Climate change adaptation in SIDS: A systematic review of the literature pre and post the IPCC Fifth Assessment Report

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Abstract
The Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change in 2014 was the most comprehensive to date. Yet it left several gaps with regards to the impacts, implications and responses to climate change in small island developing states (SIDS). SIDS are recognized as a special grouping of developing countries. Located in the Atlantic and Indian Oceans, Caribbean, and Pacific regions, they comprise 58 countries that are disproportionately vulnerable to climate change and its impacts. With adaptation to climate change viewed as a viable and necessary complement to mitigation, academic interest in adaptation in these complex geographies is increasing. Despite this, not enough is known about the body of knowledge relating to adaptation in SIDS. This article systematically reviews 208 articles, books, book chapters, conference papers, and notes, and synthesizes the nature and extent of the research evidence before and after AR5 (i.e., from 1990 to 2014, and from 2015 to 2018). It specifically explores shifts in (a) when, where and by what means knowledge is being produced (e.g., subject areas, methodologies), and the ways in which adaptation is being framed (i.e., conceptually, operationally), (b) the narratives, consensuses, and tensions across the key emerging themes in the literature, and (c) the knowledge gaps that exist. It also outlines a future research agenda, which is an important consideration not only for multi-scale actors working to help solve the global climate challenge, but also for the scholars preparing the Small Islands Chapter of the Sixth Assessment Report due in 2021.

This article is categorized under:
Climate and Development > Sustainability and Human Well-Being
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1 | INTRODUCTION

Although there has been increasing academic attention paid to the impacts and implications of climate change in small island developing states (SIDS), (e.g., see Robinson, 2018b; Scandurra, Romano, Ronghi, & Carfora, 2018), many studies either focus on a single country or a select group of them, typically approached from a regional perspective (e.g., see Reyer et al., 2017; Robinson, 2018a). Besides Chapter 29 (Small Islands) in the 2014 Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC) (see Nurse et al., 2014) and recent studies by Klöck and Nunn (2019) and Petzold and Magnan (2019), there is no comprehensive and systematic review of the scientific literature relating to climate change adaptation in SIDS. Even less one that draws attention to the shifts in understandings of vulnerability, resilience, and transformation pre and post-AR5. Chapter 29 of AR5 focused largely on observed, projected, and transboundary climate impacts in small islands, failing to delve into some of the human, social and policy dimensions of adaptation in these complex geographies. Klöck and Nunn (2019), which captured the primary climate impacts to which SIDS are adapting, is a systematic review of adaptation literature published between 2000 and 2016. Petzold and Magnan (2019) reviewed the challenges and opportunities for adaptation in SIDS and compared them with other types of island territories. Despite these studies, Wong’s (2011, p. 2) call for an “assessment of all SIDS bringing together knowledge, experiences, data, data gaps, and future needs for the SIDS group” has largely remained unanswered.

Adaptation is a “process of adjustment to actual or expected climate and its effects” (IPCC, 2014, p. 1758)—in SIDS, it is not only urgent but complicated. When overlaid with other environment and development challenges such as pollution, crime, and corruption in a small island context, it requires urgent physical, political, economic, social, and institutional adjustments of an incremental and transformational nature in order for countries to identify sustainable development pathways (Nurse et al., 2014; Nurse & Moore, 2005; Robinson, 2018a, 2018b; Saxena, Qui, & Robinson, 2018). SIDS are located across three main geographic regions—Atlantic, Indian Ocean, Mediterranean and South China Sea (AIMS), Caribbean, and Pacific. They are recognized as a special grouping of developing countries. Recent observations found that climate change is exacerbating health-related risks in SIDS (Schnitter et al., 2019), causing changes in aridity that will compound freshwater stress (Karnauskas, Schleussner, Donnelly, & Anchukaitis, 2018), and inhibiting tourism-led growth upon which small island economies are heavily dependent (Seetanah & Fauzel, 2018). The mortality, physical and heat-related morbidity, and population displacement experienced by Caribbean SIDS during and after the 2017 North Atlantic Hurricane Season, for example, are a stark illustration of the extent of the risk of and exposure to extreme weather events, and the challenge of effective and sustainable response and recovery in these small jurisdictions (Shultz et al., 2019). Pacific SIDS, particularly the atolls, have the highest per capita disaster risk globally, though grossly underestimated by popular data sources (Edmonds & Noy, 2018). With estimated anthropogenic global warming currently increasing at 0.2°C per decade due to past and ongoing emissions (IPCC, 2018), the stabilization of surface temperatures at 1.5°C will only spare the inundation of around 60,000 people living in SIDS (Rasmussen et al., 2018). And due to projected changes in sea-level rise and the resulting higher wave-driven water levels, most atolls may be uninhabitable by 2050 (Storlazzi, Elias, & Berkowitz, 2015). National SIDS governments and other actors are, therefore, prioritizing climate adaptation to minimize these and other future consequences (Robinson, 2017a).

Despite the consensus around the vulnerability of SIDS to climate change and the urgency of adaptation in individual countries, not enough is known about how SIDS, as a group, are adapting (or not adapting) to the impacts of climate change, or the factors that are limiting adaptation, or adaptation success. Recent publications such as Robinson (2017a), Robinson (2018c), and Klöck and Nunn (2019) only begin to fill this critical gap. Robinson (2017a) coded adaptation actions reported in countries’ National Communications to the United Nations Framework Convention on Climate Change (UNFCCC) and analyzed the climate, climate-related and non-climate-related vulnerabilities being addressed in SIDS, as well as the type of adaptation actions being undertaken. Robinson (2018c) classified the adaptation limits reported in countries’ National Communications and proposed a SIDS-specific typology of limits. Klöck and Nunn (2019), in reviewing the literature published between 2000 and 2016, determined where adaptation and its outcomes in SIDS are documented, the primary climate impacts to which SIDS are adapting, and the extent of adaptation success in SIDS. Equally important, however, is an understanding of how the SIDS-related literature and its framing of adaptation have changed over time. While AR5’s Chapter 29 updated the scientific, socio-economic and technical knowledge on climate change in small islands, it only tracked the changes in the major conclusions from previous Assessments in minimal detail, dedicating roughly one of 41 pages to this along with intermittently highlighting themes that had emerged since the publication of the Fourth Assessment Report in 2007. This presents an opportunity for this
paper and others to pay special attention to new understandings and the ways in which AR5 has impacted the SIDS-related literature, if at all.

