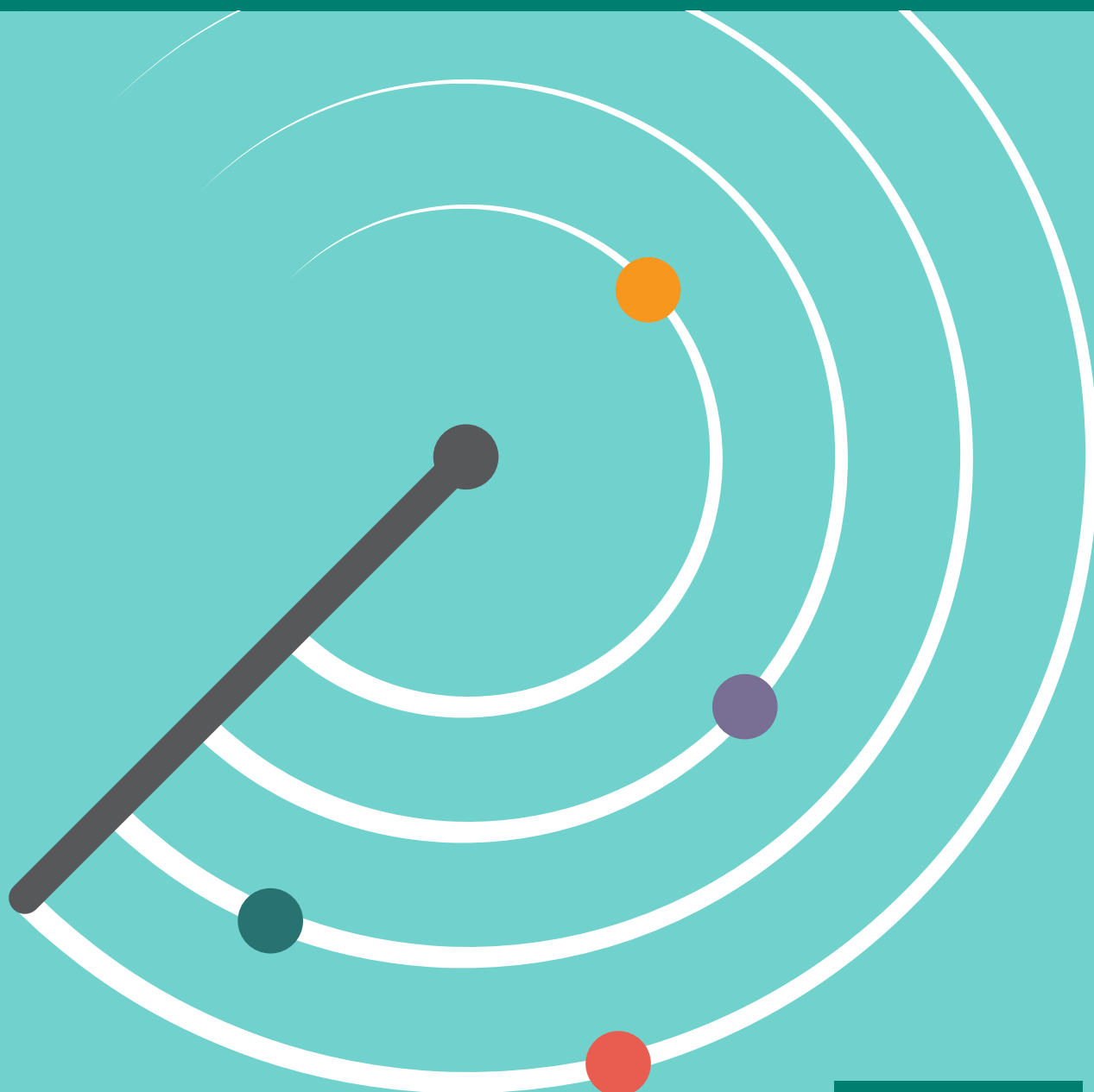# Resilience scan | April-June 2015

A review of articles, reports, debates and blogs on resilience in international development

Thomas Tanner
Aditya Bahadur
Florence Pichon
Hani Morsi

REPORT

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Abstract

This 'resilience scan' summarises writing and debates in the field of resilience during the second quarter of 2015, focussing primarily on the context of developing countries. The scan will be of particular interest to those implementing resilience projects and policies and those seeking summaries of current debates in resilience thinking. It comprises summaries of:

1. Insights from resilience experts in international development agencies

This presents a summary of individual conversations with resilience experts based in a variety of international development agencies, highlighting the benefits, the challenges and the forward agenda for the resilience agenda.

2. Analysis of recent blogs on resilience

This presents an analysis of the top 25 blogs on resilience published in the first half of 2015. Many have strong links to the international agreements under negotiation in 2015.

3. Reviews of the academic and grey literature

The literature scan from policy and practice in this quarter reveals a strong representation from theoretical/framing perspectives, as well as sector-based approaches to resilience.

Contents

Executive summary

This 'resilience scan' summarises writing and debates in the field of resilience during the second quarter (April-July) of 2015, focussing primarily on the context of developing countries. The scan will be of particular interest to those implementing resilience projects and policies and those seeking summaries of current debates in resilience thinking.

The summary of *insights from resilience experts in international development agencies* suggests that:

- The resilience agenda has been beneficial for integration: bringing together, terminology and institutions that were previously poorly connected around their common interest in tackling risks and shocks.
- Such integration is rarely easy and in some cases may actually frustrate progress, but the systems approach has certainly been influential in helping governments, individual agencies, and the UN system as a whole to address the linked up nature of development.
- Resilience was reported by several experts as promoting greater responsibility to governments through the use of narratives on local capacity and national leadership. This somewhat counters the emerging 'neo-liberal' critique of resilience as a concept used to emphasise locally mobilised response and remove state responsibility.
- Many agencies are now moving into greater internalisation of resilience into strategy and programming, developing guidance for staff and partners, and looking to improve the evidence base for investment.
- While resilience provides a great opportunity for integration, there was a general sense that not enough was happening on international coordination, particularly through the major international processes on climate change, disasters, aid and development in 2015.

Analysis of the top 25 blogs on resilience published in the first half of 2015, compiled using a combined score of social visibility, reveals that:

- Many blogs have strong links to these international agreements under negotiation in 2015, providing advocacy calls that highlight their challenges and missing elements.
- Even outside those specifically focussed on finance, there is a strong thread across the blogs on economic aspects, including the role of international funding streams, engagement of businesses in building resilience, and making the economic case for resilience investments.
- The strongest sector influence in the top 25 blogs came from agriculture, where resilience is becoming a concept applied to ecological approaches and food security, especially in the face of weather extremes and climate change.

Reviews of the academic and grey literature in this quarter reveals:

- Sector-based perspectives highlight the maturity of the resilience agenda in some fields, such as urban development, agriculture and ecosystems, and its emergence in others such as fragile states and conflict.
- The development of guidance and briefing materials in the grey literature, as well as ongoing interest in measurement and M&E reflects the growing operationalisation of resilience approaches.
- In the peer-reviewed literature, there is stronger representation of both methodological and theoretical perspectives, as well as sector-based approaches to resilience.
- Headline insights from each theme are summarised in the tables below.

Grey literature themes	Key insights presented in this theme
Urbanisation	• Perspectives of children, migrants, and women • Insights into the role of adaptive social protection • The importance of equitable urban planning and disaster recovery
Ecosystem services	• Arguments for incorporating the value of ecosystem services into decision-making • The methods in which ecosystems support livelihood resilience • A framework to assess returns on investments in dryland systems
Finance	• Arguments on how the Green Climate Fund can support or undermine resilience-building • The importance of decentralising resilience financing to create a better enabling environment
Fragile states	• Guidelines for integrating climate information into peace-building programmes • Insights into the ways in which social protection can support peace-building and post-disaster recovery • An analysis of the challenges fragile states pose for resilience-building
Monitoring and evaluation	• A logical framework for measuring resilience to shocks and stresses • A methodology for linking subnational indicators to national resilience monitoring and evaluation frameworks

Peer-reviewed literature themes	Key insights presented in this theme
Methods and approaches	• The value of agroforestry approaches for enhancing resilience • Innovations in agricultural practice to build resilience • Ways in which agricultural practice can enhance the resilience of underground water sources • The manner in which private citizens generating and sharing online geospatial data can enhance resilience to disasters • New and improved methods of testing the resilience of urban drainage systems • Ways in which social support and social capital can enhance resilience to food shocks
Theoretical approaches	• A need for coupling the concepts of sustainability and resilience • The core tenets (regardless of sector) that must be incorporated in any resilience program • The components that need to combine to deliver urban resilience • A methodology to diagnose the health of interdependent ecological-economic systems • Key theoretical constructs that need come together in any framework guiding resilience interventions • The value of using fuzzy logic for understanding the resilience of particular areas • The value of using the concept of resilience vs. other forms of risk management for enhancing national security • The urgency of ensuring that resilience makes the transition from 'concept' to a 'practice' that influences urban planning
Governance and policy	• The importance of fixing roles and responsibilities for enhancing resilience during disasters • The need for drawing on concepts of resilience to guide policies aimed at peace building • The pitfalls of focussing stability as opposed to adaptability in resilience policies • The value of looking at vulnerability even when considering the resilience of infrastructural systems • The manner in which decentralisation can contribute to resilience • The ways in which economic sanctions can sometimes enhance the resilience of the regimes against which they are directed • The reasons for the resilience of the neoliberal economic system • The reasons for the resilience of the Chinese Communist Party
Marginalisation and inclusion	• The particular needs of people with intellectual disabilities during disasters • The value of indigenous knowledge and cultural practices in processes of building resilience • The importance of considering children as active agents of change in enhancing resilience • The usefulness of including a diversity of voices in planning processes for enhancing resilience • The importance of considering the narratives and stories of resilience when designing programs
Business and economics	• The impact of flooding on tourism • The importance of micro-enterprises undertaking actions to become more resilient • The value of ensuring that people's voices are part of any plans aimed at infrastructural development • Ways of controlling externalities (e.g. pollution) from economic activity • The relationship between resilience to food shocks and international trade

1. Views from resilience experts in international development agencies

This section summarises the key challenges for resilience-related thinking and practice. This quarter, the expert section of the scan is based on reflections from resilience experts working within bilateral (DFID, GIZ, USAID), multilateral (UNDP, UNICEF) and coordinating (OECD) agencies working in international development. These perspectives were offered as individual experts rather than as the official agency view, but are largely based on the experience of working on resilience programming within those agencies. Experts consulted include Michael Brossmann (GIZ), Jan Kellett (UNDP), Hugh MacLeman (OECD), Sheila Roquitte (USAID), Antony Spalton (UNICEF) and Tim Waites (DFID). Their views are summarised below, with discussions covering both theory and practice clustered around the benefits, the challenges, and the future directions for resilience. Comments are summarised rather than individually attributed to experts and include benefits, challenges and future directions for the resilience agenda.

Integration was a commonly reported benefit. The ability of the resilience concept to pull together disparate disciplines, sectors, people and goals is regarded as one of its greatest attributes. It has rallied people around a common interest in tackling risks and shocks, in turn raising the profile of disaster risk and crisis within the development agenda. While such integration generally started in donor agencies from the perspective of bringing together disaster risk reduction, climate adaptation, social protection or food security entry-points, it is now broadening its scope in many donor agencies to link a wider range of responses to a wider range of shocks and stresses affecting development. This has been a mix of shorter term responses typical of the humanitarian community and longer term responses exemplified by approaches to peace-building as a route to greater resilience. Resilience has also helped force a greater examination of the linked up nature of the development (and particularly the United Nations) system.

