

Assessing *Resilience*
Building
Initiatives in **Africa**

A discussion on LDRI's 5i framework for evaluating
resilience-building programs

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Acronyms & Abbreviations

AfDB	African Development Bank
ARC	Africa Risk Capacity
ARV	Africa Risk View
AU	African Union
AU-DREA	African Union - Department of Rural Economy & Agriculture
CEWARN	Conflict Early Warning & Response Mechanism
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EM-DAT	Emergency Events Database
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GFDRR	Global Facility for Disaster Reduction and Recovery
GHA	Global Humanitarian Assistance
GHG	Greenhouse Gas Emissions
HFA	Hyogo Framework for Action
IGAD	Inter-Governmental Authority on Development
ODA	Official Development Assistance
SDG	Sustainable Development Goals
UNISDR	United Nations International Strategy for Disaster Reduction
WFP	World Food Program

Acknowledgements

This paper contains a collection of articles written by Joanne Kuria for a 5-part series on resilience published on the LDRI blog in late 2015 and early 2016. It also contains an additional synthesis she authored on the agriculture sector perspective of resilience in Africa. Through a review of available literature, she explored how the 5i framework elements related to each other and examples of real-world events where they were identifiable.

The 5i Framework was conceptualized by Muchiri Nyaggah as part of a project to develop a data and technology literacy program for non-state actors in the agriculture sector. He also contributed an article to the 5-part series that ran on the LDRI blog. He continues to lead further work in developing a toolkit for use by grassroots NGOs in sub Sahara Africa.

re·sil·ience [rə'zilyəns]

“ The ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions ”

United Nations Office for Disaster Risk Reduction (UNISDR),
“2009 UNISDR Terminology on Disaster Risk Reduction”,
Geneva, May 2009

Introduction

It was the winter of 1997-1998 when the granddaddy of El Niños — the one by which all other El Niños are judged — vaulted this name, now a common term associated with climate change, to household name status. In Kenya, El Niño led to the closure of schools, wide scale flooding, displacement of people and unfortunately, death. In the Far East in 2011, a tsunami dealt a catastrophic blow to Japan leaving massive destruction in its wake, and a staggering 18,000 people dead with thousands displaced. Besides crippling the nuclear industry, Japan's colossal economic setback was reported to be \$360 billion!

Disasters of varying magnitudes occur almost every year around the world with their effects becoming an increasingly greater global concern for governments. In Africa, natural disasters are increasing in number and frequency with obvious adverse impact on people. Disaster events have substantially increased the economic loss of poor communities – so much so that the impact of disasters on the African continent has had a negative impact on sustainable development (Africa Union, 2006).

Disaster risk reduction is a multidisciplinary issue cutting across a State's vital aspects such as peace & security, health, transport, agriculture and climate change. Extreme weather conditions such as floods and droughts lead to rapid spread of diseases such as cholera and malaria, render school and training facilities inaccessible therefore impeding education and learning and damage telecommunication and transport infrastructure.

The nexus between disaster risk reduction and sustainable development was embedded in the drafting and formulation process of the Sustainable Development Goals (SDG's) ultimately incorporated as goal 11 [make cities and human settlements, inclusive, safe, resilient

and sustainable] and Goal 13 [take urgent action to combat climate change and its impact].

The Sendai Framework for Disaster Risk Reduction 2015-2030 was adopted by UN Member States on 18 March 2015 at the Third UN World Conference on Disaster Risk Reduction in Sendai City, Miyagi Prefecture, Japan. The Sendai Framework was the first major agreement of the post-2015 development agenda to be adopted with seven targets and four priorities for action. With frameworks like the Sendai Framework drafted and adopted and goals mapped out, how then do we ensure that disaster risk does not impede implementation and positive impact of Africa's development goals?

Legal instruments forge a strategic framework through which Disaster Risk Reduction and Resilience can be realized. However, there is also a growing importance and understanding that data collection, analysis, and management can help both short and long-term development goals and help to identify and address disaster risks.

