared story telling

Quantitative/Experimental Methods
- Questionnaires
- Surveys (eg. Baseline)
- Statistical analysis
- Crop and field tests
- Field measurements
- Remote sensing data
- Meteorological data
- Hydrological data
- Resource clustering
- Spatial analysis
- Logical framework analysis

Participatory Action Methods
- Research reflection meetings
- Community meetings
- Committee meetings
- Consensus building activities
- Capacity building activities
- Leadership training
- SWOT analysis
- Knowledge-exchange workshops
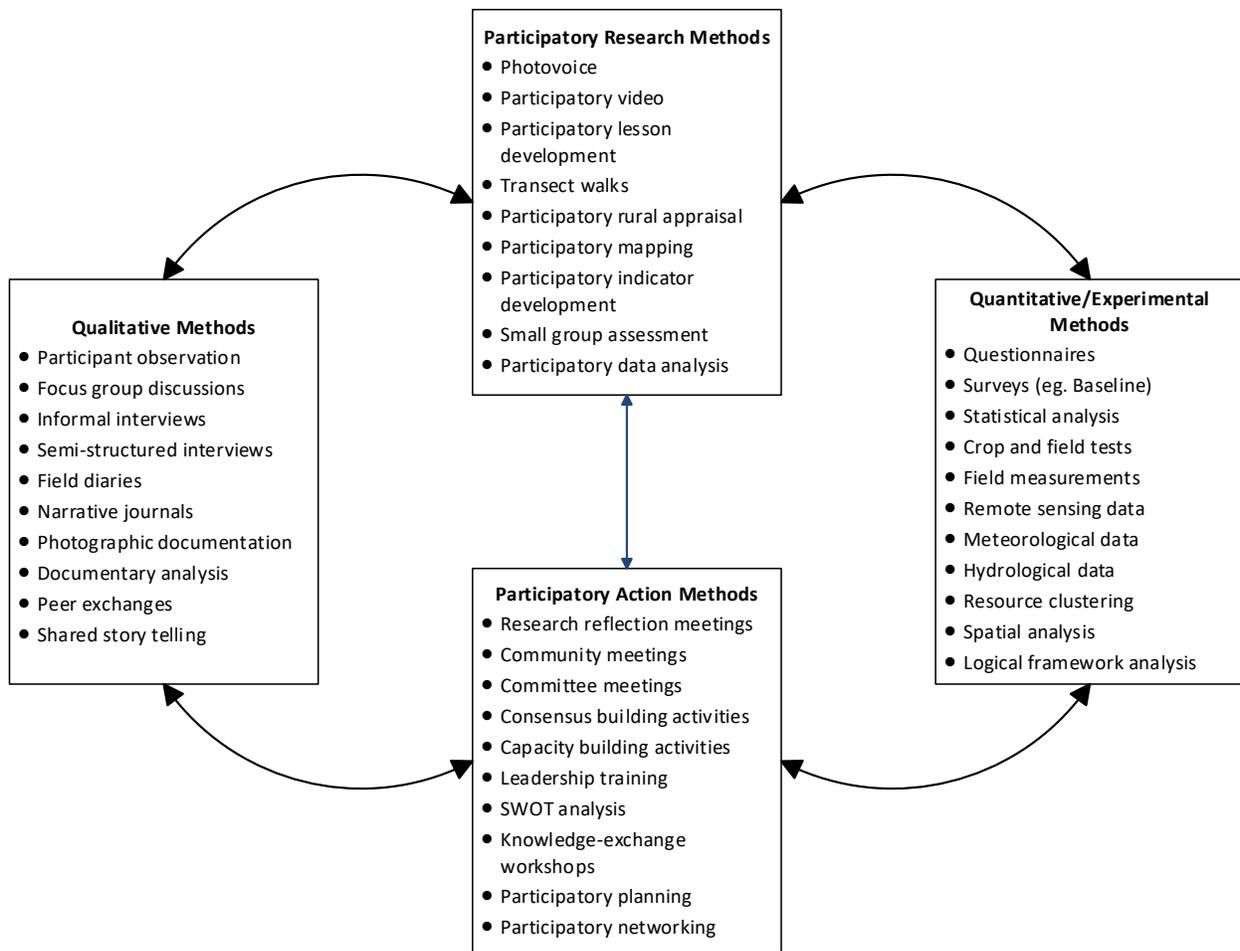- Participatory planning
- Participatory networking