Integration is nevertheless a practical challenge and some agencies had witnessed push-back against the resilience framing (for example in Myanmar or the Philippines) as potentially complicating a process of building capacity for disaster risk reduction and climate adaptation that was just beginning to bear fruit. Tackling multiple hazards and risks at the same time has intuitive appeal, but may be extremely difficult given existing institutions and ways of working. There was therefore a sense that resilience shouldn't be forced on development partners in what Béné and other thinkers have referred to as a 'new tyranny' (Bene et al., 2012). At a broader level, however, resilience is seen to have reinvigorated a discussion around how to support development in general, especially around tackling underlying risks and vulnerabilities. Working to reduce risks on one hand and enhancing capacities on the other has now become a mainstream operational approach, with the importance of both national and community capacity now part of the new consensus for international development.

Resilience as an integration tool is in part enabled by its use as a common language with which to discuss programmes in more joined up ways, for example the long-acknowledged need for convergence between the adaptation and disasters communities (Schipper and Pelling, 2006). Nevertheless, some experts noted the challenge of a 'common' language in that people sometimes think they are talking about the same thing but they actually have different

> Resilience as an integration tool is in part enabled by its use as a common language with which to discuss programmes in more joined up ways.

framings and definitions of resilience. As one expert noted, "resilience has helped engage more people but it has also confused more people". Another noted how resilience had left advisors with doubts about how or whether to keep using the concept of vulnerability. There was widespread acceptance that despite the value in the concept, this needs translation into a practical approach to be valuable to partners and field officers.

On the whole however, despite the difficulties in translating more complicated conceptual components of resilience thinking such as complexity, donor experts interviewed here generally stressed how the broader resilience concept did make sense to partners working on development programmes and people were quick to see its appeal. There also signs that the concept is now reaching out and influencing other parts of the world and other sectors following initial leadership for resilience shown by some sectors (e.g. climate adaptation, disaster risk reduction, and food security) and regions (e.g. the Horn of Africa).

The systems approach was also noted for bringing significant benefits in blending different types, spatial scales, and timescales of support to help people sustainably escape poverty. Resilience therefore allows us to consider short term shocks at the same time as longer term underlying causes of poverty, for example

by blending social protection schemes for shocks with longer term livelihood diversification programmes. Resilience thinking can then help provide a roadmap to see how and where resilience is being built and how this relates to other parts of the system, in turn allowing partners to see where others need to be playing their part. This is seen by experts as more comprehensive and constructive than an approach that just emphasises risks and shocks.

In more engaged resilience building processes, the reported benefits also include the emphasis on dynamism. This offers additional value over and above the vulnerability-based approach, which is sometimes seen as too static. Dynamism helps to reinforce the imperative to adapt development to changing circumstances, including a changing climate, where adaptation has challenged donors to shift their approaches to track progress towards a moving target.

The resilience approach has also garnered political appeal. While greater evidence is still needed (see below), this appeal has included articulating resilience as something that contributes to value for money in terms of *ex ante*, preventative investments rather than having to spend money *ex post* on tackling humanitarian crises. As a forward looking agenda, it is sometimes more politically acceptable as a discourse to partner governments than fragility or

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Internalising resilience into programming requires an improved evidence base.

conflict, for example in Somalia, where resilience has helped to frame peace-building and state-building goals. That said, some experts commented on the need to examine how resilience can be built in the context of conflict, rather than resilience as a means of fixing conflict situations. Resilience is then in part about enabling development in the face of shocks while longer term state capacity is built.

Interestingly, resilience was reported by several experts as promoting greater responsibility to governments through use of narratives on local capacity and national leadership. This counters the emerging 'neo-liberal' critique of resilience as a concept used to emphasise locally mobilised response and remove state responsibility. Similarly, while experts were aware of the potential to interpret resilience as reinforcing existing institutions and livelihoods that might not enable people to escape poverty and vulnerability, this was countered by the growing consideration of transformative aspects of resilience alongside absorptive and adaptive capacities. This capacity-based approach has been helpful to unpack the different aspects and goals of climate adaptation.

There is a clear sense that resilience has broken out of its initial pioneer areas and into wider programming. For some these pioneer areas are sectors (e.g. humanitarian, urban development, food security, climate and disasters), and for others these are geographical regions (e.g. the Horn of Africa, the Sahel). Many of the development agencies are working on integrating resilience into internal corporate procedures and increasing guidance to programmes and development partners. There is a general sense that for the resilience concept to survive it needs to be integrated into donor systems and processes, particularly around monitoring and evaluation. Guidance and training is now growing but some felt this was lagging behind the evolution of thinking and practice around the resilience concept.

Internalising resilience into programming requires an improved evidence base. Several experts noted that the concept is likely to have more traction if it can demonstrate its economic utility or brings

with it new sources of funding. Including resilience in the diagnostic assessments on the basis of which major programming decisions are made is therefore important to inform allocation of resources, rather than resilience simply reflecting risk screening procedures to 'check' programmes after they are developed. Messaging on resilience in future therefore needs to reflect the economic benefits of factoring in risk management and financing from the outset, and taking into account medium to long term climate change and other future risks. Making this economic case means improving the evidence base for the benefits of resilience, both for individual hazards, but also for multi-risk /multi-hazard approaches, such as how a resilience lens can simultaneously improve health, education and nutrition outcomes for children. Linking to benefits beyond growth, such as empowerment and equity, could also help make the case for greater investment. The case for longer term policy and development shifts also remains a challenge given the limited evidence base.

International coordination around resilience remains a key challenge. There was a common feeling of concern around the major international processes in 2015. These processes, including the Sendai Framework on disasters, Paris climate summit, SDGs summit, financing for development conference, and the 2016 World Humanitarian Summit are seen as poorly joined up in their thinking or action. This linkage is particularly important for financing streams but at a wider level the multiple definitions of resilience in operation create a danger of the concept losing its usefulness and simply becoming what one expert referred to as 'sustainability 2.0'. A number of experts noted that the use of resilience in the Sustainable Development Goals (SDGs) provided an opportunity to create definitions or indicators that are commonly agreed, making the next 6-12 months critical in terms of the future of resilience as an operational approach. The potential for international resilience indicators through the SDGs also raises the future challenge of comparing resilience between contexts and countries. There has been considerable resistance to this to date on the grounds of differential hazard burdens and measurement to date has tended to focus on assessing progress in specific systems or countries. Finally, as well as coordination through international frameworks, most experts noted the growing interest in learning and coherence over resilience approaches in different development agencies.

2. Resilience on the blogosphere

The purpose of this section is to offer insights into how the concept of resilience is written about and discussed in the blogosphere by identifying and analysing the top 25 blog posts on resilience published in the first half of 2015 (the methodology, based on a social visibility score, is described in annex 1). This analysis offers insights into the popular contexts in which resilience is blogged about, and key themes that dominate blog discourses on resilience. A combination of blog metrics and thematic analysis is employed to gain these insights.

Blog data represent textual records of public discourse comprised of the authors' posts and the readers' comments and interactions, as well as relevant meta-discourse that takes place on short-form social media like Twitter and Facebook. The interactivity of the blogging platform allows insights to be gleaned both by analysing the long-form blog material itself (dated blog entries, or posts) and the subsequent discourse in commenting, sharing and blog responses. The analysis below is clustered into five main categories, although it should be noted that there is some overlap.

2.1 Urbanisation and resilience

Blogs on urbanisation and resilience present:

- Checklists for ensuring that cities are safe, sustainable and economically successful

- Insights on reaping the dividends of building urban resilience

- Tools and methods for measuring resilience to shocks and stresses

Three blogs centre on the themes of urbanisation and resilience, covering issues that contribute to safe, sustainable and successful cities. At least two blogs present 'checklists' for achieving this goal. The blog *'How to build a city from scratch: the handy step-by-step DIY guide'* (the most influential blog in the list) draws on examples from countries as diverse as Egypt and South Korea to present a menu of twenty elements that need attention in order to design the ideal urban agglomeration. These range from hard or technical issues such as integrated transport networks, reliable water supply and carbon neutrality to vital social issues such as cultural life and raising levels of awareness on urban living for new migrants. *'Resilience resolutions for 2015'* (ranked 7) presents a similar list but is aimed at presenting broad areas of best practice for enhancing the resilience of cities to different kinds of shocks and stresses. It too engages with technical solutions (e.g. supporting bicycling and mass transit) as well as social issues (e.g. engaging women in disaster response and city planning).

'Are we resilient yet' (ranked 17) by the Rockefeller Foundation provides a pithy overview of the organisation's landmark urban resilience initiative, the Asian Cities Climate Change Resilience Network. The narrative touches upon the added value or dividend of enhancing the resilience of cities to climate change in terms of additional economic benefits (e.g. urban water bodies restored to enhance redundancy of water supply in Indore, India also resulted in local residents eating and selling fish). Importantly, the blog talks about the contribution made by the initiative to understanding how urban resilience may be measured through the development of novel frameworks, an understanding of the new dimensions of urban resilience, and finally a set of indicators as part of the City Resilience Index that is being currently piloted. An additional blog engages with urbanisation but has been accommodated elsewhere in this analysis due to the other themes with which it engages.

2.2 Disasters and resilience

Some blogs in our list of the top 25 focus on issues of resilience to natural hazards. *'UN warns of escalating cost of climate disasters'* (ranked 9) is focussed on exploring headline figures from the latest Global Assessment Report on Disaster Risk Reduction that illustrate the manner in which the global economic cost of disasters has reached an average of $250 billion to $300 billion a year. The blog draws on the report further to highlight how an annual global investment of $6 billion in disaster risk management strategies would generate total benefits in terms of risk reduction of $360 billion.

'Why we need money, not goods, for Nepal' (ranked 2) written in the aftermath of the Nepal earthquake presents a case for why concerned citizens should donate money and not old clothes or other items for relief. The reasons for this range from the high cost of flying these to disaster zones and the added burden of sorting through donated material. Two other blogs engaged with this theme but have been accommodated elsewhere in this narrative due to the other themes with which they engage.

2.3 Finance, economics and resilience

A dominant theme that the resilience blogs engage with is finance and economics. *'Green Climate Fund moves forward: Will soon disburse climate finance through 7 institutions'* (rank 5) provides a quick introduction to the seven organisations that have been accredited to receive funding from the Green Climate Fund. These include Centre de Suivi Ecologique (CSE), Peruvian Trust Fund for National Parks and Protected Areas, The Secretariat of the Pacific Regional Environment Programme, Acumen,

The Asian Development Bank (ADB), The German Development Bank, KfW and The United Nations Development Programme (UNDP).

'Finding the future: Building the case and supporting effective carbon pricing' (ranked 18), written by the World Bank's special envoy for climate change Rachel Kyte, talks about the work of the Carbon Pricing Leadership Coalition. The Coalition is preparing a business case for carbon pricing, provides technical support for carbon pricing and supports businesses to do more in their own use of carbon prices in operations. It also describes the World Bank's efforts in integrating carbon prices in its own work. *'Will businesses 'walk the walk' and 'talk the walk' on the road to Paris?'* (ranked 20) argues for business leaders to demonstrate bold action on tackling climate change by discussing the manner in which this is in their own commercial interest. It presents best practice examples from two companies, General Mills and Kellogg, who are aiming to reduce emissions across their supply chains.

2.4 Agriculture, food security and resilience

'Celebrating ecologically farmed food in Nairobi' (ranked 3) argues for the merits of a model of agriculture that is not chemical intensive, does not erode the health of ecosystems, maintains soil fertility and does not contribute to the emissions of greenhouse gases. This model of agriculture is founded on principles that include strengthening rural livelihoods, enhancing biodiversity and ecological pest control. *'Learning resilience from Peru's ancient civilisations'* (ranked 10) discusses the deployment of low-tech solutions to enhance the resilience of agricultural systems in Peru. These solutions include the use of biochar (charred bamboo that fixes

nutrients to the soil) and indigenous crops (that reduce soil erosion) to help enhance resilience to diverse hydro-meteorological disturbances.

