RESILIENCE
THE BIG PICTURE

Top themes and trends

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Acknowledgments

We are grateful to the following for their inputs to this report: Catherine Simonet, Florence Pichon, Amy Kirbyshire (ODI) and Mann Virdee, Olivia Taylor, Stephanie Ong; Paul May for copyediting; and Pia Dawson and Jonathan Mazliah for their help with the production process.

We would also like to thank our reviewers at the Rockefeller Foundation, Chukwudi Onike and Kevin O'Neil.

This report received support from The Rockefeller Foundation.

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Contents

Introduction

Our quarterly Resilience Scans[1] offer a review of articles, reports, debates, blogs and social media relating to resilience in international development. This graphical meta-analysis picks out the key themes and emerging trends in resilience thinking and practice, drawing on Resilience Scans in 2014 and 2015.

1

Resilience on the rise

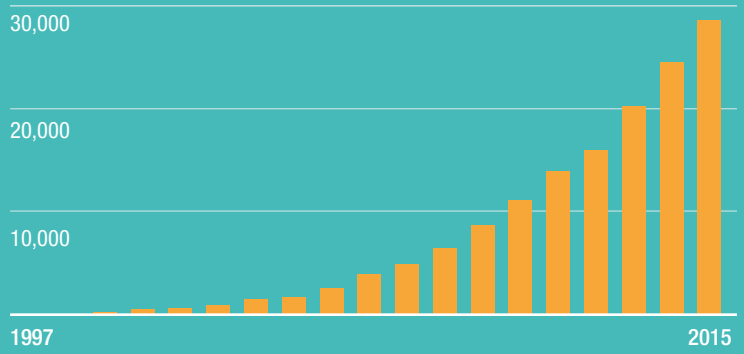
Building resilience – the practice of 'making people, communities and systems better prepared to withstand catastrophic events (both natural and manmade) and able to bounce back more quickly and emerge stronger from these shocks and stresses'[2] – increasingly features in international development discourse and practice. The topic cuts across sectors, scales and contexts, helping people prepare for, cope with and respond to a host of different shocks and stresses, from social, economic and cultural, to physical, environmental and political.

Use of the word 'resilience' is increasing in books, scholarly journals and scientific research across a range of disciplines. There was a nine-fold increase in the use of the term 'resilience' in published items between 1997 and 2015 across Web of Science, a platform that aggregates outputs from 7000+ academic and research institutions (Figure 1).[3] Citations of 'resilience' increased exponentially from almost zero in 1997 to nearly 30,000 in 2015 (Figure 2). The number of people googling the word 'resilience' more than doubled from 2004 to 2015 (Figure 3).

Resilience thinking emerges from diverse origins including engineering and an understanding of linked social-ecological systems. Our Scans demonstrate how resilience is now being employed and explored in a growing range of disciplines and sectors. Interest continued to rise in 2015, as reflected in the prominence of resilience language in the major international frameworks agreed in 2015 (see section 6).

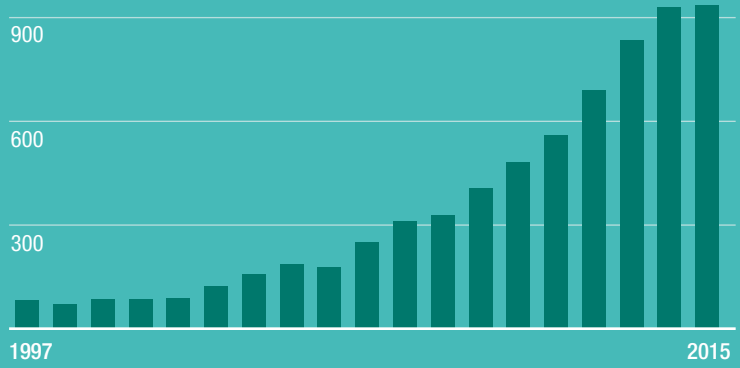
Within international development, resilience is driven in particular by its potential as an integrating concept which can break down the boundaries of different institutions, sectors and disciplines. It also provides positive language that speaks to improvement, as opposed to the concept of 'vulnerability' which can carry more negative connotations.