Figure 1. Toolbox of SDPAR methods

The toolbox illustrated in Figure 1 clarifies the breadth of methods that SDPAR scholars employed to collect data, integrate knowledge, and plan actions. In addition to contrasting the

use of qualitative and quantitative methods, the toolbox differentiates between participatory

research and participatory action methods to illustrate the breadth of action research methods in

use. Studies conducted across the major branches of knowledge found that PAR's emphasis on

co-investigation and knowledge integration provided the means to connect the qualitative and

quantitative paradigms. Although natural and applied science studies were more quantitative and

experimental in orientation, only 11 percent of all studies lacked a qualitative component. Yet

the described praxis of co-investigation did not always extend to grassroots or marginalized

stakeholders. Whereas project leaders from local organizations tended to lead actions, scholarly

actors facilitated the research component, at times with multidisciplinary research teams

comprised entirely of scholars or other elite actors. In the following section, I systematically

uncover issues related to methodological integrity then identify key challenges to SDPAR

practice.

Problematizing Research and Practice

Methodological integrity

Table 3. Coverage of PAR methodology (N = 72)

	Action-reflection	Social transformation	Cited the literature	Active participation	Critical Reflexivity	Social positionality
Yes	49 (68%)	47 (65%)	43 (60%)	42 (58%)	17 (24%)	9 (12.5%)
No	23 (32%)	25 (35%)	29 (40%)	30 (42%)	55 (76 %)	63 (87.5%)
Total	72 (100%)	72 (100%)	72 (100%)	72 (100%)	72 (100%)	72 (100%)

To determine whether the studies demonstrated awareness of PAR methodology, I

searched the articles for mention of key research standards, listed as indicators in Table 3. This

process included closely reading presentations of methodology and methods as well as any

subsequent research reflections. The data in Table 3 shows that the majority of studies conveyed

a broad awareness of action research standards. However, many of the studies failed to articulate

standards specific to PAR methodology and few authors critically reflected upon the social and political context of their identity or status in relation to the positionalities of local research participants.

As the action-reflection cycle is of central import to all action research traditions, this standard represented a baseline indicator for research validity. I found that two thirds of the studies described their use of a methodology that involves cycles of action and reflection. More than half of the studies also recognized that the primary purpose of PAR is to pursue social change via the collaborative production of actionable knowledge. Yet 40 percent of the studies failed to cite even one source of action research methodology; and when studies did cite the literature, authors often drew from discipline-specific sources that broadly discussed the notion of participatory methods rather than from the rich literature on PAR methodology. A slight majority of the studies articulated the concept of active or equitable participation, but very few of these studies used terms such as 'co-inquiry' 'co-researcher' 'co-investigator' or 'co-production of knowledge' although these concepts are specific to PAR and the practices implied by these concepts are essential to methodological integrity.

Finally, I assessed critical reflexivity by PAR both by looking for coverage of the concept or the related notion of 'critical reflection' and by examining whether the authors expressed a power-sensitive awareness of their social positionality in relation to grassroots participants. Only a quarter of the studies mentioned the concept as part of their coverage of methodology. Even when this standard was articulated, coverage tended to be brief and limited to the description of methods rather than illustrated through the provision of critical reflections of the research process. Not only were structural power dynamics rarely discussed, but studies that did talk about power generally focused solely on the institutional arena rather than on the research

process and the social relations of knowledge production. Of the eight studies that mentioned social positionality, only two discussed the identity of the scholarly actor in relation to local participants. These findings indicate the widespread failure of SDPAR scholars to exhibit critical reflexivity. The dearth of critical reflections in peer-reviewed PAR studies made it difficult to systematically assess the levels of participation actually achieved.

In cases where critical reflections were present, I found three characteristics in common. First, these studies showed greater awareness of PAR methodology by meeting at least four of the six indicators outlined in Table 3. Second, the reflections exhibited self-awareness, with authors considering their influence on the research arena. Third, the reflections demonstrated a willingness to adapt scholarly perspectives and practices in response to local ways of knowing and doing. As a qualitative example, Harper (2016) worked with Karen refugees to reconstruct cultural resilience. Harper found that the use of photovoice 'served to distribute power and vulnerability so that points of connection and commonality could emerge' (1044). By working alongside Karen co-researchers, Harper learned to recognize her own subjectivity. As a mixed methods example, Kušová and Těšitel (2017) used PAR to institutionalize a nature preserve. These authors reflected on their decision to work directly with a local community when they found that regional authorities lacked the motivation to communicate collaboratively. By bringing community members into the research team, the scholars obtained a more detailed understanding of the socio-ecological system than otherwise would have been possible while the community obtained the sociocultural capital needed to drive its own development agenda.