This article systematically reviews the pre and post-AR5 literature relating to adaptation in SIDS. Systematic reviews are “a detailed and comprehensive plan and search strategy derived a priori, with the goal of reducing bias by identifying, appraising, and synthesizing all relevant studies on a particular topic” Uman (2011, p. 57). They have become “a key tool in the development of an evidence base” (Booth, 2006, p. 422). This approach supports the aims of this paper—A comprehensive examination of the shifts in (a) when, where and by what means knowledge is being produced (e.g., subject areas, methodologies) and the ways in which adaptation is being framed (i.e., conceptually, operationally), (b) the narratives, consensuses, and tensions across the key emerging themes in the literature, and (c) the knowledge gaps that remain. To achieve these aims, the remainder of this article is divided into six sections. Section 2 presents the background and context. Section 3 explains the theoretical framework and defines key concepts. Section 4 details the methods used. Sections 5 and 6 present and discuss the results. Section 7 highlights key developments and directions for future research.

2 | BACKGROUND AND CONTEXT

2.1 | SIDS as a unit of analysis

Agenda 21 recognized SIDS as “a special case both for environment and development”, given their “small size, limited resources, geographic dispersion and isolation from markets” (United Nations, 1992a, p. 193). These countries are “ecologically fragile and vulnerable” and their characteristics “place them at a disadvantage economically and prevent economies of scale” (United Nations, 1992a, p. 193). The UNFCCC (along with subsequent Agreements, including the 2015 Paris Agreement) underscores that small island countries and those with low-lying coastal areas are “particularly vulnerable to the adverse effects of climate change” (United Nations, 1992b, p. 2). Despite this, there is no consensus on which countries are SIDS and, therefore, which countries are more prone to experience and be debilitated by climate-related impacts such as rising sea and sea-surface temperature levels (see discussions in Robinson, 2018b). The UN has never established formal criteria for SIDS (UNCTAD, 2019). Ultimately, therefore, “SIDS” is a political classification and any country list, irrespective of the organization that publishes it, is an informal one (see Robinson, 2018b). This, however, does not preclude an analysis of SIDS as a whole, or of individual or small groups of SIDS as they share geographic, environmental, socio-economic, political and/or historical commonalities (e.g., see Robinson, 2018b, 2019).

2.2 | Diversity across SIDS

The UN Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries, and Small Island Developing States informally lists 58 SIDS (UN-OHRLLS, 2015; Table 1). Despite commonalities, there is significant diversity across the group in terms of size, human and economic development, adaptive capacities, and other indicators (Ratter, 2018; UNEP, 2014). Another dimension is varying political statuses. Twenty of the 58 SIDS are non-UN Member States (identified with an asterisk in Table 1). They are overseas territories or dependencies that enjoy certain protections of political associations with a metropole and, very generally, do not grapple with some of the vulnerabilities to and challenges of post-disaster recovery that sovereign SIDS do. This lays a partial foundation for the claim that these countries are not “real SIDS” and should be treated differently, including not being lumped into a broad SIDS analysis. However, the impacts of the 2017 North Atlantic Hurricane Season on non-sovereign Caribbean SIDS such as Puerto Rico and Sint Maarten suggest that the differences may be negligible in relation to exposure to extreme weather events (see Kishore et al., 2018; Rhiney, 2018). Their inclusion in a global analysis is, therefore, warranted.

2.3 | State of research on climate adaptation in SIDS

Across different disciplines and fields, there has been increasing academic interest in the impacts and implications of climate change in SIDS and on how these countries are adapting. Betzold (2015) and Weir and Pittock (2017) explored common adaptation themes with the former focusing almost exclusively on the Pacific. Robinson (2017a) examined
adaptation trends according to vulnerabilities, actors, sectors, and actions undertaken. Klöck and Nunn (2019) documented the primary climate impacts to which SIDS are adapting, and the extent of adaptation success. Key concerns for SIDS are also reviewed in the non-peer-reviewed literature. Two examples are Ratter (2018) and UNEP (2014). Ratter (2018) chronicled the physical development of islands, their cultural and political importance, and economic particularities, emphasized the social challenge of adaptation, and argued that adaptation is framed by various socio-political and economic settings, coping capacities, and national–international relations. UNEP (2014, p. 29) showcased innovative policies that support adaptation and emphasized how adaptation in SIDS can “generate larger benefits and greater resilience when combined with disaster risk reduction and community-based approaches to development”. Despite these and other studies, many continue to either focus on a single country or a select group of them, typically approached from a regional perspective (e.g., see Reyer et al., 2017; Robinson, 2018a). This heightens the importance of a global analysis of adaptation in SIDS, given their special case and the fact that this approach is uncommon in the academic literature.

### 2.4 Contributions of the IPCC Assessment Reports

A stand-alone focus on climate change and small islands in the IPCC Assessment Reports did not come about until the Third Assessment Report (2001). There was no separate chapter in the First Assessment Report (1990)—small islands were discussed in the broader context of oceans and coastal zone management. That chapter flagged the possibility of some islands being uninhabitable by 2050 due to projected sea-level rise. The Second Assessment Report (1995), which included a chapter on coastal zones and small islands, confirmed their vulnerability, the variability of climate impacts, and the resource constraints that would challenge adaptation. The Third Assessment Report (2001) emphasized that climate change is just one of the many threats to sustainability in small island states. Up to the Fourth Assessment Report (2007), the literature focused on island vulnerability to sea-level rise, largely overlooking other impacts, but AR5 captured those studies that grappled with the diversity and complexity of the physical and human attributes of islands, that acknowledged the multi-dimensional nature of climate change, and that critiqued associated policies. AR5 also pinpointed some of the key risks for small islanders, including ill health, injury, death, and disrupted livelihoods, resulting from sea-level rise, storm surges, and coastal flooding. Despite these contributions, a few knowledge gaps remain.

### 2.5 Knowledge gaps remaining post-AR5

Though AR5 helped advance understandings of the impacts of climate change in small islands, it concluded that more work is needed on climate change and socio-economic scenario modeling at the scale of small islands, the nature of adaptation barriers and limits, the links between adaptation and sustainable development, disaster risk reduction, and
maladaptation, and comparative analyses of islands-related research. This article, therefore, explores the extent to which these gaps have been filled by the post-AR5 literature.