- How do we identify, assess, and monitor disaster risk?
- Is there data available to state and non-state actors to aid in decision making for reduction of underlying risk factors?
- Are we able to assess preparedness for effective response and recovery?
- How do we facilitate the open exchange and dissemination of disaggregated data, including by sex, age and disability, as well as easily accessible, up-to-date, comprehensible, empirical, nonsensitive risk information complemented by traditional knowledge?
- Considering the multidisciplinary nature of disaster risk, how do we perforate existing silos that lock in existing data and instead

ensure that this data is shared and made accessible to those in need of it?

This working paper develops and explores a 5i framework for resilience building: Information, Interdependence, Intervention, Insurance and Investment. The paper will look into how these 5 individual elements contribute to resilience building with the hope of painting a bigger picture as to their collective congruent nature.

As agriculture in Africa can very well be the foundation upon which we build societies that are more resilient and better equipped to deal with disasters this paper also takes a look into building resilience in agriculture.

Information

According to the World Bank, the African continent is home to some of the fastest growing economies in the world. However in the same breath, United Nations Office for Disaster Risk Reduction (UNISDR) asserts that disasters in sub-Saharan Africa are increasing in frequency, severity and impact.

On average, almost two disasters of significant proportions are recorded every week in the region since 2000. Few of these ever hit the global headlines but they silently erode the capacities of Africans to survive or prosper. Water, weather and climate hazards dominate the disaster profile of Sub-Saharan Africa, affecting, on average, around 12.5 million people per year.

Compounded by increasing vulnerabilities related to changing demographic, technological and socio-economic conditions, unplanned urbanization, development within high-risk zones, under-development, environmental degradation, climate variability, climate change, geological hazards, competition for scarce resources, and the impact of epidemics such as HIV/AIDS, points to a future where disasters could increasingly threaten Africa's economy, its population and its sustainable development.

Discussions on disaster risk reduction and resilience have gained momentum and due

prominence in the global development arena: even being mainstreamed into development agendas such as the Sustainable Development Goals and Africa's Agenda 2063.

Aspiration One of Agenda 2063 is "A Prosperous Africa, based on Inclusive Growth and Sustainable Development." Set out in the First Ten Year Implementation Plan [2014-2023] as a goal to achieve this, is environmentally sustainable climate and resilient economies and communities. Within the SDGs, Goal 11 (make cities and human settlements, inclusive, safe, resilient and sustainable) and Goal 13 (take urgent action to combat climate change and its impact) have also incorporated the disaster risk component and the need to create resilient States.

It's a no-brainer then that the success of these development frameworks is strongly linked to our ability to reduce disaster risks, mitigate possible effects and greatly increase our coping capacities and preparedness. What then must African states do in order to build resilience? Over a five-part series, we shall explore five key elements central to disaster risk reduction and resilience.

The first of these elements is Information.

Scolobig, et al [2015] point out that while the history of disaster risk reduction and management is a long and convoluted one, only by the late 1970s had governments begun to truly institutionalise disaster risk management processes and practices. Authorities were seen to hold the skills, knowledge and experience giving them the capacity and remit to manage risks and deliver emergency management services to the dependent society. Moreover, under this traditional top-down approach, responsibility rested almost exclusively on organisational shoulders and the public was perceived as passive receivers of technical

“ Africa is home to some of the fastest growing economies in the world.

World Bank

information on risk assessment, preparedness measures, emergency plans, etc.

In 1994, governments came together as signatories to the Yokohama Strategy with the desire to address growing natural hazard vulnerability and increasing disaster losses. While response remained important under the strategy, effective disaster risk reduction had to be complemented by the integration of prevention, mitigation and preparedness measures. This opened up the field to a far broader gamut of stakeholders – from government to the private sector, international organisations, non-government bodies and civil society. In this new atmosphere, multi-stakeholder interaction in decision-making (and even policy development) became fundamental.

The right to information and citizen awareness have further been embedded in the successive instruments on disaster risk reduction: Hyogo framework (2000-2015) and the Sendai Framework (2015-2030). Rather than being vulnerable, people can be capable, able to protect themselves and resilient.

Judith Rodin, C.E.O of Rockefeller Foundation in her book, *The Resilience Dividend*, illustrates the importance of awareness as being an essential aspect of resilience building because one must

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Information is critical in empowering citizens to exercise their agency. Rather than being vulnerable, people can be capable, able to protect themselves and resilient.

know what their strengths and assets are, what liabilities and vulnerabilities they have and what threats and risks they face, in order to effectively prepare for disruptions, respond to them and bounce back from them.