SDPAR challenges

To examine accounts of SDPAR challenges, I scoured the studies for accounts of lessons learned, paying multifaceted attention to identified problems, descriptions of successful

strategies, and ideas for improvement. My investigation found that SDPAR studies were grappling with four areas of concern: (1) social; (2) methodological; (3) organizational; and (5) academic.

First, social challenges centered on issues pertaining to culture, power, and identity. In their work with youth in a marine protected area of Colombia, McRuer and Zethelius (2017) admitted that they were unable to secure shared ownership of the project with their co-researchers due to issues with translation and differing cultural perceptions of time. The authors also noted that they had to slow down and reorient the project due to differences in terms of how sustainability was perceived. Studies more broadly emphasized the importance of ensuring equitable arrangements with marginalized social groups. Working on water rights issues with Indigenous people in Australia, Nikolakis and Grafton (2014) found that some participatory governance approaches did not directly involve communities in decision making, exacerbating a history of tension and mistrust between Indigenous people and the government. Indeed, several studies explicated the difficulties of establishing trust with marginalized stakeholders due to previous negative experiences with elites. Scholars who demonstrated a strong awareness of PAR standards described their efforts to provide marginalized actors with resources to co-lead the research project, with one study noting 'that the practice itself matters as much as the outcomes' (Pyles 2015:642).

Second, methodological challenges primarily focused on issues pertaining to complexity in interdisciplinary research and sustainability science. Blanchard and Vanderlinden (2013) struggled to develop a methodologically cohesive research agenda in a multidisciplinary project. A critical lesson learned was that collaborators should begin by identifying their epistemological differences as 'different disciplines have different attitudes toward truth, and different opinions

regarding what knowledge is valuable' (17). If PAR was difficult to implement in multidisciplinary settings, the complexity of sustainability research gave rise to additional methodological challenges. In their work on waste recovery, Velenturf and Purnell (2017) discussed the difficulty involved in gathering data 'from across multiple scientific disciplines and scales' as well as the necessity of developing 'tools for supporting decision making in absence of perfect environmental, economic or social data' (9). However, scholars also felt that PAR offered the means to address gaps in knowledge. According to Nguyen et al. (2014) participatory field experiments generated the degree of 'hybrid' local-expert knowledge needed to detangle complexity and ameliorate nitrate pollution in Italy (164). Working with rice farmers in India, Bonny et al. (2010) likewise found that 'local involvement has ensured that indicators remain dynamic, evolving over time as new goals emerge' (775).

Third, organizational challenges hindered scholars from meeting research standards. Scholars like Duda and colleagues (2014) noted that supportive funders and strong leadership were essential for ensuring successful outcomes. Yet several studies experienced grave challenges related to leadership turnover and funding. The first issue made it difficult for project partners to maintain strategic focus over time whereas the second hindered investments in participation and next-step research cycles. As Purnomo and colleagues (2016) stated, 'PAR can only work well when we have sufficient time and budget to truly recognise various types and interests of stakeholders, balance power of them and facilitate change' (498). Given funding shortages, researchers had to budget creatively if they were to achieve deeper levels of engagement and begin developing transformative practices.

Fourth, studies noted academic barriers to advancing engagement. Scholars found it difficult to form interdisciplinary teams as these 'collaborations are sometimes shunned by

researchers' given the difficulty of publishing PAR studies in more 'prestigious' disciplinary journals (Whitzman 2017:497). Academic researchers also encountered an unsustainable workload given the other demands of their profession. For example, Kawabe and colleagues (2013) said that their coastal service learning partnership was unable to ensure continuity due to the fact that PAR is 'not rewarded in the current university system in which an academician's achievement is evaluated mainly by the publication of research papers' (3833). More broadly, studies recognized that sustainable development 'needs a different problem structuring process than traditional mainstream research' given the complexity of social and environmental issues (Bodorkós and Pataki 2009:1128). These findings suggest that the academy is failing to recognize the value of interdisciplinary problem structuring or to provide the institutional support scholars require to sustain action research partnerships.