'Agricultural movement tackles challenges of a warming world' (ranked 12), takes this line of argument further by laying out a vision for climate smart agriculture (CSA). These are agricultural techniques that protect farmers from the effects of global warming and improve crop yields, while also limiting greenhouse gas emissions, and can include actions such as the use of seeds specifically bred to withstand certain temperatures or moisture levels, better water management etc. This idea is taken forward in *'Climate-smart agriculture: propaganda or paradigm shift?'* (ranked 19). This blog argues that efforts should be made to ensure that CSA is not merely used as a buzzword but instead supports sustainability, equity, resilience and green growth. *'Farming starts in cities'* (ranked 15) also touches upon the themes of agriculture and food security but presents a highly innovative argument on the manner in which major innovative shifts in agricultural practice stemmed from within cities. For example, when the wheat farmers of New York realised they could no longer compete with western wheat growers, or thought they couldn't, and switched to fruit farming, "the change was primarily… by the proprietors of a nursery that first supplied the city people with fruit trees, grape vines and berry bushes and then showed farmers of the Genesee Valley… that orchards and vineyards were economical alternatives."

'How agriculture's resilience to climate change benefits us all' (rank 14) argues how investing in green infrastructure – such as strategically managed wetlands, trees, and grasses can go a long way towards recharging groundwater, reducing erosion that can cause flooding downstream, protecting important species, and increasing the resilience of farms to extreme events. It argues that making the rural heartland (responsible for producing much of the food consumed in urban areas) more resilient is likely to pay rich dividends for all. *'A future without hunger?'* (rank 11) also engages with the theme of food security and agriculture to outline the manner in which availability, access, stability and utilisation are the 'four pillars' of food security. It also lays out how a focus on production, nutrition, social protection and governance is key to ensuring the resilience of food systems.

2.5 Politics and resilience

Blogs on politics and resilience present:

- Commentary on the recent papal encyclical on the environment
- The value of recent legislative activism by the Governor of California to deal with drought
- The need for convergence between political agendas steering international agreements on disaster risk reduction and climate change
- The importance of acknowledging the complexities of the relationship between climate change and conflict

Politics is another common theme in conversations on resilience. A good example is *Praised be: Pope Francis's call to action on climate* (rank 4), which highlights the recent papal encyclical on the environment outlining the importance of addressing climate change. The encyclical pushes for a wide acknowledgement of the linkages between human activity and environmental degradation and the blog tacitly argues that the Pope's message provides vital political ammunition to those engaged in processes to find solutions to climate change. *'The silver lining in the California drought'* (rank 21) approaches politics from a somewhat different perspective by supporting the legislative activism of the Governor of California to help the state become more resilient to drought and water shortage. The blog argues that strong policy measures (of the type that established standards for toilets, faucets and showerheads) have resulted in a steady decline in water use in the state from the 1970s.

'Twitter feud alert: Michael Brown vs. resiliency, climate science, and policies that keep our communities safe' (rank 22) approaches politics and resilience from yet another perspective by commenting on an acrimonious exchange between a former director of FEMA, Michael Brown, and Aaron Huertas of the Union of Concerned Scientists about FEMA's acknowledgment of the manner in which climate change is exacerbating extreme events. Brown sought to deny well-established climate projections on the links of climate change with extreme events and Huertas repudiated him publicly in a series of heated exchanges. Two blogs discuss politics around an international deal on disaster risk reduction. The first of these, *'Why is a disaster risk reduction deal important for climate change?'* (rank 16) cites experts that support a convergence of the international disaster risk reduction policy with political processes currently unfolding to consolidate the Sustainable Development Goals and the new climate change deal in Paris.

'*Will fault lines in Sendai signal a rocky 2015?*' (rank 24) by ODI's Tom Mitchell, strikes a very similar cord as he too argues for coherence between development, disasters and climate agreements and for greater accountability for progress on these agreements. Two blogs discuss the linkages between conflict, security and climate change. '*Climate change and security: here's the analysis, when's the action?*' (rank 25) argues that enduring debates on whether climate change exacerbates conflict are unhelpful and divert attention from the vital questions around the manner in which climate change, arbitrary governance and lawlessness interact to compound risks of different varieties (e.g. resource competition, livelihood insecurity, transboundary water sharing, etc.). The blog argues that this needs to be tackled through a variety of actions that include strengthening risk assessment, improving food security and establishing institutional mechanisms to resolve transboundary disputes over natural resources. '*Water wars? Think again: Conflict over freshwater structural rather than strategic*' (rank 13) also touches on very similar points as it argues that the threat of traditional, all-out war over water is currently non-existent and that it is far more important to focus on water insecurity that leads to violence. The blog posits that rather than finding new "hotspots" where water wars will break out, it better serves us to focus on ways to build resilience and adaptation.

2.6 Miscellaneous themes

Three blogs did not fit neatly into the preceding categories but present interesting arguments. '*Critically reflecting on social-ecological systems research*' (rank 23) is a highly conceptual blog that highlights the importance of understanding 'feedbacks' between human and environment systems, the degree to which concepts such as panarchy and the adaptive cycle are observable and the manner in which negotiations and contestations over knowledge, including ideas of justice, politics and power, are vital to understanding the functioning of socio-ecological systems. '*Resilience: A new conservation strategy for a warming world*' (rank 6) argues that the conservation of elements such as landscapes, marshes and sediment is key to enhancing resilience. The blog tacitly argues against a singular emphasis on the conservation of flora and fauna. The final blog, '*Mapped: Voices of people most vulnerable to climate change*' (rank 8), gathers the stories of communities vulnerable to climate change from across the world as told by themselves using photography and pithy quotes, which are presented in an interactive map.

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3. Review of grey literature on resilience

Our examination of research articles on resilience published between April and July 2015 includes 17 'grey literature' publications from research institutions and aid agencies. These span five general themes: urbanisation, ecosystem services, fragile states, climate finance, and monitoring and evaluation.

3.1 Urbanisation and resilience

Grey literature on urbanisation and resilience presents:

- Perspectives of children, migrants, and women
- Insights into the role of adaptive social protection
- The importance of equitable urban planning and disaster recovery

The nexus of poverty, climate resilience, and urbanisation presents a unique set of challenges for policy makers and development partners. Recent grey literature tackles urban resilience through a variety of lenses in order to better understand the drivers of resilience across heterogeneous groups. Marginalised perspectives, such as those of women, migrants, and children, feature heavily, and adaptive social protection and diversity-sensitive disaster recovery are proposed as methods of building more inclusive urban resilience.

Of the four key papers addressing urban resilience this quarter, a recent paper for the UN's Habitat III conference takes the most overarching view of the foundations of urban resilience. It breaks the urban system into four interdependent components: functional (e.g. municipal revenue), organisational (e.g. governance), physical (e.g. infrastructure), and spatial (e.g. urban plans), arguing that resilience strategies must take into account all of these dimensions holistically, as otherwise interventions to build resilience could have nefarious consequences on stressors such as inequality (UN Habitat III, 2015). For example, actions that aim to build resilience to flooding by moving residential

The nexus of poverty, climate resilience, and urbanisation presents a unique set of challenges for policy makers and development partners.

developments to safer areas could leave people disconnected from their livelihoods or fail to provide affordable housing. The issue paper puts forward a New Urban Agenda to mitigate this risk, which advocates for leveraging city planning instruments to reduce existing risk and prevent the creation of new risk, developing policies that promote socially-inclusive urban development, and developing mechanisms to promote coherence across systems, sectors and organisations related to investments in urban resilience.

The next three papers focus on how particular urban groups are affected by climate risks. Chatterjee (2015) examines how children in Asian cities are impacted by the spectrum of risk they face and the manner in which current CCA and DRR programmes integrated child participation. This paper suggests that children living in slums and informal settlements in cities in Bangladesh, Philippines, and Vietnamese are particularly vulnerable to climate impacts, with increased susceptibility to communicable diseases and risk of dropping out of school after disasters compared to other urban groups (Chatterjee, 2015). Yet Chatterjee argues that children are also empowered to be key risk communicators; they have access to information through school and the media that adults are not always privy to. Schools in particular play an important role in imparting climate knowledge and raising awareness of preparedness and response measures for large disasters. Amongst poor urban children, some groups are still more vulnerable than others, with migrant children carrying a disproportionate burden of risk.

Jaswal et al. (2015) expand on this notion with their study of how migrant workers in Indian

cities have a reduced capacity to deal with climate impacts (Jaswal, 2015). The authors examine how limited access to affordable housing, healthcare, and education exacerbate vulnerability to climate extremes. Migrants in the Indian cities surveyed suffered from insecure asset bases and restricted access to protective public services, such as cash transfers, asset building and food-for-work schemes, which are implemented during times of climate variability and extreme hazards. Indian legislation extends these migrants some protection against exploitation by employers, although the study found that the majority of interstate migrant workers were denied these benefits in practice. Furthermore, most migrants who obtained ration cards in their hometowns through the Public Distribution System, which offers staple foods at a subsidised price, were not able to use these in their current location. The majority of workers also lacked coverage under the government's health insurance schemes.

For more inclusive social protection, the authors call for a larger role for social workers to help build resilience amongst migrant groups (Jaswal, 2015). Social workers are important facilitators for connecting migrants to entitlements, such as health services, hazard forecasting, and education. Given that resilience is multi-dimensional, cross-disciplinary interventions by social workers on education, employment, access to safe water, hygiene education made them particularly suitable for supporting resilience programming for migrants who might not otherwise be able to access these services.

The International Federation of Red Cross' 'Gender and diversity for urban resilience: An analysis' (IFRC, 2015) gives a broad overview of gender-sensitive programming for urban disaster risk reduction. The report compliments Jaswal et al.'s (2015) and Chatterjee's (2015) studies on marginal groups in urban environments by articulating methods for gender-sensitive disaster risk management, arguing that these strategies increase community resilience as a whole (particularly for quick recovery). Often, women and migrants have lower levels of access to information, both through restricted access to education and by having fewer opportunities to learn skills that would help with preparedness and response strategies. The report reiterates Jaswal et al.'s (2015) finding that migrants are often detached from access to services, access to justice, and formal, non-exploitative work (IFRC, 2015). To pursue a diversity-sensitive approach to resilient recovery, which takes into account the specific needs of women and migrants in the aftermath of a disaster, the IFRC advocates

a variety of interventions. These include providing personal security around latrines to reduce violence against women, better access to financial resources so women may rebuild livelihoods if a male breadwinner dies, and including migrants in beneficiary registration so that they may be eligible to receive disaster relief for a more equitable recovery.

3.2 Ecosystem services and resilience

Grey literature on ecosystem services and resilience presents:

- Arguments in favour of incorporating the value of ecosystem services into decision-making
- The methods in which ecosystems support livelihood resilience
- A framework to assess returns on investments in dryland systems

Four papers argue that the role of ecosystems in supporting livelihoods and ensuring food security has been systematically undervalued in decision making. As a result, ecosystems that are highly important to the resource dependent poor are often degraded or mismanaged. These papers provide insights into the essential services ecosystems provide, from water regulation to carbon sequestration, and advocate incorporating ecosystem values into decision making.

Kratil (2015) looks to reframe the way practitioners conceive of dryland ecosystems, arguing that the variability that is inherent to dryland ecosystems presents opportunities for production and livelihood strategies. Rather than trying to eliminate or control variability, food security in drylands requires adaptive management that recognises the worth of dryland unpredictability

Actions that aim to build resilience to flooding by moving residential developments to safer areas could leave people disconnected from their livelihoods or fail to provide affordable housing.