She also illustrates the non-static nature of information. *“Secondary effects proliferate, circumstances change rapidly. Therefore there is a constant need to evaluate, assess, take in new information, reassess, and adjust our understanding of our evolving environment.”*

The public right to information and transparency are two key interrelated aspects of a people-centred approach. In this context, the increased requirement for transparency in decision-making (across scales) has empowered stakeholders by allowing them to access information they would otherwise not have had. (Rodin, 2014).

A now people-centred approach, where the public is a central element and resource in disaster risk management represents a paradigmatic shift from the top-down, traditional models of disaster risk management.

Making information available and creating awareness on aspects of Disaster Risk Reduction may seem obvious and straight forward. However, UNISDR’s Information and Knowledge Management for Disaster Risk Reduction Framework an Scorecard, identifies several challenges which include:

- Information is scattered among various agencies and institutions with limited coherence, coordination and sharing.
- Limited analysis has been done to understand the trends, spatial and temporal

impacts of potential disaster risks and their impacts.

- Risk information is not systematically used for policy and decision making.
- There is little integration of knowledge systems at regional, national and community levels.
- There is inadequate collaboration between the different organizations working in DRR or related areas such as CCA and the environment. Civil society and private sector involvement is also often limited.
- Creation of multi-stakeholder communities where robust conversations surrounding disaster risk reduction and resilience can be had and information collected and shared is

critical. Creation of synergies between key players such as governments (at regional, national and community levels), policy makers, civil society, private sector and regional institutions and mechanisms such as IGAD (CEWARN) & AU-DREA will play a key role in integrating knowledge systems, making informed decisions, developing & implementing policies and strategies.

Disasters can be substantially reduced if citizens are well informed and motivated towards a culture of disaster prevention and resilience, which in turn requires the collection, compilation and dissemination of relevant knowledge and information on hazards, vulnerabilities and capacities in ways that make it easier for them to understand.

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Access to information is critical to successful disaster risk management. You cannot manage what you cannot measure.

”

Margareta Wahlström, United Nations Special Representative of the Secretary-General for Disaster Risk Reduction

Interdependence

Over a 5 part series, we are exploring core elements of resilience which provide us with a contextual framework for examining the state of resilience approaches in Africa. Information was the first element we discussed. The second; Interdependence.

The year was 2011, the place was Japan. The most powerful earthquake ever recorded in Japan, and the fourth most powerful earthquake in the world since modern record keeping began in 1900 hit the East-Asian country. The effects of this historically unprecedented occurrence were cataclysmic: Confirmed death toll of 15,893, thousands displaced, material damage of about 25 trillion yen. Cellular and land line phone service suffered major disruptions in the affected area. Japan's transport network also suffered severe disruptions.

The eruption of the 2007/2008 post-election violence in Kenya shook not only the political and social fabric of the society but economic as well. The Finance Minister at the time, Uhuru Kenyatta noted that the violence slashed the country's economic growth to between 2 and 2.5% compared with 7.1 percent in the previous year. Thousands of people were displaced from their homes. Learning activities ground to a halt as schools remained indefinitely closed.

Over 7,000 miles away and three years later, the earthquake in Haiti exacted a death toll of approximately 200,000 people and displaced over 1 million Haitians. The country's worst cholera outbreak hit the country thereafter affecting 70,000 people and killing 9,000 more.

Disasters of a political nature can not only have a negative economic impact on the country but also affect education and learning. Natural disasters will not only affect the environment but can also have adverse effects on transport and infrastructure. Interdependence essentially means disaster risk reduction and resilience has to take into account

the multidisciplinary and multi-sectoral nature of disasters which many times cut across a State's vital aspects such as peace & security, health, trade, transport, agriculture, environment and climate change mitigation.

Disaster risk is extraordinarily complex. (Comfort et al, 1999) note that disasters threaten not only the destruction of technical infrastructure such as power lines, roads, and communication lines but also the social, organizational, and economic structures that support the daily operations of the community. The socio-technical infrastructure in most communities is not a robust system but rather a fragile, interdependent system that is sensitive to shocks and disruptions. In such systems, disruption triggers unexpected consequences and cascading failure.