Strengthening Engagement

The systematic review findings indicate that SDPAR offers potential for bringing scholarly and grassroots knowledge together to inform the development of sustainability policy and practice. However, the findings also suggest that multifaceted barriers are hindering the advancement of a potentially transformative and transdisciplinary field of study. Covering these issues in detail, this section weaves in suggestions for streamlining terminology, ensuring methodological integrity, and strengthening engagement.

On the positive side, my review uncovered an intellectually diverse field. A wide range of disciplines were involved in SDPAR, with a significant percentage of lead authors hailing from highly interdisciplinary schools or research institutes.[8] Moreover, about half of the studies explicitly identified as an interdisciplinary collaboration. These projects largely brought scholars

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[8]Nearly one fourth of the institutional affiliation names denoted either a transdisciplinary orientation or combined major branches of knowledge.

from different disciplines into conversation with one another as well as with people from communities or grassroots organizations. However, the use of stakeholder terminology was muddled, making it difficult to determine levels of engagement. In contrast to this trend, Trott et al. (2018) provided clear language that may be used to differentiate between SDPAR stakeholder groups. This study referred to 'interdisciplinary scholars' when discussing scholarly participants with interdisciplinary backgrounds, 'community collaborators' when discussing local actors involved in project actions, 'community-engaged researchers' to denote members of the research team, and 'institutional representatives' whose role may be limited to conventional methods such as interview or consultation (1).

Several of the studies employed fairly sophisticated participatory methods. The use of research reflection meetings, data analysis workshops, and consensus building activities helped scholars achieve more genuine levels of engagement, as indicated in typologies of participation (Godden 2017). Some of these studies were methodologically innovative as well, for example by drawing from advances in social technology to develop virtual partner networks that connected participants across geographic space.[9] Thirty percent of the studies employed a highly mixed methods approach that aligned quantitative, qualitative, and participatory modalities to address matters of complexity. Broadly speaking, SDPAR scholars found that PAR provides an effective framework for connecting different knowledges (Bonny et al. 2010), guiding interdisciplinary and international research collaborations (Stoate and Jarju 2008), and bridging quantitative and qualitative research paradigms (Campos et al. 2016). These findings support Santos' (2014) contention that 'ecologies of knowledges' approaches foster scientific innovation.

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[9] See Duda et al. 2014 for an informative description of this emerging practice.

On the negative side, many SDPAR studies lacked awareness of PAR standards. While it is impossible to say whether authors understated their use of PAR methodology in order to publish in journals unfamiliar with the participatory paradigm, nearly half of the studies conflated PAR with any form of action research. Not only did most studies fail to acknowledge the critical social theory and pedagogy undergirding PAR methodology, but only a quarter of the studies demonstrated critical reflexivity, and among studies that provided a reflection of the power dynamics shaping the institutional arena, only two reflected upon the social relations of knowledge production. These findings substantiate the vulnerability of PAR to elite cooptation, diminishing the integrity of SDPAR studies as a whole. Indeed, the discourse on participatory ethics emphasizes the importance of cultivating a critically reflexive awareness of the influence of social positionality in participatory research processes (Sultana 2007).

SDPAR scholars may ensure greater levels of methodological integrity by meeting the four rules of PAR engagement detailed by Fals Borda (1996). In this seminal contribution to emancipatory science, Fals Borda asks scholars to: (1) reduce the 'distance between subject and object' through the formation of fully collaborative co-researcher partnerships; (2) transcend 'elitist versions of history and science' by remaining 'receptive to counternarratives' that support struggles for justice; (3) work with marginalized communities to 'recover their values, traits, beliefs, and arts for action'; and (4) demystify science by diffusing and sharing 'what you have learned together' in an understandable and engaging manner (179).

These guidelines are compatible with the principles informing sustainability ethics. First, the values undergirding PAR are consistent with critical articulations of sustainability, which focus on bridging social justice and environmental discourses for the purpose of transformative action (Ferreira 2017). Second, the Earth Charter extends PAR principles by aligning an ethic of

ecological care with the principles of social justice and participatory democracy. In addition to recognizing the value of Indigenous and local knowledge systems to sustainability education, the Charter emphasizes a need for the sciences, humanities, and arts to harmonize engagement. According to the Charter, transitions to sustainability 'require a change of mind and heart' as well as a commitment to resolving 'tensions between important values' (Earth Charter Initiative 2015).