Most administrators and policy makers focus on infrastructure and institutions, while 'soft' systems such as ecosystem services are neglected, posing a tremendous threat to both ecosystems and vulnerable populations.

(Kratli, 2015). Farmers and herders have to make real time adjustments in cropping and grazing strategies. Small-scale crop farming and mobile pastoralism are associated with resilience in these ecosystems, as these livelihoods can adapt to structural variability of conditions. In order to better manage climate variability in dryland conditions, Kratil advances two strategies: 1) district-level planning over village-level, as livelihood strategies are not confined to villages in these ecosystems; and 2) making climate information services relevant to local needs by using mobile phones to communicate forecasts.

To quantitatively illustrate the value of dryland ecosystems, King-Okumu (2015) develops a framework to assess returns on investments in the dryland systems of northern Kenya. King-Okumu's aim is to put an economic value onto the ecosystem services provided, looking at three main types of ecosystem services: 1) provisioning of water, plants, and livestock; 2) regulating water storage, soil formation, carbon sequestration, conservation of seedbanks; and 3) cultural, scenic, recreation, and spiritual benefits (King-Okumu, 2015). This proposed outline framework aims to give attention to the distribution of returns in dryland ecosystems, adjusting investments to ensure resilience programmes are equitable. King-Okumu also advocates the increased use of participatory GIS in order to gather the necessary data on vegetation and water resources, ultimately helping decision-makers understand the state of dryland ecosystems across large areas with high variability.

Similarly, a working paper by the World Resources Institute (WRI) sets out the ways in which the value of ecosystem services can be factored into meaningful decision making at national and local levels. This approach consists of six components, 1) mainstreaming ecosystem values in national economic accounting, which are the systems that harmonise the measurement of economic activities of each state; 2) making ecosystem service valuation count in local decision making, such as applying ecosystem service assessment tools to specific policy questions; 3) scaling up investments in natural infrastructure; 4) scaling up corporate investments in ecosystems to secure vital inputs for the food sector; 5) catalysing the increased protection and restoration of ecosystem services in agricultural landscapes through restoration bonds; and 6) making ecosystem and community resilience visible through communication (Burke, 2015). These pathways are designed to build on existing policy tools that assess, model, and communicate information on ecosystem conditions, as well as leverage new accounting guidelines for national economic accounts and new funding mechanisms to provide loans to farmers undertaking ecosystem restoration. These can reward community and ecosystem stewardship by private companies, and reinforce resilience building at local, national, and global levels.

A fourth paper in this category examines the ecosystem services provided by peri-urban areas, a critical battleground for changing land-use patterns as cities expand and agricultural land is lost to housing. Taking the Gorakhpur City as a case study, Mitra et al (2015) argue that considering the peri-urban space as a geographical-administrative entity without taking into account the ecosystem services it provides (such as natural drainage, reducing exposure to floods, and providing livelihoods) risks imperilling the lives of the urban poor and of small and marginal agriculturalists (Mitra, 2015). Most administrators and policy makers focus on infrastructure and institutions, while 'soft' systems such as ecosystem services are neglected, posing a tremendous threat to both ecosystems and vulnerable populations. In Gorakhpur, a land market has emerged, ousting small-scale agriculturalists and exacerbating urban flooding by constructing on wetland areas that traditionally absorbed heavy rains. Urban and peri-urban development can only be sustainable if it is conducted through the prism of an ecosystem services approach. Mitra (2015) suggest public-private partnerships to maintain ecosystems. These funding arrangements can supply the necessary capital outlay for converting from the current arrangement of prioritizing short-term real estate profits in peri-urban areas to longer-term sustainable ecosystem management for resilient livelihoods.

3.3 Finance and resilience

Grey literature on finance and resilience presents:

- Arguments on how the Green Climate Fund can support or undermine resilience-building efforts
- The importance of decentralising resilience financing to create a more enabling environment

Three policy briefs touch on the role climate finance can play in supporting initiatives to build resilience. Barnard (2015) highlights how a small proportion of climate finance is deployed for building resilience in urban areas, with only 10% of all climate finance approved explicitly for urban projects. Similar to the UN Habitat 2015 Issue Paper (UN Habitat III, 2015), Barnard (2015) highlights the importance of coherent policy, regulatory, and planning frameworks for steering investment into climate resilient urban development. Mainstreaming climate risks into local governance is not a standalone solution, as the political dimensions of decision making need to be taken into account. Investment strategies will have little impact if they are not prioritised by key actors in urban planning and infrastructure.

Transitioning to low emission and resilient cities will require unprecedented investments in order to sustainably meet the demand from households and industries for core services such as transport, water, and energy. Barnard (2015) argues that the levels of funding offered by climate funds are nowhere near sufficient to meet the challenges that climate change will pose in urban spaces, and advances the idea that international climate funds be used to help municipal governments make a business case for climate-oriented investment projects so as to match them with private and public financiers. Barnard highlights the manner in which the Green Climate Fund (GCF), which has committed to financing low emission and resilient cities, is well placed to support urban resilience. The GCF can accredit a wide range of institutions, and there is potential for the fund to work more directly with cities rather than through multilateral development banks, which have larger time lags for developing and approving climate fund projects.

While Barnard advocates a larger role for GCF's funding initiatives in urban areas, Practical Action's (2015) policy briefing warns that the rural and agricultural loans supported through the fund can inadvertently promote maladaptive practices. It warns that anything that increases agricultural yields can be deemed 'climate smart' and thus funded through climate finance, though many technologies that increase yields promote chemical intensive monoculture farming, marginalising small holder farmers and undermining

their resilience (Sugden, 2015). Patented seeds and inorganic fertiliser offer an easier return on investment for private companies because they can be sold at a reasonably high price with a financing package (i.e. loans through the GCF). Practical Action advances agro-ecological approaches to farming systems, arguing that they are highly adaptive and better suited for the needs of small-scale farmers who are most vulnerable to climate change impacts.

Green's (2015) study of the institutional architecture for resilience building in Tanzania highlights the role of climate finance in creating an enabling environment for resilience investments at the subnational level. Green found that Tanzania's planning systems were not yet 'climate smart', with few specific policies directly supporting resilience building and very rigid budgets (Green, 2015). Green argues that the inflexibility of the budgeting system stifles local adaptive capacity; centrally set budget systems do not allow districts to respond to local climate variability. Local level planning is critical to effective resilience building efforts, and establishing district-level climate adaptation funds ensures climate finance is suited to local priorities.

3.4 Fragile states

Grey literature on fragile states and resilience presents:

- Guidelines for integrating climate information into peace-building programmes
- Insights into the ways in which social protection can support peace-building and post-disaster recovery
- An analysis of the challenges fragile states pose for resilience-building

One subset of papers examined different aspects of resilience in fragile or conflict-affected states. Covering topics ranging from climate data, social protection, and promoting climate-resilient peacebuilding, fragile states pose a unique set of challenges for resilience-building efforts. As the World Bank Discussion paper highlights, not one conflict-affected country has achieved a single one of the Millennium Development Goals, making resilient and climate-smart programming even more important for these countries.

Ovadiya et al. (2015) gather evidence of different types of social protection systems in fragile states, highlighting the importance of leveraging these to support the most vulnerable populations from being affected by systemic shocks. The paper argues that social protection is important for social inclusion and

Objectives for social protection in fragile states are multifaceted, with social protection interventions often used to reduce social tensions and promote social inclusion as a sort of peace dividend.

equality, which fits into the wider urban resilience narrative that speaks to the different ways that climate stressors affect marginal groups (Ovadiya, 2015).

Based on their analysis, Ovadiya (2015) argue that social protection plays a significant role in fragile settings in maintaining social stability, though the costs of deploying these programmes can be significant. They find that objectives for social protection in fragile states are multifaceted, with social protection interventions often used to reduce social tensions and promote social inclusion as a sort of peace dividend. These 'peace-building' social protection systems are primarily in the form of unconditional cash transfer programmes, rather than insurance arrangements, and are most prevalent in countries with high capacity and strong enabling environments. These approaches have supported post-disaster reconstruction to restore social cohesion and promote equity – necessary priorities for a more resilient recovery. Ovadiya et al. claim that social protection can be used as an effective peace-building tool, as was successfully done in Nepal in 2006.

A policy brief by the International Institute for Sustainable Development picks up on this peace-building theme, providing guidance on how to integrate climate change resilience into peace-building interventions in fragile states. The paper asserts that the links between climate change and security are not directly causal, though a body of evidence supports the idea that climate change can be one of many factors that generate conflict (Crawford, 2015). To best integrate climate concerns into peace building in a synergistic manner, the paper lays out six principles: 1) Use a holistic context analysis that combines climate information and conflict dynamics as the foundation for planning peacebuilding initiatives; 2) balance immediate and long-term priorities; 3) address climate-natural resource-conflict linkages, particularly taking note of rural livelihoods dependant on natural resources; 4) facilitate coordination across disciplines, working with the conflict community, climate change community, government, and disaster risk management; 5) adopt a forward-looking approach to planning, incorporating

potential future scenarios for climate change risks to avoid maladaption; and 6) aim for resilience as an overarching objective. Integrating climate resilience into peace building is necessary to safeguard the sustainability of efforts.

Crawford (2015) also discusses the pathways to promote climate-resilient peacebuilding in fragile states but focusses on the Sahel. He details the challenges of climate change and state fragility in the region, looking at the ongoing stressors such as short-term climate variability, competition between pastoralists and farmers, refugee migrations and population growth, poor governance and institutions, large scale dam construction, and the emergence of extremist groups. Crawford examines the possibility of these social and biophysical stressors exacerbating conflict and fragility, concluding that there is no precedent for the scale of change that is expected in the region. The paper ends on a note of caution, highlighting that communities have been adjusting to harsh, variable climates for centuries, thus the link between climate-related pressure and violence is far more complex than is often assumed.

Lastly, a working paper published by the International Institute of Environment and Development addresses the role of climate data in fragile and data-poor states where access to climate information is weak at best. In these contexts, weather stations have often been neglected or damaged during conflict, and technical staff operating weather stations have fled. Reiterating the point made by IISD's policy brief, the paper claims that climate information plays a key role in peace-building, as

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designing interventions on the basis of poor climate information can threaten the sustainability of the intervention at hand (Mason, 2015). Understanding climate data and information is not typically within the remit of peace-building practitioners, yet the working paper attempts to bridge this gap by providing a simple explanation for how to use weather- and climate-based data for various timescales. In the immediate term, peace-builders need to know short-term forecasts to conduct relief operations. For longer term planning, peace-building practitioners need longer-term forecasts to decide where to locate refugee camps and access water sources. The paper points out that humanitarian needs will be worsened by environmental changes. Incorporating climate information is vital for longer-term planning to prevent climate trends from undermining decisions made on water, infrastructure, and livelihoods.

3.5 Monitoring and evaluation

Grey literature on fragile states and resilience presents:

- Guidelines for integrating climate information into peace-building programmes

- Insights into the ways in which social protection can support peace-building and post-disaster recovery

- An analysis of the challenges fragile states pose for resilience-building

Though the subset of papers looking at monitoring and evaluation of resilience is much smaller than the publications between January and March 2015 (covered in the previous edition of the scan), two papers address the methodological challenges of tracking resilience building efforts. One is practical, examining the frameworks used to monitor and evaluate climate change adaptation in Uganda, while the other is theoretical, proposing a general logframe and methodology for tracking resilience measurement.

A briefing paper from IIED (2015) presents an M&E approach for climate change adaptation in Uganda, applying the Tracking Adaptation and Measuring Development framework (TAMD). The TAMD framework monitors the institutions and policies that enable climate risk management and the impacts of these policies on adaptation outcomes. The main task of the research in Uganda was to develop district-level indicators to provide evidence

on climate change adaptation at the subnational level (IIED, 2015). They indicators track to what extent community-level vulnerability has been reduced, looking at factors like the number of households accessing and using climate information, the area of land cultivated, and the number of energy-saving technologies taken up. The research showed that locally-identified indicators could be linked to national M&E frameworks and integrated into existing methodologies and tools using a simple data collection system.