This intricate and interdependent nature of disaster risk rung true in Sri Lanka after the Tsunami of December 2004. The coastal areas of Sri Lanka were devastated by a tsunami, a natural disaster previously unknown to almost all Sri Lankans. Except for monsoonal flooding, land lines or occasional cyclones, Sri Lanka, had previously been free from major natural disasters,

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The coastal areas of Sri Lanka were devastated by a tsunami, a natural disaster previously unknown to almost all Sri Lankans.

and the tsunami was by the far the largest natural disaster experienced by the country.

Unprepared for a disaster of this magnitude, the tsunami affected more than one million people out of a total population of 19 million. More than 35,000 died (DoCS, 2006), 20,000 were injured, 5,000 remain missing and 500,000 were displaced. It also orphaned more than 1,500 children, while another 150,000 individuals lost their livelihoods (MoFP, 2006).

The seawater intrusion by the tsunami caused significant environmental damage. It caused extensive soil erosion, damaged or destroyed coastal vegetation and contaminated inland water bodies, while the pollution of dug wells by seawater as well as wastewater from damaged infrastructure posed serious public health concerns. The total damage of the tsunami has been estimated at US \$900 million, with a large percentage of damage concentrated in the housing, tourist, fisheries and transport sectors (ADB, 2005).

A single event dramatically slashed tourist numbers, a mainstay of the country's economy, disrupted the fishing community adversely affecting livelihoods, causing death and displacement, environmental damage and loss of natural ecosystems such as coral reefs, forests, mangroves and agricultural fields. Soil erosion, salination of rice fields and destruction of vegetation had negative impact on food production, which affected nutrition which coupled with poor access to clean drinking water further exacerbated the deteriorating public health scenario.

Within weeks, reports of measles and diarrhoea were reaching officials sparking fears of a deadly epidemic. Response to medical emergencies was made difficult by the damage to infrastructure which also made it difficult to get goods to market

later and stop the slide of those in fragile economic conditions towards extreme poverty.

This multi-sectoral nature of disaster risk reduction and resilience is captured in the Sendai Framework. The framework advocates for a broader and a more people-centred preventive approach to disaster risk. It observes that disaster risk reduction practices need to be multi-hazard and multi-sectoral, inclusive and accessible in order to be efficient and effective. Because of its interdependent nature, disaster risk reduction systems need to be effectively co-ordinated to build resilience.

Judith Rodin, in her book *The Resilience Dividend* suggests the integration of ideas, people, institutions and actions into an effective resilient system that requires the presence of feedback loops. She illustrates that technology systems depend on feedback loops for successful functioning; such as the simple home thermostat, which measures the air temperature and sends signals to the heating and cooling unit to adjust its function.

Natural systems, too, including human beings, depend on feedback loops for the integration of all the elements within the system. Feedback loops can take many forms, but always involve a method of sensing or gathering data, the ability to understand and analyse the data, and the capacity to then respond in some way that is meant to keep the system functioning. The failure to acknowledge the multi-sectoral nature of disaster risks can further complicate coordination and possibly drain resources through unnecessary duplication of resources and capacities. (Rodin, 2014)

The Sendai Framework, while recognizing the leading, regulatory and coordination role of governments calls for them to engage with relevant stakeholders, including women, children and youth, persons with disabilities, poor people, migrants, indigenous peoples, volunteers, the

community of practitioners and older persons in the design and implementation of policies, plans and standards. There is a need for both state and non-state actors to work more closely together and to create opportunities for collaboration, exchange of data and for organisations to integrate disaster risk into their management practices.

The Sendai Framework also advocates for coherence in development, strengthening and implementation of relevant policies, plans, practices and mechanisms across sustainable development and growth, food security, health and safety, climate change and variability, environmental management and disaster risk reduction agendas. Therefore disaster risk reduction and resilience should be embedded in policies such as those covering transport & infrastructure, health and education.