Figure 1: Increase in the use of the term ‘resilience’ in published items



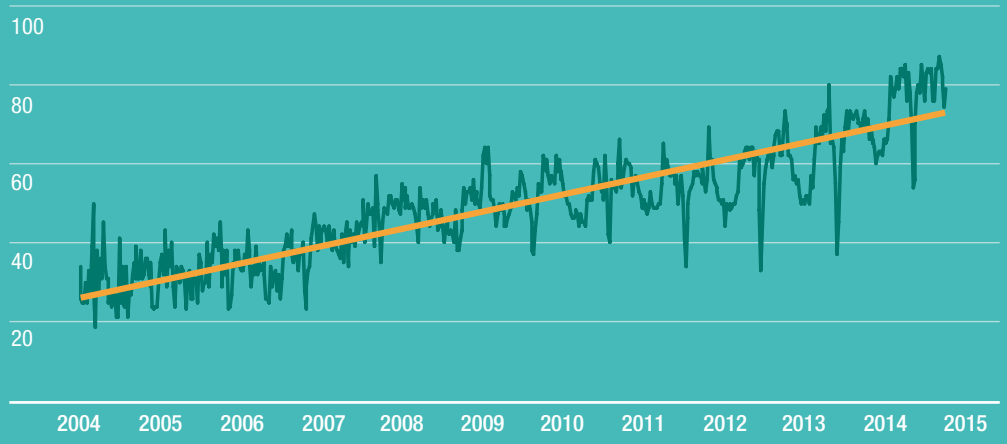
*The number of times 'resilience' appears in published items across all indexes on the Web of Science between 1997 – 2015.[4]

Figure 2: Increase in citations of resilience literature across published items



* Number of times papers on resilience are cited in published items across all indexes on the Web of Science from 1997 – 2015.[5]

Figure 3: The rise in interest in the term ‘resilience’ on Google[6]



*The rise in interest in the term ‘resilience’ on Google between 2004 – 2015, from Google Trends. The Y axis demonstrates relative interest in the term 'resilience' on Google compared to the maximum interest over the period 2004-2015, this has been rescaled to 100.[7]

2

Key themes in resilience

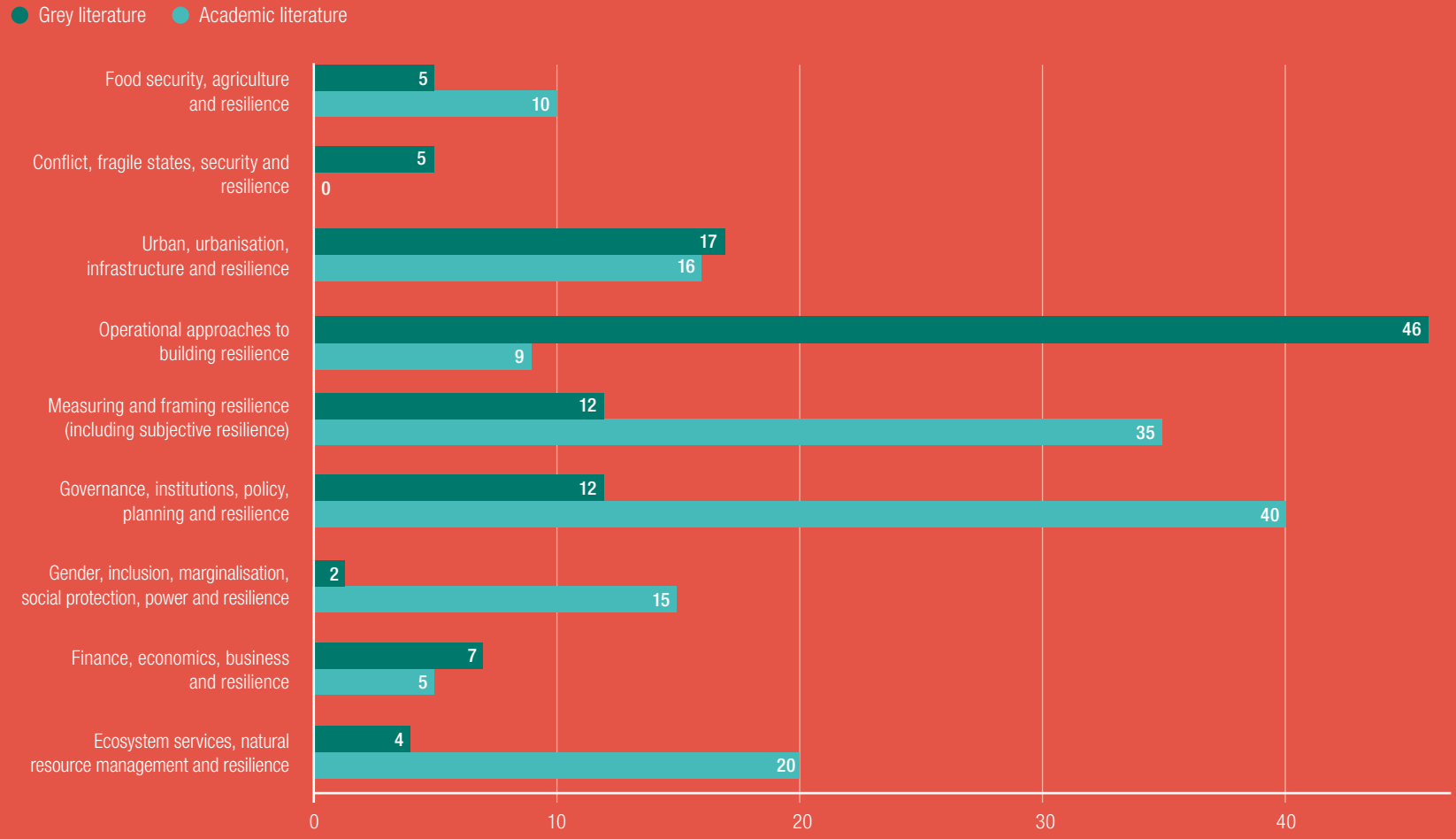
A wide range of academic disciplines and areas of practice are examining resilience. Several distinct themes emerged during our 2015 Resilience Scans of academic journal literature and 'grey literature' not published in peer-reviewed journals.[8] These are clustered here into nine thematic groups ranked by number of citations (see Figure 4).[9]