Béné et al. (2015) apply a conceptual lens to resilience measurement, breaking down the components that a project M&E system should include to adequately gauge changes in resilience. The factors they present are broken down into timescales for before, after, and during a disaster event (Bene, 2015). The authors acknowledge the need for a multi-scale approach, measuring the resilience of households, communities, and agro-ecological systems, rather than simply focussing on measuring resilience of recipients of interventions. The authors propose a logframe for M&E of resilience programmes which tracks impacts at multiple scales and suggests indicators of programme inputs, activities, and outputs. Béné et al. emphasise that the most important value is the change in the indicators over time; resilience scores cannot inform the success of interventions if they are not measured frequently. Though the logframe includes the conventional components of an M&E logframe, it is oriented towards capturing empirical evidence of three capacities that contribute to resilience: absorptive, adaptive, and transformative. The logical framework is designed to be adapted to a variety of resilience programmes.

Communities have been adjusting to harsh, variable climates for centuries, thus the link between climate-related pressure and violence is far more complex than is often assumed.

4. Review of peer-reviewed journal literature on resilience

Following the methodology described in annex 2, the scan of Quarter 2 2015 academic literature resulted in a sample of 41 papers on resilience across eight sectors. An analysis of this pool of literature permits a clustering of the findings into 5 key themes.

4.1 Methods and approaches

Papers on methods and approaches for resilience present insights on:

- The value of agroforestry approaches for enhancing resilience

- Innovations in agricultural practice to build resilience

- Ways in which agricultural practice can enhance the resilience of underground water sources

- The manner in which private citizens generating and sharing online geospatial data can enhance resilience to disasters

- New and improved methods of testing the resilience of urban drainage systems

- Ways in which social support and social capital can enhance resilience to food shocks

8 papers propose novel and innovative methods of enhancing resilience in a variety of settings. Two papers, Jacobi et al. (2015a) and Jacobi et al. (2015b) examine the resilience of systems that support cocoa farming in Bolivia. They compare agroforestry-based approaches for farming with those based on monoculture to find that the former were far more resilient to the impacts of climate change. Apart from natural and physical reasons, a major reason for the resilience of agroforestry-based approaches was that there was a higher degree of self-organisation amongst farmers practicing this method through their involvement in a federation of local cooperatives. Hailu et al. (2015)

also touch upon a very similar theme as they examine the effect of climate change resilience strategies on the productivity of the common bean. They find that technical approaches such as row intercropping (growing two different crops in alternate rows), the use of compost and furrow planting (planting vegetables in a shallow trench) enhance the ability of crops to survive climate-induced disturbances.

Siber et al. (2015) also explore agricultural resilience to underline the critical importance of practice in 'climate resilient sustainable agricultural practices' (CSRA). This encompasses a basket of practices ranging from the use of drought-tolerant local crop varieties, soil and water conservation, rainwater harvesting, practicing mixed cropping, crop rotation, and agroforestry. Nayak et al. (2015) study the resilience of groundwater in parts of Punjab, India by deploying a Water Evaluation and Planning model. Their modelling reveals that decreasing the cultivation of rice by 25% greatly enhances the resilience of underground aquifers.

Haworth and Bruce (2015) examine resilience to natural hazards and disasters to argue that the practice of private citizens generating and sharing online geospatial data presents new opportunities for the creation and dissemination of disaster-related geographic data. Mugume (2015) also consider resilience in the context of hydro-meteorological disturbance to argue that traditional methods of testing

The practice of private citizens generating and sharing online geospatial data presents new opportunities for the creation and dissemination of disaster-related geographic data.

the resilience of urban drainage systems that mostly rely on an understanding of how the system would function in case of overloading (e.g. through flooding caused by extreme rainfall events) are inadequate. Instead the authors argue for a more evolved approach to assessing resilience which includes an analysis of upper and lower limits of the simulation results for total flood volume (failure magnitude) as well as average flood duration.

Nagata (2015) deploys a robust analytical framework to demonstrate the manner in which 'social support' amongst members of a community can enhance resilience to food insecurity. The authors unpick different forms of social support to argue that practical help, loans and labour in kind given by community members to others are vital for fostering food security. In this way, the paper makes a case for enhancing the ability of communities to exchange certain kinds of social support as a valuable strategy to build resilience to food shortages.

4.2 Theory and frameworks

Papers that present insights on theoretical approaches to enhancing or understanding resilience articulate:

- A need for coupling the concepts of sustainability and resilience

- The core tenets (regardless of sector) that must be incorporated in any resilience program

- The components that need to combine to deliver urban resilience

- A methodology to diagnose the health of interdependent ecological-economic systems

- Key theoretical constructs that need come together in any framework guiding resilience interventions

- The value of using fuzzy logic for understanding the resilience of particular areas

- The value of using the concept of resilience vs. other forms of risk management for enhancing national security

- The urgency of ensuring that resilience makes the transition from 'concept' to a 'practice' that influences urban planning

9 papers present insights on theoretical approaches to enhancing or understanding resilience. The highly topical article by Rodriguez-Nikl (2015) approaches the allied concepts of resilience and sustainability from an engineering perspective. It provides an understanding of the manner in which the paradigms of resilience and sustainability need to be effectively coupled more closely than current practice. The

The health of eco-economies comprises three elements 'vigor', 'organization' and 'resilience'.

authors argue that sustainability is usually concerned with ordinary events that have relatively high probabilities and low impacts while resilience concerns itself with 'extraordinary events' that have relatively low probabilities and high impacts. A premise of the paper is that the extraordinary events considered by those looking at resilience play an equally important role in sustainability because they affect the environmental, social, and economic aspects of our built environment, which in turn influences their sustainability.

A paper by Dahlberg (2015) approaches the theoretical aspects of the resilience debate from yet another perspective by providing a pithy analysis of the variety of ways in which resilience is understood. The authors examine resilience in the context of pastoral care and trauma management, US federal policy on emergency management and Disaster Risk Reduction (in the context of the Hyogo Framework for Action) to argue that the common characteristics of preparedness, survival, adaptability, experience, coordination, and cooperation tie these varied interpretations together. On the whole, the paper makes a strong argument for the use the term in a way that incorporates these core tenets. Bozza et al. (2015) also attempt to examine the components that contribute to resilience. Operating in the context of disasters and urban areas, the authors argue that urban systems have infrastructural, economic and social components, all mutually interacting through a dynamic network of relationships; each needs adequate consideration in any process to enhance urban resilience. The paper is innovative in that it sheds light on developing quantifiable indicators to measure quality of life and the social sustainability of cities, factors that the authors consider to be key to enhancing urban resilience.

Wang et. al. (2015) also identify components of resilience, presenting a methodology to diagnose the health of interdependent ecological-economic systems (also known as eco-economies). They argue that the health of eco-economies comprises three elements 'vigor', 'organization' and 'resilience'. 'Vigor' is a function of ecological and economic productivity, 'organization' of economic, social and natural structures and 'resilience' of input capacity and stability. Similarly, the article by Miles (2015) stems

from the premise that the field of disaster resilience, in its sharp focus on developing indicators and practical methodologies has overlooked the development of robust theoretical frameworks. The paper goes on to propose such a framework with four key constructs: wellbeing, identity, services, and capitals. The framework argues that community 'wellbeing' is dependent on 'capitals' (cultural, political, social, human, built, economic and natural resources) and the relationship between wellbeing and capitals is mediated by 'services' (redundancy, robustness, connectedness etc.) and 'identity' (adaptability, diversity, continuity etc.). These four elements need to work together to ensure the resilience of communities in the face of disasters. Batisha (2015) presents a rich discussion on identifying the degree to which the Nile delta is resilient to climate change by using the fuzzy logic decision making technique. The authors finds fuzzy logic to be particularly useful in evaluating situations that deal with ambiguity and vagueness, involve subjectivity, and imprecise information, a scenario that is not uncommon for those wishing to measure resilience in different settings.

Helm (2015) engages in a theoretical examination of resilience by comparing it to earlier concepts of risk management. The, author who works with the Department of the Prime Minister and Cabinet in New Zealand, argues that security today can no longer be guaranteed through risk management alone, where the focus is on known threats, hazards and societal vulnerabilities. Instead it puts forth a blueprint for a new approach to national security that entails a multi-layered approach involving systems planning, risk management, resilience building, and adaptive responses. The authors demonstrate the manner in which resilience provides a better basis for security planning in uncertain or complex situations than risk management. This is because as a concept, it is more concerned with 'outcomes' (or how a system fairs during and after disturbances) rather than being focussed on only 'inputs' (or judging the manner in which a system might fair through disturbances by analysing pre-determinable assets/resources).

A final paper that engages with this theme by Coaffee and Clarke (2015) springs from an impatience with the slow transition of resilience from 'concept' to a 'practice' that influences urban planning. The authors demonstrate how the 'resilience turn' has had a number of benefits for planning including foregrounding risk in planning processes, considering multiple, dynamic risks and highlighting the importance of collaborative decision making. Even though the authors provide examples of the manner in which resilience has led to positive changes to planning regimes, they argue that a resilience implementation gap remains and must be bridged. They present the case of the impact of Hurricane Sandy to argue that prior to the storm, the word resilience was everywhere but there was scant evidence of actual planning for resilience.

4.3 Governance and policy

Papers that engage with the themes of governance, policy and resilience articulate:

- The importance of fixing roles and responsibilities for enhancing resilience during disasters
- The need for drawing on concepts of resilience to guide policies aimed at peace building
- The pitfalls of focussing on stability as opposed to adaptability in resilience policies
- The value of looking at vulnerability even when considering the resilience of infrastructural systems
- The manner in which decentralisation can contribute to resilience
- The ways in which economic sanctions can sometimes enhance the resilience of the regimes against which they are directed
- The reasons for the resilience of the neo-liberal economic system
- The reasons for the resilience of the Chinese Communist Party

Ten papers present an analysis of the governance and policy arrangements needed to enhance resilience and the resilience of certain governance arrangements and policy models. A typical member of this cluster of papers is the article by Sciulli (2015) that focusses on the 2010/2011 floods in Victoria, Australia to argue for a greater consideration of the clear demarcation of responsibilities for enhancing resilience. The author underlines the urgency of developing a more coherent policy stance by demonstrating how mixed messages were being communicated by the government to the public. These ranged from those that supported the provision of as much governmental assistance as needed to rebuild communities following an extreme weather event, to those that encouraged communities to become more resilient themselves. Similarly, Porfiriev (2015) too provides suggestions on optimal policy environments for resilience. The author considers climate change to be a potential impediment to economic development and argues for the integration of disaster risk reduction and climate change adaptation policies as both sets of policies concern themselves with mapping the likelihood of certain events, analysing potential impact and gauging the degree to which society is prepared. The paper highlights the role of formal institutions but also the mainstream media in bridging these somewhat parallel streams of international and national policies. Bargués-Pedreny (2015) adds to these voices and

provides a strong case for using resilience as a primary lens for policies aimed at peace building. The authors argue that by focussing on facilitating resilience, governance approaches can move away from top-down liberal peace models to experiment with long-term, iterative and relational processes, respectful of local realities.