Legal instruments forge a strategic framework through which Disaster Risk Reduction and Resilience can be realized. However, there is also a growing importance and understanding that data collection, analysis, and management can help both short and long-term development goals and help to identify and address disaster risks. Ensuring that policy and legal instruments respond to the need for better coordination in sharing of data and information in ways that acknowledge and accommodate the interdependence in resilience is vital in implementation of Africa's Agenda 2063 and the Sustainable Development Goals.

There are three key questions we need to ask:

- Considering the multidisciplinary nature of disaster risk, how do we perforate existing silos that lock in existing data and instead

ensure that data is shared and made accessible to those in need of it?

- Is there data available to state and non-state actors to aid in decision making for reduction of underlying risk factors?
- How do we facilitate the open exchange and dissemination of disaggregated data, including by sex, age and disability, as well as easily accessible, up-to-date, comprehensible, empirical, non-sensitive risk information complemented by traditional knowledge?

Disasters indiscriminately affect all facets of life. The political, social and economic fabric of society is easily shattered by disasters. Entire countries can be affected overnight by a single disaster. The intertwined effects of disasters clearly demonstrates the multidisciplinary nature of disaster risk reduction and resilience making multi-sectoral and multidisciplinary collaboration and data sharing among stakeholders existential to the achievement of resilient communities in Africa.

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We must, above all, shift from a culture of reaction to a culture of prevention. Prevention is not only more humane than cure; it is also much cheaper... Above all, let us not forget that disaster prevention is a moral imperative, no less than reducing the risks of war.

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Ban-Ki Moon, UN Secretary General

Interventions

The past few chapters have explored key elements of Resilience in Disaster Risk Reduction. The vital role played by data and information was the first in this series and it illustrated the importance of awareness in resilience building because, as Judith Rodin explains in her book *The Resilience Dividend*, we must know what our strengths and assets are, what liabilities and vulnerabilities we have and what threats and risks we face to effectively prepare for disruptions, respond to them and bounce back from them. This right to information and citizen awareness have been embedded in the policy instruments on disaster risk reduction: Hyogo framework and the Sendai Framework.

Information paved the way for our discussion on Interdependence which illustrated the maze-like nature of Disaster Risk Reduction. Everything is interconnected – a single disruption often triggers another. Disasters of a political nature can not only have a negative economic impact on the country but can also affect education and learning. Natural disasters will not only affect the environment but can also have adverse effects on transport and infrastructure. Evidently, Disaster Risk Reduction and Resilience is a multidisciplinary and multi-sectoral issue cutting across a State's vital aspects such as peace & security, health, trade, transport, agriculture, environment and climate change.

This chapter discusses the third element in building resilience: Interventions.

The frequency and severity of disasters is on the rise and is further exacerbated by twenty first century complications such as urbanization, climate change and globalization. Timely and effective interventions are more critical than ever. What interventions do we put in place before disasters strike, and how do we bounce back in the aftermath of a disaster?

The Boston Marathon bombing of 2013 highlighted the positive impact of pre-disaster interventions.

On Patriots' Day, April 15, 2013, the 117th annual Boston Marathon began without any signs of an imminent attack. Officials swept the area for bombs twice before the explosions; the second sweep occurred one hour before the bombs went off.

The bombs exploded about 12 seconds and 210 yards apart near the marathon's finish line on Boylston Street. Although the attack was unanticipated and unpredictable, Boston had been getting ready for such an event for more than a decade. The city had participated in preparatory exercises such as drills and Urban Shield exercises conducted by the Metro Boston Homeland Security Region.

Prior to the marathon, a multi-agency coordination centre was set up comprised of the Boston police, firefighters, Emergency medical practitioners, Massachusetts state police, the National Guard and the Coast Guard, the FBI and the Boston Athletic Association, which organizes the race (Rodin, 2014).

The efforts were well integrated, and there were ample alternatives, backups and options that could be called to action if needed. The hospitals were ready and fully equipped with personnel, the security apparatus was prepared and on high alert (ibid). The preparations did not prevent the bombings from taking place but they greatly reduced the impact of the disaster. Pre-disaster interventions are as crucial to resilience building as they offer a buttress and mitigate possible adverse effects.

Having reached the 1 billion mark by 1998, India with a population of 1,295 billion (World Bank, 2014), is projected to be the world's most populous nation by 2022 surpassing China. Population growth in India has led to an urban population surge and an increase in poverty levels. Urban areas have developed without much attention

to drainage and only during disasters does this become apparent.