- **Top theme in academic literature: Governance, institutions, policy, planning and resilience:** Academic papers commonly focus on different types of governance and policy arrangements that can enhance resilience, from water management to urban planning. Some papers look at how decentralisation can contribute to resilience through governance that better reflects local contexts and enhances local ownership and accountability. Papers also highlight the integrated, multi-level, and multi-stakeholder approach needed to build resilience to a range of shocks and stresses at different levels and scales in complex systems. Recognition is also given to the range of different perspectives, objectives and contexts within a system, and the trade-offs that may be required in planning and policymaking.

- **Top theme in grey literature: Operational approaches to building resilience:** The most prominent theme within the grey literature focuses on supporting operational approaches to resilience thinking, particularly for NGOs and international organisations. Reflecting the different mandates of each organisation, these papers are diverse in their interpretations. Reports use different working definitions of resilience, and include different sectoral focuses (e.g. resilience in the water sector, or urban resilience). Operational entry points for enhancing resilience include: gender equality and social inclusion; challenging social norms and power relations; harnessing and building upon people's capacities; promoting food security and agricultural resilience; supporting people in fragile and conflict affected states; and effective evaluation and measurement.

The Scans indicate that the discourse on resilience is progressing from conceptual thinking to operational ways to build resilience, and the governance arrangements needed to do this. This trend reflects the substantial investments in donor funded programmes and initiatives to enhance resilience over the past five years, many of which are engaging with partners from developing countries.

Figure 4: Key themes within resilience literature



*Data based on the key themes which emerged repeatedly during our '2015 Resilience Scans' of grey and academic literature.

3

Geographies of resilience

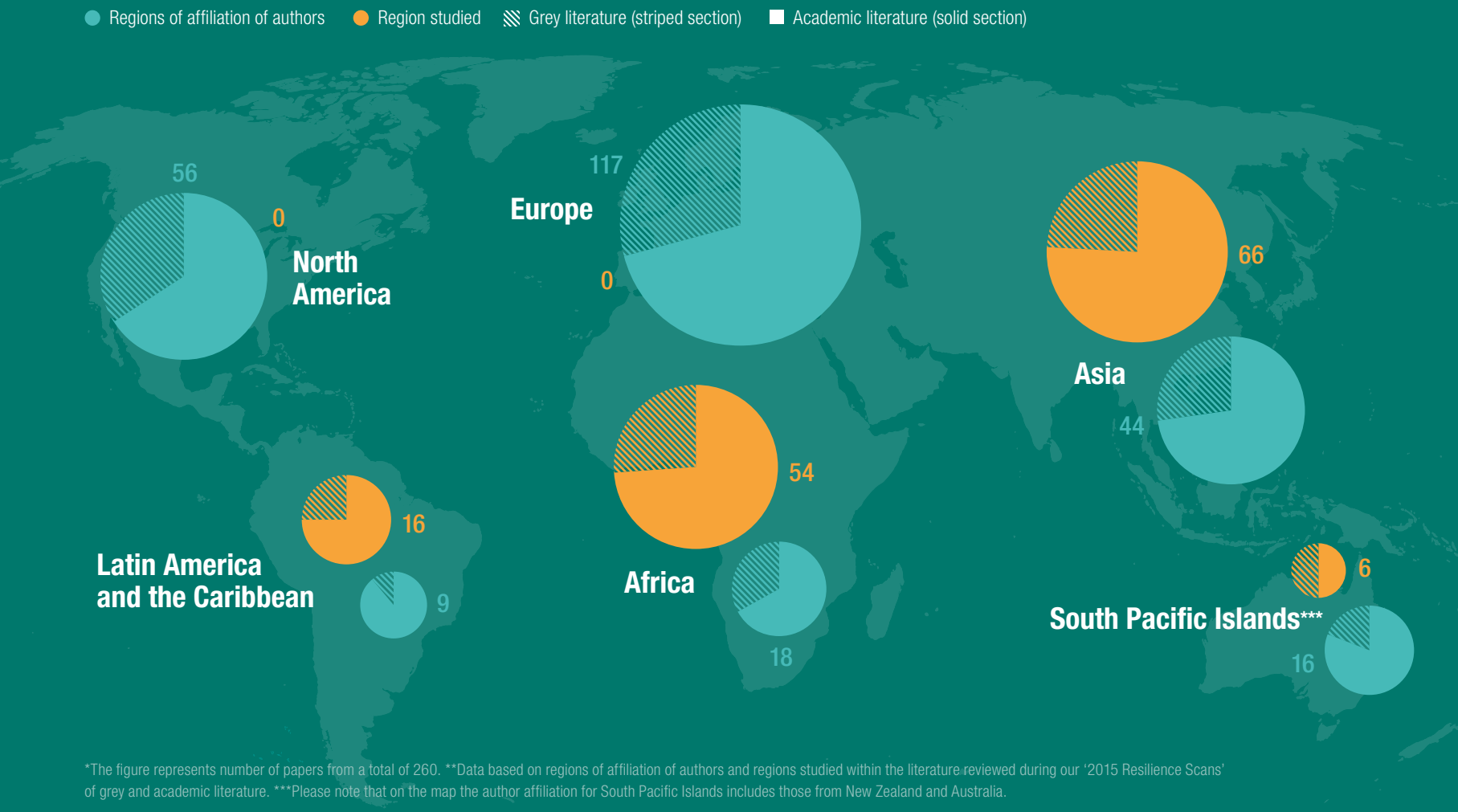
To understand how resilience thinking is gaining traction in different parts of the developing world, we identified the countries of author affiliation and the regions studied in the 2014-15 Resilience Scan grey and academic literature.[10]