Sage et al. (2015) also provide policy prescriptions to enhance resilience. The paper reviews examples of policies for infrastructure governance and use in the UK to argue that the current notions of resilience embedded within these are inadequate. This is primarily because these are geared towards ensuring stability as opposed to adaptability. The authors argue that while this widely prevalent emphasis on stability has its advantages, in that it permits the testing of the 'efficacy' of current procedures, assets, and policies, it is not geared to understanding how systems would perform under unpredictable, long-term changes. Importantly, the paper argues that assertions made by institutions such as the United Nations Office for Disaster Risk Reduction that varying interpretations of resilience currently in circulation are compatible may not be accurate as there are important trade-offs between those perspectives that privilege stability over those that highlight the importance of adaptability. Overall, the paper is a clarion call for a more deliberate and rigorous engagement with socio-ecological interpretations of resilience in the design of policy responses that aim to ensure that infrastructural systems function through disturbances. Agarwal (2015) also engages with the idea of infrastructural resilience. This paper stems from the premise that vulnerability is a concept that is widely used in the context of the resilience of social and ecological systems but that its potential is not exploited to the optimal level when considering the resilience of infrastructural systems. The author argues that infrastructural systems have come to incorporate social and behavioural dimensions (through, for

By focussing on facilitating resilience, governance approaches can move away from top-down liberal peace models to experiment with long-term, iterative and relational processes, respectful of local realities.

instance, the organisations that govern infrastructure use and development) and therefore deploying the idea of vulnerability is valid and it is the urgent call of the hour to understand how these vital systems can function through disturbances.

Chelleri et al. (2015) argue that urban resilience must move beyond a conservative concept for planning deployed to tackle specific vulnerabilities to become a concept that is used for enabling transformation. Taking the case of a recent urban regeneration and development plan, the "Mexico City Green Plan", the authors demonstrate its potential for effecting transformation through decentralised water management and service delivery. The article argues that while the plan adequately provides adaptation actions necessary to support resilience, it fails to adequately address the political barriers (community engagement, education and empowerment) that will ensure transformation through decentralisation. Vaidya (2015) also focusses on water management to argue that developing systems for local and decentralised water storage enhances resilience to water insecurity. This is because decentralisation provides communities control over water supply which in turn allows them to use it to deal with fluctuations in water availability from other sources (e.g. rainfall); it encourages the community to participate in watershed management and in the maintenance of healthy ecosystems; it also encourages collective action, self-governance and community mobilisation over water that enhances the ability of communities to coordinate better to deal with water shocks in the long term. The authors argue that systems of local water storage can only be successful when government interventions do not interfere with traditional institutional arrangements, when local NGOs are asked to participate, and when local government institutions (such as village councils) play a role in dispute resolution.

A number of papers do not directly comment on the governance arrangements necessary to enhance resilience but instead examine the resilience of systems of governance instead. A good example of such a paper is by Naghavi and Pignataro (2015) who examine the resilience of political systems, in particular those systems that have had economic sanctions imposed upon them by the west. The authors argue that while in some situations sanctions can serve to weaken the state, in others they may serve to legitimise an incumbent government mobilising calls to a religious ideology and further stabilising its grip on power. The authors use the case of Iran to illustrate key arguments that show how sanctions have not only fallen short of achieving their

Urban resilience must move beyond a conservative concept for planning deployed to tackle specific vulnerabilities to become a concept that is used for enabling transformation.

goals here, but have instead bolstered the regime by further stabilising their roots and empowering their policies. The paper then goes onto provide an economic model to study these dynamics empirically.

Similarly Sindzingre (2015) asks 'Why, despite decades of demonstrations of theoretical errors and practical inefficiency, is 'neoliberalism' still a predominant framework within economics and policy-making?' The paper is focussed on Sub-Saharan Africa and first seeks to understand the nature of neo-liberal policies unfolding in the region and then examines the reasons for the resilience of this paradigm. The authors find that the resilience of the neo-liberal paradigm emanates from the strength of international institutions such as the IMF and the adaptability of those supporting neo-liberal policies to explain away inconsistencies in their approach. Another paper in this category is focusses on the resilience and adaptability of the Chinese Communist Party as seen through the restructuring of the party's organisational structures in China's urban business districts (Han, 2015). The author demonstrates that in 1956, 83% of the Party's base was composed of workers and peasants compared to just 29% in 2005. To engage with the massive structural shifts in economy and society for maintaining the 'resilience' of its authority, the Party restructured territorially to open offices in urban business districts and adapted organisationally to open units in organisations such as chambers of commerce and trade associations. These changes have allowed the party to stay relevant and thereby gain support from the non-state sector for party building and the recruitment of party members.

4.4 Marginalisation and inclusion

Papers that engage with the themes of marginalisation, inclusion and resilience articulate:

- The particular needs of people with intellectual disabilities during disasters
- The value of indigenous knowledge and cultural practices in processes of building resilience
- The importance of considering children as active agents of change in enhancing resilience
- The usefulness of including a diversity of voices in planning processes for enhancing resilience
- The importance of considering the narratives and stories of resilience when designing programs

9 papers engage with the themes of marginalisation and inclusion in the context of resilience. Stough (2015) highlights the manner in which individuals with intellectual disabilities are more vulnerable to disasters than the general population. This is because they are often excluded from relief processes and are disadvantaged in disaster support situations. They also often have needs for assistive technology and special rehabilitative services. The authors provide a case study of Costa Rica to demonstrate the manner in which those with intellectual disabilities are likely to live in older buildings due to higher levels of poverty and are therefore highly exposed to certain kinds of risk. The article makes a case for enhancing the resilience of this group of individuals through improving their access to mainstream systems and services and providing adequate, targeted funding for recovery and disaster mitigation.

Paulraj and Andharia's (2015) article is based on a close study of the indigenous Konyak community in Nagaland, India and records the manner in which indigenous knowledge and cultural practices can enhance resilience to disasters. The author demonstrates that traditional practices such as storing grain in secluded locations away from residential compounds (to protect these from the possibility of fire or attacks from other communities), ensuring the participation of village elders in drainage planning processes (to integrate their inherited understanding of local topography), building houses with a traditional sloping roof (to reduce the impact of high velocity winds), all successfully contribute to the resilience of the local community. The article underlines an urgent need to rethink the somewhat scientist and Eurocentric models of knowledge considered legitimate in enterprises of building resilience.

Haynes and Tanner (2015) examine another marginalised group to illustrate how young people regularly face great hurdles in getting their voices heard. They claim that research and practice in the disaster and climate change community commonly represent young people as passive victims requiring protection. The authors present empirical data from participatory video activity undertaken with groups of young people in three communities in Eastern Samar in the Philippines and argue that this process was an effective tool for them to raise important issues with decision makers and advocate change on behalf of their communities. The article describes how community members noted the manner in which young people with videos, were better able to communicate the community's message to decision makers than adults would. This was because adults were thought to be restricted and even if the film portrayed an honest account it would be interpreted as biased.

A similar theme is also elucidated in the article by Watson (2015), that argues how in in portrayals of contemporary conflict and post-conflict situations, we most often think of children as victims but given that they are disproportionately affected by conflict, children should be placed centre stage as agents for peace themselves. Even though Shah (2015) also talks about children, his paper takes a different perspective. He discusses the process of including children in enterprises of building resilience to conflict in Palestine through educational programs. He says that even though this has yielded some positive results (such as reduced nightmares, enhanced social capital, better counselling of children), it sidesteps critical issues, serves to depoliticise the context of conflict and transforms the ongoing occupation into a series of symptoms to be 'treated'. The paper shows how, under the banner of supporting resilience, education is positioned as a means to support the construction of individuals, communities and societies who are able to operate in a more adaptive, responsive and flexible way in situations of instability and crises. In doing so, resilience serendipitously and tacitly does not contribute to challenging the status quo.

James and Paton (2015) highlight the importance of including aspects of local social dynamics and culture on initiatives to enhance disaster resilience. In particular, they take the case of communities in Taiwan and Burma using the 921 earthquake and

Culture is vitally important and can support resilience.

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cyclone Nargis as examples. The paper provides numerous instances of the manner in which these issues supported vulnerable communities in dealing with shocks and stresses. The authors argue that in collectivistic societies like Myanmar and Taiwan, social capital is extremely important in times of disaster, and is often the first resort in beginning the relief, recovery and reconstruction processes ahead of any official governmental or civil society programs. They also argue that culture is vitally important and can support resilience as for instance, in Taiwan the Hakka cultural predisposition of frugality and belief in coexisting with the environment supports aspects of preparedness for disaster.

This emphasis on including a diversity of perspectives in processes to enhance resilience is also evident in the paper by Goldstein et al. (2015). This paper makes a strong call for acknowledgement of how 'narratives' or the ways in which different stakeholders view problems can have a major influence on processes to enhance urban resilience. The authors use three case studies to demonstrate that stories are carriers of meaning, interpretations and rationales and "…help us to account for how our urban worlds are arranged as well as how they might be deliberately adjusted and transformed." The paper argues that generalised templates for enhancing urban

resilience that do not accommodate the divergent and subjective worldviews of urban residents tend to shift focus from political to technical questions and can erode resilience instead of enhancing it. An emphasis on narratives is also seen in the paper by Mosavel et al. (2015). The paper examines narratives of everyday risks and stressors faced by South African youth part of the study (e.g. violence, deprivation, insecurity) and investigate pathways of resilience. The authors argue that these narratives reveal the manner in which the youth considered laws and regulations, community facilities, social services and poverty alleviation to be the main factors that were critical to enhancing their resilience.

This theme of including a diversity of perspectives is also picked up Odemerho (2015). The author engages with the problem of flooding in Wari, Nigeria to demonstrate the potential pitfalls of an exclusive and expert-led process to determine adaptation actions. Participatory flood risk assessments carried out in the area provide a richer account of the reasons for flooding by highlighting developmental and political challenges. These assessments also supply a broader range of adaptation and resilience-building options as compared to analyses led by experts only.

4.5 Business and economics

Papers that engage with the themes of business, economics and resilience articulate:

• The impact of flooding on tourism

• The importance of micro-enterprises undertaking actions to become more resilient

• The value of ensuring that people's voices are part of any plans aimed at infrastructural development

• Ways of controlling externalities (e.g. pollution) from economic activity

• The relationship between resilience to food shocks and international trade

Five papers engage with the theme of business and economics in the context of resilience. Ghaderi et al. (2015) focus on the tourism industry and investigate the effects of the floods which covered parts of Thailand in 2011. The findings suggest the public and private sectors were severely affected by the disaster, but they recovered after a relatively short period of time and business soon returned to normal. This was because of numerous reasons that included previous experience of similar crises, the participation of the private sector in disaster management and an aggressive marketing campaign by the government to attract tourists back to the city after the floods. This said, more needed to be done in order to enhance the resilience of the city such as the use of cutting-edge engineering solutions, improved generation and dissemination of risk information, and better organisation within the tourism sector for a joined-up response should a similar disaster strike again.

Prasad (2015) examines resilience and business by analysing the manner in which micro enterprises have been found to be particularly vulnerable to disaster-related shocks emanating from their supply chains as they have limited internal resources, lack the capacity to acquire formal assistance in times of need, and are less likely to have access to formal credit and insurance markets. The authors argue that an organisation's recognition of potential causes of disruptions, its ability to learn from disturbances, deep and wide ties with suppliers and customers, strong social bonds between employees and the respect and trust it enjoys from members of the supply chain all contribute to its resilience.

Kumaraswamy et al. (2015) in their highly innovative article make a strong case for bringing 'people' to the centre of public-private partnerships (PPP) for delivering infrastructure. The authors approach the case for a much bolder acceptance of the pivotal nature of human relationships in PPP arrangements from a number of perspectives. A key strain running through their analysis is that resilience demands flexibility which results from soft/informal relationships between parties engaged in delivering or receiving infrastructural services from any PPP. Tobon et al. (2015) talk about the manner in which instruments to control 'externalities' of economic activity either prescribe to the command and control model (i.e. regulation) or offer incentives to reduce these externalities. The authors then deploy general equilibrium modelling to understand the manner in which economic incentives could reduce pollution from an economic sector. They find that economic incentives help keep pollution levels down to where they do not disrupt natural cycles.