3 | THEORETICAL FRAMEWORK AND KEY CONCEPTS

This study inverts the theoretical framework described in Robinson (2018a)—it uses a vulnerability lens to frame its enquiry. Vulnerability is often understood as the counterpart of or having an opposite relationship with “resilience” (Robinson, 2018a). “Vulnerability and resilience are considered to be important integrating concepts when managing the local consequences of global changes” (Hay, 2013, p. 309). As a result, many adaptation actions are designed and implemented for the purposes of reducing vulnerability as well as increasing resilience through “strengthening socio-economic systems and livelihoods” (Hay, 2013, p. 309; Robinson & Wren, 2020).

AR5 defines “vulnerability” as the “propensity or predisposition to be adversely affected”; it “encompasses a variety of concepts and elements including sensitivity or susceptibility to harm and lack of capacity to cope and adapt” (IPCC, 2014, p. 1775). This definition represents a progress in the science, reflecting a difference in the breadth and focus of the entry used in the Fourth Assessment Report and other IPCC Reports. Pre-AR5 definitions can be seen as representing “first generation” approaches where vulnerability studies were largely impacts driven (e.g., see Liverman, 2008; O’Brien, Eriksen, Nygaard, & Schjolden, 2007). Post-AR5 studies are focusing more on “double exposure” and examining multiple exposure pathways along with the interactions between these various processes and climate change. With the more contemporary approaches, vulnerability is not only “a characteristic or state generated by multiple environmental and social processes” and “exacerbated by climate change” but also reflective of the “capacity of individuals and social groups to respond to […], cope with, recover from or adapt to, any external stress placed on their livelihoods and well-being” (Kelly & Adger, 2000, p. 325). It is, therefore, a “multidimensional process affected by social, political, and economic forces interacting from local to international scales” (Thomas et al., 2018, p. 2).

Some countries are more vulnerable than others—they “experience greater loss of resources and greater impacts to livelihoods and cultural identity than others” (Thomas et al., 2018, p. 4). SIDS fall within this group (Robinson & Wren, 2020). The root causes of vulnerability in these countries “interact with dynamic structural pressures to create unsafe conditions” (Zakour & Swager, 2018, p. 45). There are, however, both absolute and relative dimensions to island vulnerability (Robinson & Wren, 2020). This is acknowledged in the UNFCCC, the 1994 Barbados Programme of Action for the Sustainable Development of SIDS, and many other international policy documents (see UNGA, 1994; United Nations, 1992b). AR5 reconfirms “the high level of vulnerability of small islands to multiple stressors, both climate and non-climate”, given their “inherent physical characteristics” (Nurse et al., 2014, p. 1616). These vulnerabilities span economic, social, political, and environmental domains, which are inextricably linked to “adaptive capacity”—the “ability of systems, institutions, humans, and other organisms to adjust to potential damage, to take advantage of opportunities, or to respond to consequences” (IPCC, 2014, p. 1758). As a result, vulnerabilities and adaptive capacities not only vary at the national level and across SIDS regions, but also at the subnational level (Robinson & Wren, 2020) - across individuals, social groups, communities, and sectors within countries (see Adger, 2006; Adger, Huq, Brown, Conway, & Hulme, 2003; Grothmann & Patt, 2005). Intra-country differentiation can, therefore, shape or alter national-level vulnerability (Robinson & Wren, 2020).

Vulnerabilities exist in both natural and human systems, and national governments and other local and international actors have a responsibility to develop and implement adaptation actions that reduce vulnerabilities in SIDS. These actions can be incremental or transformational. Incremental adaptation occurs “where the central aim is to maintain the essence and integrity of a system or process at a given scale” (IPCC, 2014, p. 1758). Transformational adaptation “changes the fundamental attributes of a system in response to climate and its effects” (IPCC, 2014, p. 1758). Whether incremental or transformational, or taking place in natural or human systems, adaptation remains a challenge in SIDS. This is so particularly because of the complexities and failings at the exposure and sensitivity-adaptive capacity nexus wherein local- and broad-scale determinants affect vulnerability and adaptation (Smit & Wandel, 2006).

To promote sustainable development pathways, adaptation in SIDS should be appropriate, given the local- and broad-scale determinants of vulnerability. “ Appropriateness” refers to “what works” and conveys a “sense of ‘rightness’ for the circumstances”, as interpreted by each country and outlined in associated policies (Buetow, Sibbald, Cantrill, & Halliwell, 1997, p. 262). Countries’ vulnerabilities, which are multiple in nature (Adger, 2006), interconnected and connected to wider development concerns (Kelman, 2014), affect their capacity to develop and implement good, adequate, effective, and/or successful adaptation actions (Robinson, 2018b).
Five propositions can be made from the foregoing: (a) SIDS, as the vulnerable subject, should be prioritized in research and other endeavors, as should adaptation, and vulnerability reduction and resilience-building actions in these countries, (b) vulnerability is universal across SIDS; while it can be reduced, it may not be possible to eradicate it completely due to its root causes, which “interact with dynamic structural pressures to create unsafe conditions” (Zakour & Swager, 2018, p. 45), (c) national SIDS governments and other local and international actors have a responsibility to develop and implement adaptation actions that reduce vulnerabilities and build resilience; but due to the roots causes of vulnerability, this responsibility is essential, inescapable, and must be shared between national and international actors, (d) research on adaptation in SIDS should reflect the multi-dimensional nature of vulnerability as well as its connection to wider development concerns with a view to mitigating the unequal impacts of climate change in and across SIDS, and (e) national governments and other local and international actors, in sharing the adaptation responsibility, should intervene more to address the unequal impacts of climate change in and across SIDS. In some respects, these propositions are encapsulated by the vulnerability theory espoused by Fineman (2008) in the law/political science literature (see Rich, 2018). Fineman’s (2008) theory is comprised of five major components, the (a) dominance of the vulnerable subject, (b) universality and constancy of vulnerability, (c) role institutions play in mitigating vulnerability, (d) movement from formal to substantive equality, and (e) call for increased government intervention (see Rich, 2018). This article systematically reviews the pre- and post-AR5 body of knowledge relating to adaptation in SIDS to interrogate and discuss the five propositions made here.

4 | METHODS

To identify, review, and report on the relevant academic literature relating to climate change adaptation in SIDS, this article applies the STARLITE principles (sampling strategy, type of study, approaches, range of years, limits, inclusion and exclusions, terms used, electronic sources) (Booth, 2006; Table 2). The sampling strategy was selective and identified relevant studies within specified limits. The type of study was partially reported and did not specify actual study types or designs, but instead indicated broad categories of studies and designs to be included. The approach was electronic subject searching. Range of years was fully reported, including start and end dates. Results were limited to English publications using SIDS as case studies. There were no other exclusions. Terms were fully present in Scopus®, the database used. All identified publications were manually coded by one coder and again by a second. Inter-coder reliability was 80.3%.