- **Author affiliation:** researchers in industrialised countries produced the vast majority of research on resilience in the Global South. 72.31% of authors were based in institutions in Europe, Northern America, New Zealand and Australia (188 papers out of 260 papers included within this sample). The remaining authors were located in Asia (17%), Latin America and the Caribbean (3%), Africa (7%), and South Pacific Islands (0.69%).

- **Regions studied:**[11] By region, the largest proportion of papers include case studies from Asia (25%) and Africa (21%). 6% of papers focused on Latin America and the Caribbean, and 2% on South Pacific Islands. 12% of papers include countries from a range of regions (multinational), while 34% of papers were theoretical and not based on any particular country or region.[12]

The analysis reveals that most of the research on resilience in the developing world is conducted by authors affiliated with institutions in industrialised countries. 71% of the papers reviewed come from academic literature or journals published in industrialised countries, which can be less accessible to organisations in the Global South. By contrast, more grey literature is produced by authors affiliated with institutions in developing countries. The data overall suggests that greater efforts are needed to promote the study of, and publication about, resilience in the Global South.

Figure 5: Geographies of resilience literature



*The figure represents number of papers from a total of 260. **Data based on regions of affiliation of authors and regions studied within the literature reviewed during our '2015 Resilience Scans' of grey and academic literature. ***Please note that on the map the author affiliation for South Pacific Islands includes those from New Zealand and Australia.

4

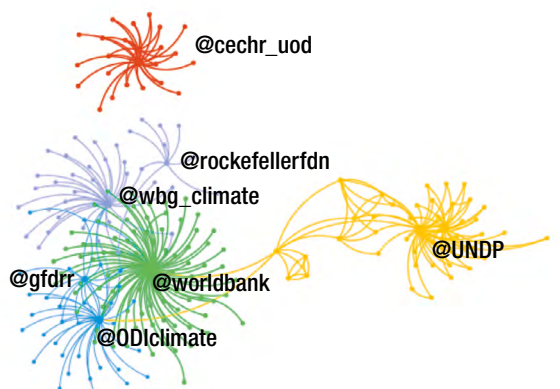
Resilience on Twitter[13]

Of the conversational sector areas analysed in the Twitter scans (Figure 7), 'Climate resilience' is the most popular resilience topic on Twitter and featured in around 39% of resilience conversations in 2015. The word cloud (Figure 8) shows the thematic terms most frequently used on Twitter in relation to resilience and climate change. The conversational social network map for 'climate resilience' (Figure 6) shows conversational clusters demonstrating who is talking to whom about climate and resilience.[14] Gender, innovation, success stories, and context-appropriate responses were common themes found across the different sectors analysed. Of all the sectors analysed, urban resilience was the least tweeted about in 2015.