Surat, previously known as Suryapur, is a city in the Indian state of Gujarat. The diamond rich city has been inundated by recurrent flooding over the years. Major flooding occurred in 1994 and 1998 but the 2006 floods tipped the scales. The water levels rose to unprecedented levels resulting to 90% submergence of the Surat city area. [Yadav,2015]

A lot has changed after the 2006 floods in Surat. Learning from their past experiences, Surat employed various structural interventions. Setting up an Early Warning System (EWS) to warn the city before water is released from the nearby Ukai Dam was one of them. In 2006, when Surat got severely flooded, it received only eight hours warning from the dam authorities, this did not give the city enough time to prepare. Now, with a new EWS, Surat gets a 72-hour advance warning before the Ukai Dam opens its gates. (Quartz India,2015).

After the pneumonic plague that hit the city following the 1994 floods killing 52 people and causing the migration of 1.5 million others (Dutt et al,2006), Surat began a complete overhaul of the administrative structure of its sanitation system, revamped its solid waste management systems, enforced strict hygiene and sanitation standards across establishments, and improved water and

sanitation facilities across its slum areas. (Quartz India,2015).

A public health mapping exercise was initiated, and a network of 274 surveillance centres was established to allow Surat's health managers predict trends and prevent outbreaks of epidemics [ibid].Using the 1994 plague and subsequent floods as a launch pad, the city of Surat has built greater resilience and has been a great learning point for other cities in India.

Two major attributes of Disaster Risk Reduction & Resilience are evident in the Boston Marathon Bombings and the Surat Floods. The Boston Marathon bombings highlights the multidisciplinary nature of disaster risk reduction. Leaders of law enforcement agencies, through their unified command mechanisms, demonstrated extraordinary cooperation, working across multiple local jurisdictions. Those responsible for emergency medical services distributed patients across the Boston hospitals, orchestrating a close to seamless and flexible performance that saved both lives and limbs. The Mayor's office set up a fund whose \$60 million kitty was distributed to victims and families who lost their loved ones. (Marcus et al, 2004)

The law enforcement agencies would be ill equipped to solely handle the post disaster interventions and so would the medical teams. The concerted multidisciplinary efforts coupled with planning and adequate resources created the synergy that played a significant role in the success of the response operations.

The Surat floods of 1994 unearthed the multi-hazard nature of Disaster Risk Reduction. With all efforts geared towards the floods, another unpredicted disaster was in the offing: An unexpected outbreak of pneumonic plague (a more deadly strain of the bubonic plague) hit Surat. The plague is spread

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The Boston Marathon bombings highlights the multidisciplinary nature of disaster risk reduction.

via coughs and droplets of contaminated saliva exhaled by infected individuals.

Scenes of confusion and panic reminiscent of the plague outbreaks that devastated India before the advent of effective antibiotic treatment and insecticides in the 1960's (New York Times, 1994) were reported with public health officials at first seeming to downplay the danger of the disease, undoubtedly to avoid panic. However in September, 1994, Indians began dying from the plague. In less than a week, about 200,000 panicky residents fled in jammed trains and buses, mostly heading South to Bombay. Even doctors fled Surat by the hundreds. (Kohn, 1995)

The realisation that Disaster Risk Reduction is a multi-hazard issue and responding to this reality

allowed Surat to bounce back from the horrific plague of 1994 and also emerge as a model for public health in the region. Though experiencing subsequent floods, interventions that were put in place after the 1994 floods have kept plagues and other health crises at bay.

Both pre and post disaster interventions are critical in building resilience and in achieving goal 11 of the SDG's. Interventions of any nature are not merely a means to an end, they are an ongoing necessity in resilience building. These interventions must be collaborative, incorporating a myriad of stakeholders at community, sub-national, national and regional levels. Resources must be appropriated for these interventions, awareness must be created and information shared.

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Because everything is interconnected - a massive system of systems - a single disruption often triggers another, which exacerbates the effects of the first, so that the original shock becomes a cascade of crises.

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Judith Rodin, *The Resilience Dividend*

Investment

China was the most disaster-affected country in 2014, with drought, storms and flooding affecting more than 58 million people and economic damages of US \$ 23.17 billion.