Suweis et al. (2015) present a methodology and framework for understanding the resilience of countries to food shocks. They evaluate food security by relating population growth to the availability of food sufficient to meet country-specific demands. The authors argue that demographic shifts and increases in population that exacerbate resource scarcity are serious threats to the food security of certain countries. They find that as the dependency on trade increases, the global food system is losing resilience and is becoming increasingly unstable and susceptible to conditions of crisis.

References

Agarwal, J. (2015) Improving resilience through vulnerability assessment and management. *Civil Engineering and Environmental Systems*. 32 (1-2). p.5-17.

Barnard, S. (2015) *Climate finance for cities*. London: Overseas Development Institute.

Bargués-Pedreny, P. (2015) Realising the post-modern dream: strengthening post-conflict resilience and the promise of peace. *Resilience*. 3 (2). p.113-132.

Batisha, A.F. (2015) Implementing fuzzy decision making technique in analyzing the Nile Delta resilience to climate change. *Alexandria Engineering Journal*.

Béné, C.F., Godfrey Wood, R., Newsham, A., and Davies, M. (2012) *Resilience: new utopia or new tyranny? Reflection about the potentials and limits of the concept of resilience in relation to vulnerability reduction programmes*. Brighton: Institute of Development Studies.

Béné, C. F. et al. (2015) *Design, Monitoring, and Evaluation of Resilience Interventions: Conceptual and Empirical Considerations*. Brighton: Institute of Development Studies.

Bozza, A. Asprone, D., and Manfredi, G. (2015) Developing an integrated framework to quantify resilience of urban systems against disasters. *Natural Hazards*. p.1-20.

Burke, L. R. (2015) *Revaluing ecosystems: pathways for scaling up the inclusion of ecosystem value in decision making*. Washington D.C.: World Resources Institute.

Chatterjee, S. (2015) *Climate Change Risks and Resilience in Urban Children in Asia*. London: IIED.

Chelleri, L., Schuetze, T., and Salvati, L. (2015) Integrating resilience with urban sustainability in neglected neighborhoods: Challenges and opportunities of transitioning to decentralized water management in Mexico City. *Habitat International*. 122 (130).

Coaffee, J. and Clarke, J. (2015) On securing the generational challenge of urban resilience. *Town Planning Review*. 86 (3). p.249-255.

Crawford, A. (2015) *Climate change and state fragility in the Sahel*. FRIDE.

Crawford, A. D. (2015) *Promoting climate-resilient peacebuilding in fragile states*. Geneva: IISD.

Dahlberg, R., Johannessen-Henry, C.T., Raju, E., and Suhella, T. (2015) Resilience in disaster research: three versions. *Civil Engineering and Environmental Systems*. 32 (1-2). p.44-54.

Ghaderi, Z., Mat Som, A.P., and Henderson, J.C. (2015) When disaster strikes: the Thai floods of 2011 and tourism industry response and resilience. *Asia Pacific Journal of Tourism Research*. 20 (4). p.399-415.

Goldstein, B.E. (2015) Narrating resilience: transforming urban systems through collaborative storytelling. *Urban Studies*. 52 (7). p.1285-1303.

Green, S. (2015) *Resilience Building in Tanzania: Learning from Experiences of Institutional Strengthening*. London: IIED.

Hailu, N., and Fininsa, C. (2015) Effect of climate change resilience strategies on productivity of common bean (Phaseolus vulgaris L.) in Semi-arid areas of eastern Hararghe, Ethiopia. *African Journal of Agricultural Research*. 10 (15). p.1852-1862

Haynes, K., and Tanner, T.M. (2015) Empowering young people and strengthening resilience: youth-centred participatory video as a tool for climate change adaptation and disaster risk reduction. *Children's Geographies*. 13 (3). p.357-371.

Han, Z. (2015) Party building in urban business districts: organizational adaptation of the Chinese Communist Party. *Journal of Contemporary China*. 24 (94). p.644-664.

Haworth, B., and Bruce, E. (2015) A review of volunteered geographic information for disaster management. *Geography Compass*. 9 (5). p.237-250.

Helm, P. (2015) Risk and resilience: strategies for security. *Civil Engineering and Environmental Systems*. 32 (1-2). p.100-118.

IFRC. (2015) *Gender and diversity for urban resilience: An Analysis*. International Federation of Red Cross and Red Cross Societies.

IIED. (2015) *Strengthening frameworks to monitor and evaluate climate adaptation in Uganda*. London: IIED.

Jacobi, J., Schneider, M., Bottazzi, P., Pillco, M., Calizaya, P., and Rist, S. (2015a) Agroecosystem resilience and farmers' perceptions of climate change impacts on cocoa farms in Alto Beni, Bolivia. *Renewable Agriculture and Food Systems*. 30 (2). p.170-183.

Jacobi, J., Schneider, M., Bottazzi, P., Pillco, M., Huber, S., Weidmann, S., and Rist, S. (2015b) Farm resilience in organic and nonorganic cocoa farming systems in Alto Beni, Bolivia. *Agroecology and Sustainable Food Systems*. 39 (7), 798-823

James, H., and Paton, D. (2015) Social capital and the cultural contexts of disaster recovery outcomes in Myanmar and Taiwan. *Global Change, Peace & Security*. 27 (2). p.207-228.

Jaswal, S. S. (2015) *Climate Change, vulnerability, and adaptive social protection*. London: IIED.

King-Okumu, C. (2015) *A framework to assess returns on investments in the dryland systems of Northern Kenya*. London: IIED.

Kratli, S. (2015) *Valuing Variability*. London: IIED.

Kumaraswamy, M., Zou, W., and Zhang, J. (2015) Reinforcing relationships for resilience – by embedding end-user 'people' in public–private partnerships. *Civil Engineering and Environmental Systems*. 32 (1-2). p.119-129.

Mason, S. K. (2015). *Accessing and using climate data in fragile, data-poor states*. IISD.

Miles, S.B. (2015) Foundations of community disaster resilience: well-being, identity, services, and capitals. *Environmental Hazards*. 14 (2). p.103-121.

Mitra, A. W. (2015) *Wheezing ecosystems, livelihood services, and climate change resilience in Uttar Pradesh*. IIED.

Mosavel, M. (2015) South African, urban youth narratives: resilience within community. *International journal of adolescence and youth*. 20 (2). p.245-255.

Mugume, S.N. (2015) A global analysis approach for investigating structural resilience in urban drainage systems. *Water Research*. 81. p.15-26

Nagata, J.M., Fiorella, K.J., Salmen, C.R., Hickey, M.D., Mattah, B., Magerenge, R., Milner, E.M., Weiser, S.D., Bukusi, E.A., and Cohen, C.R. (2015) Around the table: food insecurity, socioeconomic status, and instrumental social support among women living in a rural Kenyan island community. *Ecology of Food and Nutrition*. 54 (4). p.358-369.

Naghavi, A. and Pignataro, G. (2015) Theocracy and resilience against economic sanctions. *Journal of Economic Behavior & Organization*. 111. p.1-12.

Nayak, P.C., Wardlaw, R., and Kharya, A.K. (2015) Water balance approach to study the effect of climate change on groundwater storage for Sirhind command area in India. *International Journal of River Basin Management*. 13 (2). p.243-261.

Odemerho, F. O. (2015) Building climate change resilience through bottom-up adaptation to flood risk in Warri, Nigeria. *Environment and Urbanization*. 27 (1). p.139-160.

Ovadiya, M. K. (2015) *Social Protection in Fragile and Conflict-Affected Countries*. Washington D.C: World Bank.

Paulraj, J., and Andharia, J. (2015) Resilience of indigenous peoples to disasters: an exploration of practices of Konyak community, Nagaland. *European Scientific Journal*. 11(10),

Porfiriev, B. (2015) Climate change as a major slow-onset hazard to development: an integrated approach to bridge the policy gap. *Environmental Hazards*. 14 (2). p.187-191.

Prasad, S., Su, H.C., Altay, N., and Tata, J. (2015) Building disaster-resilient micro enterprises in the developing world. *Disasters*. 39 (3). p.447-466.

Rodriguez-Nikl, T. (2015) Linking disaster resilience and sustainability. *Civil Engineering and Environmental Systems*. 32 (1-2). p.157-169.

Sage, D., Sircar, I., Dainty, A., Fussey, P., and Goodier, C. (2015) Understanding and enhancing future infrastructure resiliency: a socio-ecological approach. *Disasters*. 39 (3). p.407-426.

Sciulli, N. (2015) New development: flood events continue to raise issues of public sector accountability. *Public Money & Management*. 35 (3). p.239-244.

Schipper, L., & Pelling, M. (2006) Disaster risk, climate change and international development: scope for, and challenges to, integration. *Disasters*. 30(1). p.19-38.

Shah, R. (2015) Protecting children in a situation of ongoing conflict: is resilience sufficient as the end product? *International Journal of Disaster Risk Reduction*.

Sindzingre, A.N. (2015) Whatever inconsistencies and effects? Explaining the resilience of the policy reforms applied to developing countries. *Forum for Social Economics*. 44 (2). p.159-178.

Stough, L.M. (2015) World report on disability, intellectual disabilities, and disaster preparedness: Costa Rica as a case example. *Journal of Policy and Practice in Intellectual Disabilities*. 12 (2). p.138-146.

Suweis, S., Carr, J.A., Maritan, A., Rinaldo, A., D'Odorico, P. (2015) Resilience and reactivity of global food security. *Proceedings of the National Academy of Sciences*

Sugden, J. (2015) *Climate-smart agriculture and smallholder farmers: The role of technology*. Practical Action.

Tobón, D. Molina, C., and Vasco, C.A. (2015) Scope of economic incentives and abatement technologies to regulate a natural system's resilience in a general equilibrium model. *World Bank Economic Review*.

UN Habitat III. (2015) *Issue Paper 15 - Urban Resilience*. Retrived from: http://unhabitat.org/wp-content/uploads/2015/04/Habitat-III-Issue-Paper-15_Urban-Resilience-2.0.pdf.

Vaidya, R.A. (2015) Governance and management of local water storage in the Hindu Kush Himalayas. *International Journal of Water Resources Development*. 31 (2). p.253-268.

Wang, Z.T., Yang, L., Guo-Jun, C., Bao-Ru, M., and Chai, C.S. (2015) A quantitative health evaluation of an eco-economy in the semi-arid Loess Plateau of China. *Human and Ecological Risk Assessment*. 21 (7). p.1884-1902.

Watson, A.M.S. (2015) Resilience is its own resistance: the place of children in post-conflict settlement. *Critical Studies on Security*. 3 (1). p.47-61.

Annex 1: Methodology for blog searches

Methodology

Given the long-form nature of blogs, the utility of online media monitoring software[1] to capture and analyse blog data can be limited. In contrast with short-form social media, the discursive characteristics of blogs (comments, response posts, linking, etc.) require a different approach to data gathering and analysis, which involves more manual (vs software-based) search and analysis of blog posts. The basic approach is based on the metrics of visibility and (online) impact and engagement, and comprises three phases: exploratory blog search and ranking, identification of top blog posts and thematic analysis of blog posts.

1. Who are the top influencers in resilience blogging?

Measuring visibility

The purpose of this initial step is to offer a bird's-eye view of the resilience blogosphere

a. Using blog search engines, Boolean search queries were performed to identify blogs[2] that publish about resilience in different contexts[3]. This initial exploratory search identified the top 50 resilience blogs, with the criteria being how visible the relevant blog content is on the web. This ranking was derived by a score based on Google PageRank[4], Page Authority[5] Domain Authority[6].
b. The next step involved narrowing down the list to the top 25 resilience blogs. With the initial list ranked by search engine visibility and content relevance, the 50-blog list was manually reviewed to exclude blogs that:

- Have low keyword/subject matter relevance.
- Are link farms and blog aggregators, which do not publish original content, or syndicate posts from other blogs.
- Have no active comment sections or measurable social sharing features.
- Posted no relevant updates in 2015.