Organisations tend to have the widest reach on Twitter around resilience issues and are generally better resourced in term of social media management. Nevertheless, experts and academics are increasingly joining the conversation. There is a degree of overlap with various sectors, including water, agriculture, conflict and food security in relation to resilience. Also, most conversational clusters, across these sectors of resilience, are driven by a few very central and visible influencers. Most conversational clusters are driven by a few very central and visible influencers.

Twitter and other social media platforms offer individuals, organisations and donors alike the chance to network, influence conversations and drive change on different themes around resilience over time.

Figure 6: A conversational social network map for 'climate resilience'



*The figure is comprised of nodes (Twitter handles of organisations or individuals) and ties, which are the lines connecting the nodes (representing relationships and interactions). The figure shows the Twitter accounts of prominence in the centre, who are often driving the conversations. The closer a node is to the centre of its conversational cluster, the more vocal or influential the Twitter account is in conversation around this theme.

Figure 7: Thematic breakdown of resilience conversations on Twitter in 2015

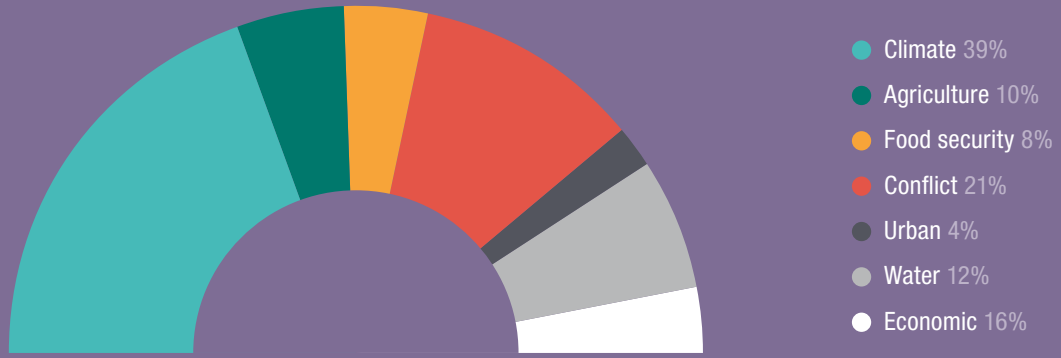


Figure 8: Word cloud of the key themes in Twitter conversations

'climate resilience'

Twitter conversations on climate resilience in 2015 focus on:

- Financing mechanisms for climate resilience
- Innovative solutions to enhance climate resilience
- The importance of gender equality in building climate resilience
- Methods and modalitites of reducing disaster risk

Top Twitter influencers on climate resilience

@wbg_climate
World Bank Climate

@ODIclimate
Climate and Environment at the Overseas Development Institute

@worldbank
The World Bank

@rockefellerfdn
The Rockefeller Foundation

@cechr_uod
Centre for Environmental Change and Human Resilience

@UNDP
The United Nations Development Programme

@gfdrr
The Global Facility for Disaster Reduction and Recovery

5

Characteristics of resilience

The Rockefeller Foundation has been influential in translating resilience thinking into operational characteristics, including awareness, diversity, self-regulation, integration and adaptiveness.[15] Our Resilience Scans include a summary of the way in which academic and grey literature speak to these characteristics.[16] Based on the number of citations used within the Scans to date, we found that diversity is the most dominant resilience characteristic, followed by integration. Awareness and adaptiveness were joint third, and the least represented characteristic was self-regulation.

- **Diversity:** Papers recognised the diverse nature and characteristics of different systems and ecosystems, as well as the 'range of capabilities, information sources, technical elements, people or groups' that are needed for effective resilience building initiatives. Papers also acknowledge that a diverse range of skills and capacities, methods or techniques are needed to prepare for and respond to shocks and stresses. For instance, income diversification to enhance adaptive capacity and resilience at the individual or household level; diverse approaches to ecosystem and resource management to enhance biodiversity; and soft and hard infrastructure approaches to protect coastlines are all emphasised as essential for resilience.
- **Integration:** This characteristic considers horizontal and vertical integration between individuals, groups and organisations, as well as across sectors and scales, as essential for building resilience to shocks and stresses. Integrating an understanding of risk into budgets and investments, the sharing of information, knowledge, communication, tools and methodologies were common themes that were seen to enhance efficiency and effectiveness in resilience building. Collaboration and multi-sector/multi-stakeholder engagement across disciplines and levels of society (communities, NGOs, private sector, government) were considered key to an integrated approach for reducing risk and vulnerability. Papers highlighted the vital importance of integration and coherence between the major 2015 international policy frameworks on disaster risk reduction, climate change and sustainable development in order to deliver resilience across sectors and scales.