Between July 2011 and mid 2012, a severe drought was experienced in the horn of Africa. It ramped up a chronic livelihoods crisis to a tipping point of potential disaster by putting extreme pressure on food prices, livestock survival, and water and food availability. Earmarked as the worst drought in 60 years, the estimated death toll was 260,000 people. The drought directly affected over 13 million people in Kenya, Somalia, Ethiopia and Djibouti.

Unofficially known as 'Superstorm Sandy', hurricane Sandy was the deadliest and most destructive hurricane of the 2012 Atlantic hurricane and the second costliest cyclone to hit since 1900. Estimated damage of over US \$ 50 Billion an amount surpassed only by Hurricane Katrina. It is clear that the economic costs of disaster remain both significant and worrisome for the countries and areas impacted (Vorhies, 2012). The total number of disaster events and related economic and humanitarian losses have been increasing steadily since the 1980s.

Economic losses from extreme weather events are now in the range of US \$150–200 billion annually, with an increasing share of damages located in rapidly growing urban areas in low and middle income countries. However, despite widespread awareness of these rising losses, investment in ex-ante disaster risk management (DRM) remains relatively low (Tanner, et al, 2015).

In March 2012, the Global Humanitarian Assistance (GHA) programme published 'Disaster risk reduction: Spending where it should count', which examined the levels of donor investment in disaster risk reduction (DRR). The report found that despite the rhetoric, just 1% (US\$3.7 billion) of total Official Development Assistance

(ODA) had been spent on DRR in 40 of the world's poorest and most disaster-affected countries.

While most donors seem to agree that financing measures to reduce risk can lessen impact, quicken recovery and result in lower levels of assistance, there is continuing uncertainty as to whether this is happening in practice. Despite the positive inroads made since the Hyogo Framework in 2005 in terms of promoting DRR on the global agenda, there still appears to be a gap between rhetoric and policy recognition on the one hand, and action and investment on the other.

Tracking DRR within international ODA is complex. Volumes of ODA funds invested in DRR are very difficult to track and assess, and data on financing for DRR is poor. Quantifying the total amount spent on DRR is difficult. DRR activities are commonly tucked within wider programmes and projects, including those relating to food security, health systems, and environmental management. (Chakrabarti,2013)

Because DRR projects have emerged relatively recently, the data on DRR funding is limited and donors are still unsure how to report it. Current donor reporting methods therefore fail to capture adequately the full nature and extent of financing for DRR, and it is only on the basis of this limited data that we are currently able to examine donor commitments to financing DRR.

Governments renewed their commitment to investing in disaster risk reduction at the June 2012 Rio+20 Conference. The Rio+20 outcome document, 'The Future We Want', invites governments at all levels to commit to adequate, timely and predictable resources for disaster risk reduction. It also calls for disaster risk reduction and the building of resilience to disasters to be addressed with a renewed sense of urgency in the context of sustainable development and poverty eradication and, as appropriate, to be integrated into policies, plans, programmes and budgets at

all levels and considered within relevant future frameworks.”

The June 2012 Rio+20 Conference set the pace for the inclusion of investing in disaster risk reduction for resilience in the current post 2015 DRR Framework. The Sendai Framework sets out investing in disaster risk reduction as the third priority in reducing disaster risk for resilience. It also enumerates seven agreed global targets that include reducing direct disaster economic loss in relation to global gross domestic product (GDP) by 2030.

What then is the role of the State?

To discharge their leadership and stewardship responsibilities effectively, governments need to express this commitment through strategically and adequately resourced actions. Therefore, a committed political leadership should also facilitate the mobilization of resource investment by communities and the private sector in disaster risk reduction. This partly depends on promoting other forms of resourcing disaster risk reduction, such as insurance and micro-finance (Africa Regional Strategy for Disaster Risk Reduction, 2004).

For decades, Japan has been assisting countries in Disaster Risk Reduction (DRR) by sharing its own experiences, from having been affected by disasters. Japan in the recent years has experienced unprecedented disasters, including the Kobe Earthquake (1995) and East Japan Earthquake and Tsunami (2011). Japan’s long history of fighting disasters has built some of the world’s leading science and technology in DRR. While Japan is known more for its infrastructural and technical measures, there is also an extensive knowledge base in non-structural DRR measures, including institutional building, end-to-end early

warning systems, DRR education and community-based DRR.