Systematic reviews, in general, have some drawbacks. While they aim to find all published studies that meet the inclusion/exclusion criteria, Bartolucci and Hillegass (2010) noted that there is no objective way of verifying that all relevant publications on a topic have been identified and included in the review, though electronic searches should identify 90% of the relevant publications. Another drawback is that this study only searched one database—Scopus®—and the results are, therefore, limited to the publications retrieved by the search terms. This limitation was, however, mitigated by two other considerations. First, Scopus® affords access to a broad journal range—it is the largest abstract and citation database with over 22,800+ serial titles from 5,000+ publishers, ensuring broad interdisciplinary coverage (Elsevier, 2017); it also generally finds more citations in the Social Sciences and Humanities, compared to Web of Science® (Chadegani et al., 2013; Harzing & Alakangas, 2016). This allows the paper to delve into some of the human, social and policy dimensions of adaptation in SIDS that Chapter 29 did not address. Second, this review covers 28 years of literature, signifying a broad data range and the inclusion of a large number of studies—almost seven times the
number of studies considered as meeting the requirements for a Social Science systematic review (e.g., see Sherman et al., 2016). By qualitatively drawing out and comparing key emerging themes in the pre and post-AR5 literature, this study (a) highlights shifts in knowledge and (b) identifies knowledge gaps and future research priorities, which will help guide those scholars preparing the Small Islands Chapter of the Sixth Assessment Report, due to be finalized in 2021.

5 | RESULTS

5.1 | Adaptation knowledge sources

The application of the search criteria outlined in the preceding section retrieved 127 results for 1990–2014, and 149 results for 2015–2018. Figure 1 illustrates the long-listed results according to (a) publication year, (b) document type, (c) author affiliation, (d) author country, (e) subject area, and (f) source. These all indicate when, where, and in what domain knowledge is being produced. Sixty-eight results (30 for 1990–2014 and 38 for 2015–2018) were subsequently excluded.

In the pre-AR5 era (and using it as the base period), 24% of the publications (30 of 127 results) were published in 2014 (Figure 1a). The years 1992, 1994, 1996, 1998, and 2000 saw no publications. The four years constituting the post-AR5 era, however, saw a 17% increase in the number of publications over the 24 years constituting the pre-AR5 era. Forty percent of the publications (59 of 149) were published in 2018, representing a 103% increase over 2017. Of the 127 results in the pre-AR5 era, 69% (87 results) were journal articles, 16% (20 results) were books and book chapters, and 7% (nine results each) were conference papers or reviews (Figure 1b). The dominance of journal articles continued into 2015–2018, representing 79% (117 of 149 results) of document types. Books and book chapters were a distant second with 11% (16 results).

There were 155 and 151 counts of author affiliation, respectively. Between 1990 and 2014, 6% of affiliations were with the University of the West Indies (UWI; all campuses; 9 counts), followed by the University of East Anglia (7 counts), and the Universities of Southampton, Melbourne, and Copenhagen (6 counts each; Figure 1c). Between 2015 and 2018, the UWI again topped the table but with 19 counts, eclipsing its contribution over the base period by 111% and over The Australian National University by 36% and The Nature Conservancy by 138%. Author countries varied widely. The top three (of 60) named countries in the pre-AR5 era were the United Kingdom (29 of 225 counts or 13%), the United States (23 counts or 10%), and Australia (21 counts or 9%; see more in Figure 1d). The top three (of 52) named countries in the post-AR5 era remained the same but with Australia first (37 of 255 counts or 15%), the United States again second (31 counts or 12%), and the United Kingdom third (22 counts or 9%). Canada, which ranked eighth in the pre-AR5 period, was a new top five entrant, ranking fourth. New Zealand, originally ranked fourth alongside Germany, dropped to 11th place, tying with Indonesia.

Fourteen and 19 subject areas were covered, respectively. Environmental Science accounted for 36% (74 of 208 counts in 1990–2014) and 38% (110 of 288 counts in 2015–2018), Social Sciences for 31% (65 counts) and 25% (71 counts), and Earth and Planetary Sciences for 15% and 13% (31 and 37 counts; Figure 1e). In the post-AR5 era, Economics, Econometrics, and Finance (12 results or 4%) and Energy (nine results or 3%) eclipsed Business, Management, and Accounting (five results or 2%), originally ranked fifth.

The journals Global Environmental Change, Climate Policy, and Natural Resources Forum were the top three sources from 1990 to 2014 (Figure 1f). Global Environmental Change, however, slipped to 21st place in 2015–2018, tying with 52 others, including Natural Resources Forum. Climate Policy was not a source, though the data featured other policy-focused journals such as Marine Policy (third with six results). Regional Environmental Change was first with 17 results in 2015–2018, 143% more than Climate and Development (second with seven results). Altogether, these results indicate that there has been a proliferation of research since AR5’s publication; most publications are journal articles geared toward Environmental Science audiences but with most authors having developed country affiliations.

5.2 | Adaptation frames and methodological approaches

The further application of the search criteria outlined in Section 4 above resulted in the short-listing of 208 publications for systematic review—97 for 1990–2014 and 111 for 2015–2018 (see the Data S1 for the full list of the publications
reviewed). Figure 2 illustrates these results according to their (a) adaptation framing, (b) methodological approach, (c) system of focus, (d) sector of focus, (e) climate change impact of focus, and (f) region of focus.

Research published across both periods primarily framed adaptation conceptually (see typologies in McEvoy, Fünfgeld, & Bosomworth, 2013). Studies taking a vulnerability approach increased threefold; those taking a resilience approach doubled (Figure 2a). In the post-AR5 period, scholars increasingly applied multiple adaptation frames. In terms of methodology, qualitative studies increased by 92%, up from 39 to 75 publications (Figure 2b). Quantitative and mixed methods studies decreased by 21 and 45%, respectively, from 24 to 19 and 31 to 17.