Given the breadth of engagement, SDPAR has an important role to play in bringing cohesion to the diverse knowledge systems informing sustainability science. To support this process, SDPAR studies should unpack the nexus of participation, knowledge, and sustainability. While the philosophical discourse on development ethics assumes the interdependence of these dimensions, empirical knowledge remains underdeveloped (Author Forthcoming). SDPAR studies may address this gap by critically reflecting on efforts to: (1) equalize power imbalances; (2) integrate different knowledge systems; (3) and transition to more sustainable ways of living. By including these reflections in published accounts, SDPAR scholars will not only strengthen their commitment to methodological integrity, but they also will generate invaluable insight into the dynamics shaping socio-ecological change in action. Scholars situated in positions of authority may help ensure a welcoming space for the advancement of SDPAR scholarship by addressing deficiencies in the peer-review processes, and by working within the academy to improve recognition and support for collaborative and interdisciplinary research approaches. The establishment of a coordinating mechanism that brings action research and sustainability networks into dialogue may be an appropriate starting point for institutional action.

Conclusion

This systematic review of practice has demonstrated the rise of a participatory action research approach to sustainable development. Focusing on the last decade of SDPAR research, I have contributed to the scholarly body of knowledge by systematically mapping the field, problematizing research and practice, and considering strategies strengthening engagement.

As I have discussed, SDPAR scholarship is marked by diversity. Although the majority of studies were situated in Europe, Africa, or Asia, research occurred around the world, with a quarter of studies produced by scholars located at Asian or Global South institutions. Half of the studies focused on agriculture, education, or health where action research traditions are well established; yet environmental conservation, cultural heritage, and urban studies were prevalent as well. All the major branches of scholarly knowledge were involved in SDPAR research, with the majority of studies coming from applied science, natural science, and transdisciplinary scholars. Indeed, only 20 percent of the scholars identified as social and behavioral scientists or educationalists, the disciplines from which PAR derives its critical epistemological roots. This diversity has engendered a complex array of methods for research and action. While some studies believed PAR to be a qualitative approach based on a methodology of dialogue and reflective co-learning,[10] others viewed it as a means to bridge the differing paradigms of qualitative and quantitative research.[11] An integrative view may be that PAR is capable of engaging a wide range of methods to meet the complexities of sustainable development, but only if the qualitative and participatory dimensions are retained to ensure quality control.

This review also uncovered threats to methodological integrity. While the majority of studies recognized PAR's participation imperative, few studies provided critical reflections, making it difficult to measure the levels of participation actually achieved. It was impossible to

[10] See for example Kawabe and colleagues (2013).
[11] See for example Campos and colleagues (2016).

tell whether authors lacked awareness of PAR standards or simply omitted critical reflections in publications. However, several studies conflated PAR with other research traditions or failed to involve members of marginalized social groups. These findings indicate the vulnerability of PAR to elite cooptation, as the involvement of grassroots stakeholders is essential to fostering transitions to knowledge democracy (Rowell and Hong 2017).

Although these omissions are grave, I found that SDPAR scholars must navigate significant barriers in order to meet PAR standards. In contrast to conventional research, where the scholar retains control over research design and analysis, SDPAR scholars are tasked with sharing power, reconciling different attitudes toward truth, managing the complexity of collecting data across multiple scales, and otherwise working with grassroots communities to innovate solutions to complex sustainability problems. My review found that scholars struggled to access the time and funding needed to meet these multifaceted agendas. In addition to experiencing organizational challenges, scholars stated that they were beholden to the demands of an academic system that neither recognizes the value of interdisciplinary problem structuring nor provides the support needed to sustain community partnerships. Given these blockages, the numerous examples of innovative practice uncovered in this review indicate a fairly remarkable commitment to sustainable and participatory research agendas.

PAR may be challenging to enact in a world that values speed and detachment, but its relational orientation is compatible with current perspectives on sustainable development. Indeed, more sustainable ways of living cannot be realized without taking the time to consider the hidden influence of cultural values and human relations (Horlings 2015). Over the previous decade, SDPAR researchers have invested in increasingly sophisticated methods in an effort to detangle these complexities. Over the next decade, scholars may bring coherence to the field by

aligning PAR rules for practice with a sustainability ethic of ecological care. To facilitate interdisciplinary dialogue, published work should include critical reflections that unpack the nexus of participation, knowledge, and sustainability. This will not only ensure greater attention to methodological integrity across SDPAR geographies and disciplines, but it also will provide the conceptual foundation for deeper connectivity. Whether the focus is on connecting local-expert knowledge or achieving transdisciplinary understanding, the integration of differential paradigms may be key to realizing transitions to sustainability.

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