Resilience has been interpreted differently within different geographical contexts and academic disciplines. However, almost all of the papers analysed speak to these characteristics in one way or another, despite their thematic, geographic and sectoral differences. The definition of these operational characteristics can therefore be seen to support a greater degree of cohesion in the interpretation of resilience thinking.

Figure 9: The Rockefeller Foundation's five characteristics of resilience[17]

1 Awareness

The ability to constantly assess, learn and take in new information on strengths, weaknesses and other factors through sensing, information gathering and robust feedback loops.

2 Diversity

Diversity implies that a person or system has a surplus of capacity such that they or it can operate successfully under a diverse set of circumstances, beyond what is needed for every-day functioning or relying on only one element for a given purpose.

3 Self-regulation

This implies that a system can deal with anomalous situations and interferences without significant malfunction, collapse, or cascading disruption. This is sometimes called 'islanding' or 'de-networking' – a kind of 'safe failure' that ensures any failure is discrete and contained.

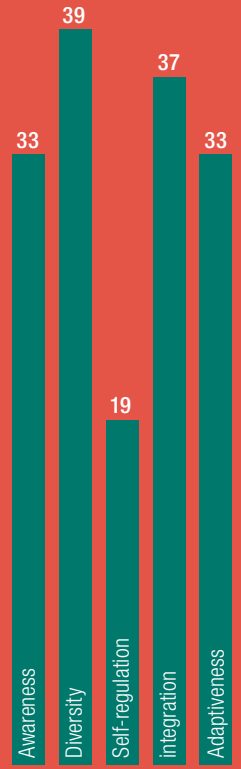
4 Integration

Being integrated means that individuals, groups, organisations and other entities have the ability to bring together disparate thoughts and elements into cohesive solutions and actions. Again, this requires the presence of feedback loops.

5 Adaptiveness

The capacity to adjust to changing circumstances during a disruption by developing new plans, taking new actions or modifying behaviours so that you are better able to withstand and recover from it, particularly when it is not possible or wise to go back to the way things were before. Adaptability also suggests flexibility, the ability to apply existing resources to new purposes or for one thing to take on multiple roles.

Figure 10: The most influential characteristics of Resilience*



*Data based on the number of citations that emerged from July – December 2015 within Resilience Scans of grey and academic literature.

6

Resilience in the post-2015 agenda

Resilience was a prominent theme across the three major international frameworks agreed in 2015 – the Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR), the Sustainable Development Goals (SDGs), and the COP21 Paris Agreement on climate change (Figure 11). Its inclusion demonstrates the importance of resilience to development finance, policy and practice, making it a priority for governments, policymakers and practitioners alike.

- **The SFDRR** aims to substantially reduce 'disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries' by preventing and reducing hazard exposure and vulnerability to disasters, increasing preparedness for response and recovery, and thus strengthening resilience.[18] Resilience is explicitly mentioned in the framework's goal, targets and priorities.[19]

- **The 17 SDGs** and 169 targets aim to ensure action to eradicate poverty by 2030 through economic, social and environmental sustainable development. This vision will only be achieved if a resilience approach is taken, which will help protect development gains and reduce the risk of future shocks and stresses. Target 1.5 of the SDGs directly pertains to resilience: 'build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters' by 2030.[20] Resilience is also included within a number of other targets.[21]

- **The COP21 Paris Agreement** is the first ever universal and legally binding global climate deal. It aims to reduce climate change and global warming, and build resilience to climate shocks and stresses by establishing a 'global goal on adaptation of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an adequate adaptation response in the context of the temperature goal'.[22] Resilience is explicitly mentioned 10 times in the agreement, including Articles 2, 7, 8 and 10.

While resilience is an important theme in all of these frameworks, there remain a number of key challenges. These include creating coherence between the post-2015 frameworks; measuring improvements in people's resilience through the frameworks; and the lack of a joined-up approach at the national level due to departments not working collaboratively. To achieve resilience in sustainable development, climate change, and disaster risk reduction, a greater 'cross-sectoral, multi-dimensional and dynamic understanding of resilience' is needed, which in turn will help achieve other goals.[23]

Figure 11: The prominence of resilience in three post-2015 major international frameworks

The Sustainable Development Goals
2015-2030[24]

Prominence of resilience

Goal 1: No poverty
Build the *resilience* of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters

Goal 2: Zero Hunger
Ensure sustainable food production systems and implement *resilient* agricultural practices

Goal 9: Industry, innovation and infrastructure
Build *resilient* infrastructure

Goal 11: Sustainable cities and communities
Make cities and human settlements inclusive, safe, *resilient* and sustainable

Goal 13: Climate Action
Strengthen *resilience* and adaptive capacity to climate-related hazards and natural disasters in all countries