Research on adaptation in the human system dominated both periods (see Figure 2c). Again, this could be partly due to Scopus® generally finding more studies in the Social Sciences and Humanities, compared to other databases such as Web of Science® (Chadegani et al., 2013; Harzing & Alakangas, 2016). However, these studies totaled 57 (or 59%) before the publication of AR5 and 71 (or 64%) after. There was a 33% increase in studies that focused only on adaptation in the natural system, up from 12 to 16 publications, but with numbers remaining relatively low. Using a SIDS-specific sector list developed by Robinson (2017a), planning was the major, non-exclusive focus of 25% of studies between 1990
and 2014, and of 21% of studies between 2015 and 2018 (Figure 2d). In the pre-AR5 era, this was closely followed by non-exclusive foci on adaptation in the context of countries’ foreign/external affairs (11% of studies), primarily investigating how SIDS negotiate in the UNFCCC to secure financial and technical support for adaptation, and on adaptation in the coastal zone and tourism sectors (10% of studies, respectively). Considering studies’ non-exclusive climate change impact of focus, 37% of post-AR5 publications situated their analyses within the broad context of global change/warming (Figure 2e). Sea-level rise and rainfall/precipitation remained of interest but increasing attention was paid to air and sea-surface temperatures, erosion, flooding, drought, and storm surges. Generally, a wider range of climate impacts was studied in the post-AR5 era.

Overall, most scholarly interest was directed toward Pacific SIDS (Figure 2f). Despite this, there was a 107% increase in the number of single-region Caribbean studies along with a 58% decrease in single-region AIMS studies. Six post-AR5 publications were explicit two-region comparative case studies. This portion of the analysis shows that a shift to more operational adaptation framings (McEvoy et al., 2013) has not taken place, and that more cross-regional, comparative studies are needed.

**FIGURE 2** Summary of short-listed results by (a) adaptation framing, (b) methodological approach, (c) system of focus, (d) sector of focus (top five), (e) climate change impact of focus (top five), and (f) region of focus
5.3 Narratives, consensuses, and tensions across the key emerging themes in the literature

5.3.1 Climate change is an imminent threat to the survivability of SIDS; however, there are divergent perspectives on whether it is the most imminent threat and whether internal factors such as poor governance quality are bigger threats to island vulnerability and adaptive capacity

Across the 97 pre-AR5 studies, authors such as Mills and Hancock (2005), Murray, McBean, and Bhatt (2012), Veitayaki (2010), and Wong (2011) all acknowledged that SIDS are among the countries most vulnerable to the impacts of climate change. Albert et al. (2013) and Forbes, James, Sutherland, and Nichols (2013) further posited that climate change is the most imminent threat to the survivability of SIDS. However, Lewis (2012) quipped that the at-risk populations in SIDS are significantly smaller than those in densely populated, low-lying countries, suggesting that impacts will not be as great. Despite this, whether climate change is the most imminent threat to the survivability of SIDS was a source of tension. Butler, Skewes, Mitchell, Pontio, and Hills (2014) observed its “marginal” impact on declines in ecosystem services in Papua New Guinea. Birk (2014, p. 59) contended that there are a host of internal and external factors in the Solomon Islands that are more pressing than sea-level rise and that are driving SIDS to their limits faster than climate change—these spanned internal factors such as “population growth, inadequate land use practices, and lack of economic potential”, and external factors such as “poorly developed infrastructure, economic marginalization, and weak governance”. Storey and Hunter (2010) also drew attention to other obvious threats in Kiribati, including poor sanitation, pollution, and urbanization. These studies, if not determining the factor(s) constituting the greatest threat to the survivability of SIDS, highlighted that the vulnerabilities of these countries are many.

In the post-AR5 era and barring those publications ahead of the October 2018 release of the IPCC 1.5°C Special Report that explored the variance of impacts at 1.5°C versus 2°C of warming (e.g., Karnauskas et al., 2018; Rhiney, Eitzinger, Farrell, & Prager, 2018; Taylor et al., 2018), studies generally placed less emphasis on the imminent nature of the threat of climate change, thereby avoiding the debate on whether it is, in fact, the most imminent threat in SIDS. Research by Beckford and Rhiney (2016), Monioudi et al. (2018), and Nunn and Kumar (2018) all highlighted the serious environmental, economic, and social implications of climate change in SIDS, particularly along coasts and for island livelihoods. Kuruppu and Willie (2015) and Nalau et al. (2016) emphasized the relationship between climate change and disaster risk, calling for integrative approaches that reflect Indigenous knowledge and voices, and the documentation of lessons as a way of informing policy and practice. Bambrick (2018) illustrated how activities such as natural resource extraction can exacerbate climate risks, and Magee, Verdon-Kidd, Kiern, and Royle (2016), Orcherton, Mitchell, and McEvoy (2017), and Thomas and Baptiste (2018) noted high levels of risk perception among some but not all islanders. These and other post-AR5 studies, however, largely underscored consensuses of earlier IPCC Reports, particularly as they relate to the vulnerability of islands and the variability of impacts across them (Second Assessment Report), as well as the multiplicity of sustainability threats that they face (Third Assessment Report). They did not attempt to quantify the relative impacts of the threat.

Across both periods, acknowledgment of the grave consequences of the interaction of climate and disaster risk in SIDS gave rise to studies investigating the art and challenges of climate change governance (e.g., see Barrowman & Kumar, 2018; Hassanali, 2017; Pittman, Armitage, Alexander, Campbell, & Alleyne, 2015; Scobie, 2018; Sjöstedt & Povitkina, 2017). There was some focus on “governmentality”—the set of organized practices through which subjects (in this case, climate and climate-related impacts) are governed—but less on the correlation between governance quality and island vulnerability, and adaptive capacity. In some instances in the post-AR5 literature, the link was an accidental finding. Robinson (2018c), for example, found that 39% of adaptation limits in SIDS are “institutional”. Robinson (2017b) reported poor planning/governance as a barrier to adaptation mainstreaming in SIDS but this was among several other factors. Of note, however, is the conclusion that Kelman (2016, p. 355) drew that, “all development activities are imbued with power relations [...] among [...] institutions and governance bodies” and, as a result, “SIDS governments should not necessarily be blamed for any deficiencies in national governance due to the challenge of small-scale and limited resources”. As some SIDS, the author continued, have “populations in the tens of thousands, it is unrealistic to expect to find a civil servant conversant in every aspect of CCA [climate change adaptation]; hence, the need for pooled governance as part of inter-SIDS cooperation” (Kelman, 2016, p. 355). But as Robinson and Gilfillan (2017) found, pooled adaptation governance at the regional level in the Caribbean and Pacific is hampered by competing organizational mandates and major climate information deficits. It, therefore, remains difficult to
identify effective solutions to governing climate change at finer scales, and to quantify the relative impact of poor governance quality on island vulnerability and adaptive capacity, though some scholars would argue that poor governance in many SIDS is a development challenge in which climate change compounds and undermines existing resource constraints.