2. Who published the most popular blog posts on resilience in 2015?

Measuring impact

A complete manual review and analysis of resilience-related blog posts published in 2015 was performed, and the top 25 blog posts published on resilience in 2015 were identified based on metrics of social shares and comments/reader engagement.

A score was derived by aggregating the following metrics:

- Blog comments
- Facebook shares
- Facebook 'likes'
- Facebook comments
- Twitter shares
- LinkedIn shares

The list was then ranked by aggregate impact score to present the top 25 resilience blog posts of 2015.

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1   A large number of multi-platform online media monitoring software applications is available, such as HootSuite, Twitonomy, Klout, SimplyMeasured (among others) for Twitter and Facebook analytics.

2   In this report, *blogs* refers to weblogs or blogsites (websites that publish blog entries), whereas blog posts refers to discrete, dated published blog entries or articles.

3   For blog discovery purposes, the sectors/keywords used are: Climate, Agriculture, Urban, Water, Disasters, Food Security and Conflict.

4   An algorithm used by Google to rank websites in search results.

5   A predictive score that measures the relevance of information on a specific page on a website, and how well it will rank on search engines. This is useful when looking at specific blog pages within large websites.

6   A predictive score of how well a whole domain, or subdomain, will rank on search engines. It is a good indicator of the overall visibility of a whole website, not just specific pages within it.

Table 1: Top 25 resilience blog posts in 2015, ranked by visibility on social networks

Rank	Blog name and shortened hyperlink	Blog post title	Author	Context	Social visibility score
1	Guardian Resilient Cities http://bit.ly/1MrzuJx	How to build a city from scratch: the handy step-by-step DIY guide	Stuart Jeffries, Guardian columnist	Urban resilience	3520
2	British Red Cross blogs http://bit.ly/1HXpa5X	We need money, not goods, for Nepal	Mark Cox, Red Cross	Disaster resilience	2336
3	Greenpeace Africa blog http://bit.ly/1Mrzv0j	Celebrating Ecologically Farmed Food in Nairobi	Taahir Chagan, Greenpeace	Agricultural resilience	1054
4	Politics of Poverty, Oxfam America http://bit.ly/1JCvNup	Praised Be: Pope Francis's call to action on climate	Heather Coleman, senior policy advisor on climate change, Oxfam America	Climate change resilience	561
5	World Resources Institute http://bit.ly/1SFQwm1	Green Climate Fund Moves Forward: Will Soon Disburse Climate Finance through 7 Institutions	Louise Helen Brown and Athena Ballesteros, World Resources Institute	Climate change resilience	538
6	Environment 360 @ Yale http://bit.ly/1SFQxGJ	Resilience: A New Conservation Strategy for a Warming World	Jim Robbins	Climate change resilience	509
7	100 Resilient Cities http://bit.ly/1HXpamc	Resilience Resolutions for 2015	David Schreiner, 100RC Digital Communications and Marketing Manager	Urban resilience	507
8	Responding to Climate Change http://bit.ly/1HXp8Lm	Mapped: Voices of people most vulnerable to climate change	Sophie Yeo, RTCC	Climate change resilience	497
9	Business Green http://bit.ly/1JCvNea	UN warns of escalating cost of climate disasters	James Murray, Founding Editor, BusinessGreen	Disaster resilience	460
10	SciDev http://bit.ly/1SFQwlW	Learning resilience from Peru's ancient civilisations	Rodrigo de Oliveira Andrade, SciDev	Agricultural resilience	350
11	IDS blogs http://bit.ly/1SFQwm0	A future without hunger?	Stephen Devereux, Research Fellow, Rural Futures cluster at IDS	Food security resilience	305
12	Environment 360 @ Yale http://bit.ly/1JCvLD4	Agricultural Movement Tackles Challenges of a Warming World	Lisa Palmer, public policy scholar at The Woodrow Wilson Center	Agricultural resilience	303
13	New Security Beat http://bit.ly/1JCvLD5	Water Wars? Think Again: Conflict Over Freshwater Structural Rather Than Strategic	Cameron Harrington, University of Cape Town	Water resilience	289
14	Environmental Defense Fund http://bit.ly/1JCvNeb	How agriculture's resilience to climate change benefits us all	Sara Kroopf, Agriculture Project Manager, EDF	Agricultural resilience	210
15	Resilience.org http://bit.ly/1CZ2lSq	Farming Starts in Cities	Gene Logsdon, author	Urban resilience	189
16	Carbon Brief http://bit.ly/1SFQxGl	Why is a disaster risk reduction deal important for climate change?	Sophie Yeo	Disaster resilience	187
17	The Rockefeller Foundation Blog http://bit.ly/1SFQwlX	Are We Resilient Yet?	Cristina Rumbaitis Associate Director, Kimberly Junmookda, Program Associate, Phiradol Koopthavonrek, Program Associate. All at The Rockefeller Foundation.	Urban resilience	168

Rank	Blog name and shortened hyperlink	Blog post title	Author	Context	Social visibility score
18	World Bank Blogs http://bit.ly/1SFQwlZ	Finding the future: Building the case and supporting effective carbon pricing	Rachel Kyte, World Bank Group vice president and special envoy for climate change.	Climate change resilience	166
19	FAO blogs http://bit.ly/1SFQxGA	Climate-smart agriculture: propaganda or paradigm shift?	Vanessa Meadu, Global Communications and Knowledge Manager, CCAFS	Agriculture resilience	145
20	Politics of,Poverty, Oxfam America http://bit.ly/1JCvNuo	Will Businesses 'Walk the Walk' and 'Talk the Walk' on the Road to Paris?	Irit Tamir, Senior Campaigns and Advocacy Advisor	Climate change resilience	109
21	Post Carbon Institute blog http://bit.ly/1SFQxGF	The Silver Lining in the California Drought	Sandra Postel Fellow, Post Carbon Institute	Water resilience	101
22	Natural Resources Defense Council http://on.nrdc.org/1HXp8Ln	Twitter Feud Alert: Michael Brown vs. Resiliency, Climate Science, and Policies That Keep Our Communities Safe	Becky Hammer, Project Attorney, Water Program, NRDC	Other	95
23	Resilience Science http://bit.ly/1SFQwlY	Critically reflecting on social-ecological systems research	Garry Peterson, Prof. of Environmental Science, Stockholm Resilience Centre	Other	69
24	ODI blogs http://bit.ly/1HXp8Ll	Will fault lines in Sendai signal a rocky 2015?	Tom Mitchell, Head of Programme, Climate and Environment, ODI	Disaster resilience	68
25	Open Democracy http://bit.ly/1SFQxGE	Climate change and security: here's the analysis, when's the action?	Dan Smith, secretary general of International Alert	Climate change resilience	59

Table 2: Breakdown of social sharing scores for top 25 resilience blog posts in 2015

Blog post rank	Blog comments	Facebook likes	Facebook Shares	Facebook comments	PlusOnes	Tweets	LinkedIn Shares
1	50	1653	773	215	62	312	455
2	2	1610	523	96	1	99	5
3	3	922	54	17	1	57	0
4	0	328	54	7		172	0
5	3	161	31	16	2	128	197
6	4	153	91	6	11	179	60
7	17	195	78	9	4	204	0
8	0	57	151	6	23	243	17
9	0	270	97	21	1	79	1
10	1	176	46	13	9	96	9
11	2	129	51	4	1	29	89
12	2	25	45	5	8	204	14
13	2	85	65	12	6	115	4
14		26	11	3	1	151	18
15		127	39	7	1	14	1
16	0	36	8	2	4	137	0
17	0	1	0	0	2	156	9
18	0	88	27	4	3	18	26
19		26	20	1	0	98	0
20		22	8	0	0	74	5
21	4	77	5	11	0	4	0
22	2	15	13	11	2	51	1
23	0	38	5	5		21	
24	1	2	3	0	0	61	1
25	3	12	5	0	12	15	12

Annex 2: Methodology for literature search

Grey Literature Search

The sample for the grey literature scan was generated by entering a series of key words (resilience and climate change, disasters, food security, agriculture, conflict, water, urbanisation, infrastructure, economics) into the databases of 37 organisations/networks with a track record of work on resilience (IIED, IISD, ODI, Resilience Alliance, Stockholm Resilience Centre, SEI, TERI, UEA, Tyndall Centre, FAO, WFP, TANGO, ISET, Oxfam, WRI, UCL, Chatham house, IFPRI, PreventionWeb, CDKN, FSIN, GFDRR, ICLEI, World Bank, ADB, RAND, UC Berkley, IPPR, OECD, ARUP, ILRI, IFRC, ICRC, UNDP, USAID, UNISDR, ActionAid, PracticalAction).

The search was geared towards including papers published between 1st October 2014 and 1st April 2015 and yielded 74 papers. A number of subjective exclusion criteria were applied to this sample to exclude papers that were a) sharply oriented towards policy advocacy for the World Conference on Disaster Risk Reduction (as these would be dated/less relevant to this scan); b) that were not relevant to developing countries; c) highly operational and meant for internal audiences within particular organisations (protocol and process documents); d) did not offer fresh perspectives or insights; and e) explicitly publicity oriented (e.g., brochures and flyers). Applying these criteria yielded 27 articles for analysis, which was undertaken through the use of mainly inductive approaches. This entailed a perusal of papers to determine the main themes that they engaged with and then clustering papers according to these themes before extracting the key insights that they provide. This methodology was employed to provide representative as opposed to comprehensive findings.

Academic Peer-Reviewed Literature Search

The literature review was performed using a methodology of three main steps described below. In order to maintain homogeneity in our approach, and as the methodology used for the 2014 scan has been validated, the approach is similar to the one used during the first round scan.

Step one: querying databases and applying primary exclusion criteria

As for the 2014 scan, two academic databases – Google Scholar and Ingenta Connect – were used and a list of relevant publications was collated from these. These databases were once again chosen because they include papers from a variety of publishers[7]. The nine keywords used to search for papers in these databases were:

- Resilience climate
- Resilience disasters
- Resilience agriculture
- Resilience food security
- Resilience conflict
- Resilience urban
- Resilience water
- Resilience economic
- Resilience infrastructure.

On Google Scholar[8] and Ingenta Connect, we applied the search to the titles of papers published since the last scan (December 2015). This first sample produced 180 papers for analysis (without duplicates). Based on the information provided in the abstract and the title, we then excluded:

- Papers with a primary focus or case study on industrialised/developed countries rather than low or middle income countries (as classified by the World Bank)
- Papers on ecological resilience (i.e. natural science-focussed rather than socio-ecological systems)
- Papers on technological resilience (usually linked to the resilience of computer systems and buildings)

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7   Web of Science has not been include directly in the systematic scanning for this period, a rapid scan on the first two key-words didn't highlight overlap. Web of Science will be include during the next scan which will be retroactive from January to June, so then missing paper will be added.

8   As previously, Research on Google Scholar was carried out using the incognito mode of the browser in order to avoid a bias in the results obtained.

- Papers on psychological resilience (where this was not overtly linked to our search areas).

Step two: Assessment to gauge relevance

The second step of the review entailed a detailed review of the 55 papers retained after stage 1. A more subjective assessment of the relevance of each paper was conducted at this stage. An ODI resilience expert reviewed the titles, keywords, abstracts to gauge:

a. Whether the paper would be of interest to the staff of the Rockefeller Foundation (based on an understanding of the Foundation's engagement with resilience); and
b. Whether the paper held insights that were applicable to wider contexts beyond those from which it originally sprang.

ODI