Goal 14: Life below water
Strengthen the *resilience* of marine and coastal ecosystems

Sendai Framework for Disaster Risk Reduction
2015-2030[25]

Prominence of resilience

Goal
'Prevent new and reduce existing disaster risk through the implementation of integrated and inclusive… measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus *strengthen resilience*' through:

Priority 1
Understanding disaster risk

Priority 2
Strengthening disaster risk governance to manage disaster risk

Priority 3
Investing in disaster risk reduction for *resilience*

Priority 4
Enhancing disaster preparedness for effective response and to 'Build Back Better' in recovery, rehabilitation and reconstruction

COP21: UN Climate Change Conference
Beyond 2020[26]

Prominence of resilience

The framework calls for:
International, regional and national financial institutions to report on the manner in which development assistance and climate finance programmes incorporate climate-proofing and climate *resilience* measures

The identification of concrete opportunities for strengthening *resilience* and reducing vulnerabilities

Scaling up efforts to reduce emissions and/or to build *resilience* and decrease vulnerability to the adverse effects of climate change

Ensuring the adequate financing of climate-*resilient* development

The establishment of a global goal on enhancing adaptive capacity, strengthening *resilience* and reducing vulnerability to climate change

Building the *resilience* of socioeconomic and ecological systems, including through economic diversification and sustainable management of natural resources

Building the *resilience* of communities, livelihoods and ecosystems

Realising technology development and transfer in order to improve *resilience* to climate change and to reduce greenhouse gas emissions

Notes

1 Available here: www.odi.org/resilience-scan

2 Rockefeller Foundation. (2016) Resilience. Washington: The Rockefeller Foundation. Available from: www.rockefellerfoundation.org/our-work/topics/resilience

3 The Web of Science platform is the 'search and discovery choice for 7,000+ academic and research institutions, national governments, funding organisations, and publishing organisations in 100+ countries worldwide'. The platform provides indexing on 'multidisciplinary research covering scholarly journals, books, proceedings, published data sets, and patents… a key set of citation indices make up the most influential content. These indices, most notably Science Citation Index Expanded, Social Sciences Citation Index, and Arts & Humanities Citation Index, are complemented across the broader platform by additional indices, covering specific subjects, specific regions or specific publication and data types'. It is consequently a robust and useful source for gaining insights into papers published on resilience, as well as providing a platform for analysing the rise of citations on resilience across the different indices. More information on the Web of Science is available from: http://ipscience.thomsonreuters.com/product/web-of-science

4 Thomson Reuters (2016) Citation Report, All databases. Web of Science. New York: Thomson Reuters. Data is available from: http://apps.webofknowledge.com/CitationReport.do?product=UA&search_mode=CitationReport&SID=T16rVU7rUNdPLwUw4lP&page=1&cr_pqid=8&viewType=summary NB: This report reflects citations to source items indexed within all databases between 1997 - 2015; it based on approximately 7,821 items and has been refined by: Research areas: (environmental sciences ecology or sociology or forestry or biodiversity conservation or government law or religion or urban studies or marine freshwater biology or ethnic studies or cultural studies or agriculture or geography or social sciences other topics or history or fisheries or international relations or anthropology) and research areas: (environmental sciences ecology or biodiversity conservation or fisheries or marine freshwater biology or agriculture or anthropology or forestry or ethnic studies or cultural studies) and research areas: (environmental sciences ecology or international relations or biodiversity conservation or marine freshwater biology or agriculture or water resources or anthropology or forestry or geography or urban studies or ethnic studies or cultural studies or history or religion or fisheries or social sciences other topics).

5 Thomson Reuters (2016) Citation Report, all databases. Web of Science. New York: Thomson Reuters. Data is available from: http://apps.webofknowledge.com/CitationReport.do?product=UA&search_mode=CitationReport&SID=T16rVU7rUNdPLwUw4lP&page=1&cr_pqid=8&viewType=summary NB: This report reflects citations to source items indexed within All Databases between 1997 - 2015; it based on approximately 7,821 items and has been refined by: Research areas: (environmental sciences ecology or sociology or forestry or biodiversity conservation or government law or religion or urban studies or marine freshwater biology or ethnic studies or cultural studies or agriculture or geography or social sciences other topics or history or fisheries or international relations or anthropology) and research areas: (environmental sciences ecology or biodiversity conservation or fisheries or marine freshwater biology or agriculture or anthropology or forestry or ethnic studies or cultural studies) and research areas: (environmental sciences ecology or international relations or biodiversity conservation or marine freshwater biology or agriculture or water resources or anthropology or forestry or geography or urban studies or ethnic studies or cultural studies or history or religion or fisheries or social sciences other topics).