### 5.3.2 SIDS are particularly vulnerable to the impacts of climate change; the ways in which intra-country differentiation shapes or alters national-level vulnerability are hardly explored in the literature yet the debate about whether SIDS are, in fact, the most vulnerable group re-emerged

Like in other geographies, vulnerability to climate change in SIDS is understood as a function of exposure and sensitivity to hazards (e.g., see Guillotreau, Campling, & Robinson, 2012; Lam, Arenas, Brito, & Liu, 2014; Payet & Agricole, 2006; Rasmussen, May, Birk, Mataka, & Mertz, 2011). It is not specific to one sector, but instead spans several (Hanna, 2013; Mills & Hancock, 2005; Voccia, 2012; Wong, 2011). Tourism, fisheries, water resources, and agriculture, but to a lesser extent, are seen as the most vulnerable sectors (e.g., see Klint et al., 2012; Kuruppu, 2009; Moustache, 2014; Mycoo, 2014; Payet, 2005). Guillotreau et al. (2012) reviewed the exposure and sensitivity of fish stocks in SIDS and drew on literature that shows that economic losses brought on by changes in stock catchability, productivity, and redistribution, though temporary, can total as much as 40% in years with climate-related events. Lebot (2013) identified the economic and biophysical vulnerabilities of food systems in the Pacific, including genetic diversity studies on major export crops that introduced pests and pathogens. Pre-AR5 research also established that varying biophysical and socioeconomic conditions make different SIDS differently vulnerable to the same hazard (e.g., see Chadee & Sutherland, 2014; Lam et al., 2014; Moore & Smith, 1995). Studies emphasized the diversity between and among groups of countries in terms of size, topography, geology, precipitation, population density, storm patterns and intensities, relative sea-level rise, indicators of wealth (such as GDP [gross domestic product] per capita), and other island characteristics (Mills & Hancock, 2005, p. 570). Within countries, Heller and Mani (2002) flagged the climate burdens to be borne by the rural poor. Later, Dulal, Shah, and Ahmad (2009) expanded on this to highlight the possibility of vulnerable groups such as the poor, women and children being further marginalized in the implementation of adaptation responses. While these studies put forward a broad understanding of differentiated vulnerability, they do not sufficiently address or comprehensively explain intra-country, inter-country, or cross-regional differentiation. They also do not examine the impact of this differentiation on national-level vulnerability.

Similar to the research captured in the Third Assessment Report, post-AR5 vulnerability-related studies emphasized the multiplicity of climate and climate-related stressors in SIDS and the diverse impacts across productive sectors (e.g., Martin, Nunn, Leon, & Tindale, 2018; Nelson, Devenish-Nelson, Rusk, Geary, & Lawrence, 2018; Pearce, Currenti, Mateiwai, & Doran, 2018; Wabnitz, Cisneros-Montemayor, Hanich, & Ota, 2018)—McCubbin, Smit, and Pearce (2015), for example, observed the interaction of climate forces (e.g., changing marine conditions, higher sea-levels, dry spells, stronger winds, etc.) and non-climate-related forces (e.g., urbanization, overcrowding, limited economic opportunities, shifting cultural norms, land use change, etc.) that exacerbated the vulnerability of water, land, and food resources. Studies also examined the wide variety of climate and climate-related processes beyond sea-level rise, much like the research captured in the Fourth Assessment Report. These processes included historical shoreline changes (Reguero, Beck, Agostini, Kramer, & Hancock, 2018) and reef island dynamics (Aslam & Kench, 2017). Despite a push toward strengthening vulnerability methodologies (McLeod et al., 2015), identifying trends in actions taken to reduce vulnerability (Robinson, 2017a, 2018a), and improving vulnerability and adaptive capacity mapping (Duvat et al., 2017; Owen, Kench, & Ford, 2016; Weis et al., 2016), the number of studies examining the relationship between within-country and within-group vulnerability was low. Furthermore, the nature and implementation of reported adaptation strategies did not reflect the importance of same. It is, therefore, unsurprising that authors conceded that more research is needed to assess island vulnerabilities due to climate change risks (Baptiste & Kinlocke, 2016; Monioudi et al., 2018; Owen et al., 2016).

A partial understanding of the dimensions of intra-country vulnerability in the context of SIDS and the ways in which this differentiation shapes or alters national-level vulnerability further impacts the depth and breadth of the inputs into the processes that drive national adaptation planning and implementation. This is especially true when considering the application of vulnerability as a criterion for accessing and allocating international adaptation financing (e.g., see Robinson & Dornan, 2017; Weiler, Klöck, & Dornan, 2018), perhaps leading some SIDS to “perform” vulnerability as a way of leveraging more financing (see Barnett & Campbell, 2010; Webber, 2013). But authors such as Petzold
and Ratter (2015), Schwebel (2018), and Walshe and Stancioff (2018) strongly contested the portrayal of islands as passive, inherently vulnerable places. And so, the debate about whether SIDS are, in fact, the most vulnerable group of countries, as compared to least developed countries, for example, re-emerged. Monnereau et al. (2017), using fisheries as a case example, tested the relative vulnerability of islands to various climate stressors, compared to least developed and other coastal countries. The researchers concluded that, due to four methodological flaws, previous assessments had underestimated the vulnerability of SIDS and that this group is, in fact, the most vulnerable. Along with similar lines, Blasiak et al. (2017) developed a fisheries vulnerability index, which showed that seven out of the 10 most vulnerable countries are SIDS. One shortcoming of the Monnereau et al. (2017) and Blasiak et al. (2017) studies, however, is that they were limited to fisheries, raising questions about generalizability and leaving the issue largely unresolved.

5.3.3 SIDS’ absolute and relative vulnerability to climate change will lead to forced migration from these countries; existing notions of island identities and sovereignty will be (in)advertently redefined, magnifying the need for the creation and effective functioning of national and/or international mechanisms for delivering climate justice for SIDS

In the pre-AR5 period, Hinkel et al. (2013) linked climate-related sea-level rise to beach erosion and ultimately to forced migration, highlighting the human, and national security dimensions of climate change. Barnett (2004, p. 169) identified the implications of climate-related migration and resettlement in Niue—“distortions in markets; obsolescent political and administrative institutions; a hyper-concentration of social capital; increased demands on labor; difficulties in defining and maintaining that which is ‘traditional’ and an erosion of Niuean identity”. Despite this, some national SIDS governments are using relocation and resettlement as an adaptation policy. Butler et al. (2014) documented the prioritization of relocation as a policy response to ecosystem change in Papua New Guinea; Mortreux and Barnett (2009) discussed a potential migration/relocation policy based on anticipated climate impacts in Tuvalu, which would have both advantages and disadvantages. On the one hand, Birk and Rasmussen (2014, p. 1) suggested that current migration in the Solomon Islands “improves access to financial and social capital, reduces pressure on natural resources, and makes islands community less vulnerable to extreme weather events and other shocks”. On the other hand, Kothari (2014) noted the “recycled” nature of similar approaches in the Maldives, and argued that such policies mask and pander to broader political agendas. Political manipulation, in this regard, lends itself to the promulgation of misaligned national development strategies, which has implications for resilience and transformation in SIDS (see related discussions in Holler, Bernier, Roberts, & Robinson, 2020).

Following AR5’s publication, studies that focused on climate-related displacement, relocation, resettlement, and forced migration began adopting a clearer climate justice orientation (e.g., see Asugeni, MacLaren, Massey, & Speare, 2015; Burkett, 2015; Fornalé, Guélat, & Piguet, 2016; Wewerinke-Singh, 2018; Zellentin, 2015). Some attention was paid to the interaction of multiple climate stressors and vulnerabilities that result in displacement (e.g., see Martin et al., 2018; McCubbin et al., 2015) but far more to the “fairness” of interventions and outcomes, sometimes against the backdrop of countries’ colonial histories and negligible greenhouse gas emissions, alongside the mental health burdens of losing one’s home, income, traditions, and culture (e.g., see Asugeni et al., 2015; Baptiste & Rhiney, 2016; Zellentin, 2015). There was also an expansion of the human rights lens, which sought to unpack climate migrants’ rights (e.g., see Wewerinke-Singh, 2018). There was, however, an acknowledged absence of appropriate legal remedies (Burkett, 2015) and policies, especially related to loss and damage (Thomas & Benjamin, 2018), and of valid ways to secure legal status for those forced from their homes (Fornalé et al., 2016). Here, the need for the creation and effective functioning of national and/or international mechanisms for delivering climate justice for SIDS is clear.

In view of actual and expected climate-related sea-level rise in SIDS, any large-scale relocation and/or forced migration could result in a refugee crisis. Moore and Smith (1995) and Biermann and Boas (2014) flagged this possibility, with the former study subtly examining the implications of climate-related movement for the migrants themselves (e.g., higher health, education, and other living costs) as well as for larger, potential migrant-receiving States (e.g., Australia, New Zealand, and the United States). The implications for migrants led Mortreux and Barnett (2009) to call for future adaptation policies in Tuvalu to take collective goods such as culture, identity, and sense of home into consideration. In an attempt to address and manage climate-induced migration at the supranational level, Byravan and Rajan (2006, p. 247) proposed “immigration benefits by countries through a formula that ties numbers of immigrants to a country’s historical greenhouse gas emissions”. They suggested that “such a compensatory mechanism appears to be a
fair way of addressing the problems faced by climate exiles” (Byravan & Rajan, 2006, p. 247). Compensation, like the discussions around loss and damage associated with climate change, is a sensitive issue that has resulted in an impasse in the UNFCCC negotiations. Agreement on compensation would imply an acknowledgment of liability as well as a legal responsibility for the historical emissions that caused climate change. Lawrence (2014, p. 44, 122) raised the issue of intergenerational equity and climate justice in Pacific SIDS, framing climate change as a threat to their “collective human rights” and considering the possibility of international lawsuits being filed by SIDS against developed nations, including claims for new territory. Puthucherril (2012) offered a more localized, yet scalable solution—the negotiation of bilateral agreements on resettlement. These would need to be complemented by technical and financial assistance programs, requiring agreement in the context of the global climate action framework.

6 | DISCUSSION

6.1 | The developed world continues to be the main source of knowledge on adaptation in SIDS; SIDS need to invest more in research and development to have a greater impact on the research landscape and its narratives

This study establishes that, despite the UWI (all campuses) being the most common affiliation across both periods, the developed world continues to be the main source of knowledge on adaptation in SIDS. In the pre-AR5 era, eight of the top 10 author countries are developed—the other two were Trinidad and Tobago (UWI St. Augustine), and Fiji. These eight countries accounted for 53% of all affiliations. In the post-AR5 era, six of the top 10 author countries are developed. Jamaica (UWI Mona) and Barbados (UWI Cave Hill) were new top 10 entrants. These six countries accounted for 52% of all affiliations. Based on this data, more island research from the developing world is needed.

While the “dominance” of the developed world decreased over the period, the contributions of SIDS-based authors only improved marginally. Developed countries have more financial resources to dedicate to research and development. Currently, global spending is at a record high, US$1.7 trillion, with 10 countries accounting for 80% of spending in absolute terms (UNESCO, 2018). Trinidad and Tobago, one of the top 10 author countries, is among the four SIDS spending consistently on research and development—an average of 0.07% of GDP—the other three SIDS are Singapore (2.07%), Cuba (0.39%), and Bermuda (0.25%; UNESCO, 2019). By comparison, four of the 10 countries investing the most (United States, Japan, Germany, and United Kingdom) spent an average of 2.63% of their GDPs in 2016—they are among the main countries producing SIDS-related adaptation knowledge. Here, there are three cues for SIDS. First, innovation is a major competitive advantage for developed economies. To progress economically, greater investments in research and development are needed. And considering their “special” circumstances, innovation can help secure economic and environmental sustainability, for example, through the development and implementation of locally-appropriate climate solutions. Second, groups of countries are stimulating greater investments by setting explicit national targets for research spending as a percentage of GDP. The European Union set a target of 3% by 2020—Sweden and Austria have already exceeded this target (UNESCO, 2018). The African Union, of which six SIDS are Member States, set a target of 1% of GDP—only Kenya, Senegal, and South Africa (none of which are SIDS) are nearing the target, hovering around 0.8% each (UNESCO, 2018). These targets, which can also include increases in the number of researchers, can form part of SIDS’ sustainable development strategies but which should be accompanied by monitoring mechanisms that can track and evaluate progress. Third, the countries that spend the most on research and development worldwide show strong spending by the private sector (UNESCO, 2018). As a result, engaging the private sector and forming public-private partnerships for this purpose are key.