6 Figure 3 represents the number of searches for the term 'resilience' on Google, relative to the maximum number of searches for 'resilience' reached over the period selected. The highest search for the term 'resilience' over the period 2004-2016 was during the week beginning 14.11.2015. The series was then rescaled using 100 for this maximum period. The graph should be read as follows: for instance, in April 2010, the volume of searches for 'resilience' represented 55% of the maximum searches for 'resilience' reached in one week over the period. In order to control for noise in the data we apply a moving average over 20 weeks (represented in green). The noise or outliers could be the result of specific events (i.e. events related to resilience leading for greater research). The results can also be affected by significant research undertaken over a period or season (i.e. the biggest general bias in the data is due to greater internet penetration in developing countries

that are parallel to the current trend); we cannot control for the second pattern. A linear trend on the weekly raw data (red dot curve) has also been calculated.

7 Google Inc. (2014) 'Resilience'. Google Trends. California, USA: Google Inc. Data is available from: www.google.co.uk/trends/explore#q=resilience
NB: The raw data is taken weekly and can be really noisy. In order to control for this noise we calculated a moving average over 20 weeks (results are presented in green). Please note that the trend calculation is linear; other trend calculations have been tested allowing for a nonlinear relation but linear trends present a similar or better R-squared, we have therefore presented this trend estimation. We do not control the trend calculation for seasonality effect.

8 See pgs. 29-31 of the 2014 Resilience Scan for more information on the detailed Resilience Scan methodology. Available here: https://www.odi.org/publications/9288-resilience-scan-2014.

9 Alongside separate analysis of operational approaches to resilience examined within the grey literature

10 This is based on the first author's affiliation, signalling the geography of the institution within which the author is based. The sample represents top-ranking peer reviewed literature and grey literature based on the Scan methodology (which excludes papers on 'resilience' based in industrialised countries); only literature in English was selected. Note that in 2014 only academic literature was reviewed.

11 The sample is based on the Scan methodology which excludes papers on resilience in the Global North.

12 The graphics do not include papers which study a number of different regions or those not based on a particular country or region.

13 The network maps and conversational clusters are generated from datasets that represent accounts which are central to the topic and how it is discussed at a certain point in time. These networks are in constant flux, and therefore 'influence', as a measure of impact on how a topic is communicated and who is driving the conversations, is constantly changing. In addition, certain events such as academic and professional conferences, may momentarily influence the conversational visibility around certain themes/sectors under analysis.

14 The figure is comprised of nodes (Twitter handles of organisations or individuals) and ties, which are the lines connecting the nodes (representing relationships and interactions). The figure shows the Twitter accounts of prominence in the centre, who is often driving the conversations. The closer a node is to the centre of its conversational cluster, the more vocal or influential the Twitter account is in conversation around this theme.

15 Rockefeller Foundation. (2015) Rockefeller's Characteristics of Resilience. Rockefeller Foundation.

16 Since July 2015.

17 Rockefeller Foundation. (2015) Rockefeller's Characteristics of Resilience. Rockefeller Foundation.

18 UNISDR (2015) Sendai Framework for Disaster Risk Reduction 2015-2030. Geneva, Switzerland: United Nations Office for Disaster Risk Reduction.

19 Target D) Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030.

Priority 3: Investing in disaster risk reduction for resilience.

20 United Nations. (2015) Sustainable Development Goals. New York: Division for Sustainable Development. Department of Economic and Social Affairs, United Nations. Available from: https://sustainabledevelopment.un.org/index.php?menu=1300

21 For instance Target 9 which centres on building resilient infrastructure and Target 11 which is on making cities and human settlements resilient.

22 UNFCCC. (2015) Adoption of the Paris Agreement. Conference of the Parties, Twenty-first session, Paris, 30 November to 11 December 2015. Bonn, Germany: United Nations Framework Convention on Climate Change. Available from: www.cop21.gouv.fr/wp-content/uploads/2015/12/l09r01.pdf

23 Bahadur, A., Lovell, E., Wilkinson, E., and Tanner, T. (2015) Resilience in the SDGs: developing an indicator for Target 1.5 that is fit for purpose. London: Overseas Development Institute.

24 United Nations. (2015) Sustainable Development Goals. New York: Division for Sustainable Development. Department of Economic and Social Affairs, United Nations. Available from: https://sustainabledevelopment.un.org/index.php?menu=1300

25 UNISDR (2015) Sendai Framework for Disaster Risk Reduction 2015-2030. Geneva, Switzerland: United Nations Office for Disaster Risk Reduction.

26 UNFCCC. (2015) Adoption of the Paris Agreement. Conference of the Parties, Twenty-first session, Paris, 30 November to 11 December 2015. Bonn, Germany: United Nations Framework Convention on Climate Change. Available from: https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf

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