6.2 | AR5’s Small Islands Chapter appears to have played a role in shaping the research agenda on climate change adaptation in SIDS in the subsequent period; however, “island studies” needs to be “legitimized” and the importance of these geographies as early indicators of common global challenges recognized through, for example, the take-up of SIDS-related research in top-tier journals with a global scope

AR5 concluded that more work is needed on climate change and socio-economic scenario modeling at the scale of small islands, the nature of adaptation barriers and limits, the links between adaptation and sustainable development,
disaster risk reduction, and maladaptation, and comparative analyses of islands-related research. This study finds that Khan and Amelie (2015), Kuruppu and Willie (2015), Mycoo (2017), Rhiney et al. (2018), and Robinson (2017b) were among those publications that explicitly addressed these gaps, suggesting that the Small Islands Chapter played a role in shaping the research agenda on climate change adaptation in SIDS.

While this study finds that there was a 17% increase in the number of publications in 2015–2018 over the 24 years constituting the pre-AR5 era, few of these were in top-tier, high impact factor journals with a global view, suggesting that there is scope to increase the profile of SIDS-related research. Global Environmental Change, Climate Policy, and Natural Resources Forum were the top three sources from 1990 to 2014. Global Environmental Change, however, slipped to 21st place in 2015–2018, tying with 52 others, including Natural Resources Forum. Climate Policy was not a source. Regional Environmental Change, Climate and Development, and Marine Policy assumed the top three positions in 2015–2018. Though publishing high-quality research, these journals have an average percentile rank of 65%. By comparison, Global Environmental Change has a percentile rank of 99% in Geography (#1 of 83 journals), Environmental Studies (#2 of 116 journals), and Environmental Sciences (#4 of 250 journals) (Clarivate Analytics, 2019). The poor take-up of SIDS-related research in these journals could be the case for several reasons, including the lack of broad subject matter appeal and generalizability of what many would consider a case study. This makes the calls in Baldacchino (2018) and Grydehoj (2017) for the case for several reasons, including the lack of broad subject matter appeal and generalizability of what many would consider a case study. This makes the calls in Baldacchino (2018) and Grydehoj (2017) for the “legitimization” of “island studies” even more relevant. An increased take-up of SIDS-related research in top-tier, high impact factor journals with a global view would signal a recognition of the importance of islands as early indicators of common global challenges.

6.3 A future research agenda for adaptation in SIDS should fill the gaps identified in AR5, particularly cross-regional, comparative case study research; special attention should also be paid to identifying locally-appropriate, effective adaptation interventions, and exploring the intersection of climate adaptation finance and climate justice in the context of SIDS

Though AR5’s Small Islands Chapter appears to have played a role in shaping the subsequent research agenda on climate change adaptation in SIDS, several gaps remain, particularly the need for more cross-regional, comparative case study research. Researchers taking this approach could more closely examine differentiation in and across countries, especially atoll nations, and the nature of within-country and within-group vulnerability (e.g., poor, urban/rural, women, children, persons with disability, etc.) and how these shape the trajectory of subnational adaptation efforts and the aggregation of vulnerability at the national level. Although Duvat et al. (2017) and others called for more Pacific-focused contributions, this study finds that most academic interest is directed toward the Pacific, which accounted for 39% of studies in the post-AR5 era. Also of note is the 58% decrease in AIMS studies across both periods—AIMS SIDS only accounted for 5% of single-region studies in the post-AR5 period. This suggests that the AIMS region, though the smallest, is under-studied. Scholars should use these numbers as a guide when selecting future case study regions and countries. Additionally, this signals an opportunity for collaborations between the developed and developing worlds to establish platforms for adaptation scholars/practitioners in SIDS (particularly early- to mid-career researchers, and those in the AIMS region) to engage in exchange activities, and for setting and implementing their own research agendas, with a view to publishing in top-tier, high impact factor journals. Moving forward, however, it is critical that more research is action-based where those working on the frontlines of operationalizing climate change activities in SIDS are also provided with opportunities to collaborate with academics and co-produce knowledge that is locally-relevant and outside the academe.

The vulnerability of SIDS to the impacts of climate change requires urgent adaptation interventions. But while SIDS have undertaken many initiatives (Robinson, 2017a), the flows of international adaptation financing have not kept pace with recipient country needs or demands (Khan, Robinson, Weikmans, Ciplet, & Roberts, 2019). Countries’ dissatisfaction with the modalities for accessing financing through the Green Climate Fund and other mechanisms is growing (Robinson & Dornan, 2017). Some authors such as Nunn and Kumar (2018) have argued that, despite millions invested in adaptation in SIDS, the situation in many countries remains unchanged. Structural interventions such as seawalls have failed, and coastal fringes and livelihoods continue to be vulnerable and at climate risk (Betzold & Mohamed, 2017; Nunn & Kumar, 2018; Ratter, Petzold, & Sinane, 2016). This not only highlights the need for more locally-appropriate and effective interventions but also for further investigations into whether international adaptation finance is fit-for-purpose and/or...
meeting recipient country needs and priorities. This links almost seamlessly into another area that warrants more academic attention: the intersection of climate adaptation finance and climate justice for SIDS, particularly the mirror issue of loss and damage and liability and compensation, and the pitfalls of aggregating vulnerability at the national level, especially when investigations into intra-country, inter-country and cross-regional differentiation are so few.

7 | CONCLUSION

SIDS are on the frontlines of climate change. The importance of adaptation research in these complex and vulnerable geographies should be reflected in the scale of funding that SIDS dedicate to research and development, and the publication of island scholarship in top-tier, high impact factor journals. This article systematically reviewed 208 studies published before and after the release of AR5’s Small Islands Chapter in 2014. It found that the developed world was the main source of knowledge and that some of the countries dominating this scholarship commit upwards of 2% of their GDPs to research and development. This helps to solidify their competitive advantage. To produce more local narratives of risk and resilience, to “legitimize” “island studies” as a worthwhile line of enquiry, and to create a paradigm in which climate justice can be delivered, SIDS must also prioritize the detection and attribution of past impacts to various climate processes. There is also a need to reduce uncertainty in climate projections, uncertainties which typically delay adaptation policy- and decision-making. While AR5’s Small Islands Chapter appears to have played a role in shaping post-2014 research on climate change adaptation in SIDS, not all the gaps in understanding have been filled, especially the need for more cross-regional, comparative case studies. This raises questions about the extent to which researchers should consider IPCC Reports instructive. Going forward, the intersection of adaptation finance and climate justice, and the identification of more locally-appropriate and effective adaptation interventions, also warrant deeper academic attention. These concerns are at the heart of securing sustainable futures in SIDS.

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CONFLICT OF INTEREST

The authors have declared no conflicts of interest for this article.

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**SUPPORTING INFORMATION**

Additional supporting information may be found online in the Supporting Information section.

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