The resourcing of disaster risk reduction is a shared responsibility between the State and other stakeholders. To facilitate this increased resourcing commitment, both political leaders and investors need to be convinced of the developmental benefits of investing in disaster risk reduction. This requires demonstrating the cost-benefit of investment in reducing disaster risks (Africa Regional Strategy for Disaster Risk Reduction, 2004).

For long, the corporate sector had been viewed as a separate entity perennially ranged at the other end of the spectrum vis-à-vis the society. Over the past few decades, this perception has undergone a complete metamorphosis and the existence of corporate sector is today intimately intertwined with the safety and well-being of the society.

Rather the community today is the very *raison d’être* of its being. It is the crux lending credence and substance to the world view of the corporates. The corporate sector and the society are being seen as complementary to each other – heavily dependent upon each other for mutual existence and prosperity.

Through their CSR programs, corporate organizations can invest in disaster risk reduction by building capacity on DRR, sponsoring DRR training curricula, this mandate clearly links investments in disaster risk reduction to the broader objectives of sustainable development and poverty eradication.

Incidentally, investing in disaster risk reduction as the Sendai Framework explains, includes monetary investment but is so much more. Policy investments need to be made through the implementation of

disaster risk reduction strategies, policies, plans, laws and regulations in all relevant sectors.

Other than the guiding principles set in the formative frameworks globally and regionally, states should have national disaster plans as well as mainstream disaster risk assessments into the state's vital aspects such as peace & security, health, transport, agriculture and climate change. This is why Investments are part of the five-element framework we are exploring here at LDRI on effective resilience building programs in Africa.

The adverse impacts of climate change and extreme weather events are a severe threat to livelihoods, and hold back growth and sustainable development (Tanner, et al, 2015). The global costs of disasters are generally in the billions of US dollars per annum and rising. Channelling investments into the DRR pool is not only necessary but a *si ni qua non* towards resilience building.

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Reducing disaster risk should not be seen as an additional expenditure, but rather an investment for a safer and more resilient world. It is about ensuring that our investments in development are not washed away when the next flood or tsunami occurs.

”

Kevin M. Cahill, M.D .

More With Less: Disasters in an Era of Diminishing Resources

Insurance

Located within the drought-prone Sahel region, Senegal is heavily reliant on rain fed agriculture despite the irregular rainfall that characterizes the region making resilience building a priority. The reliance on rain fed agriculture, only 5% of agricultural land is under irrigation, results in high fluctuation in production output adversely affecting many families. Agriculture (including forestry, livestock, and fisheries) contributes to 70% of the employed labor force with the sector accounting for 18% of GDP. Most farms are small (less than 6 acres) and about 60% are in the so-called Peanut Basin, east of Dakar. Only about 11% of Senegal's total land area is cultivated with millet and peanuts dominating.

It wasn't unusual therefore that in 2014 – 2015 the country experienced late and poor rains which had a direct and negative impact on agricultural production; a 40% decrease in the cereal production compared to 2013/2014, and 45% compared to the average past five years.

An estimated 927,000 people across Senegal were extremely affected by March 2015, 95,000 of them in the Tambacounda region of the country.

During the last decade Tambacounda has been increasingly affected by erratic rains and frequent dry spells, as well as variations in the timing and length of the rainy season. During that season, drought mainly affected the western districts, mostly dedicated to peanuts cultivation.

The government of Senegal and development partners have over the years sought ways to reduce the impact of failed rains, especially the rise in food prices, on vulnerable populations in the rural areas. Weather-based and index-based insurance are some of the interventions that have been successfully implemented in addition to climate smart agriculture. The country participates in the

Africa Risk Capacity (ARC) insurance pool and also benefits from the WFP/Oxfam R4 Initiative.

As a result of the countries participation in the ARC and the presence of the R4 Initiative, Tambacounda benefited from multiple insurance interventions designed to respond to the persistent drought risk in the Sahel. Whilst benefiting from the country's subscription to the Africa Risk Capacity, Tambacounda's farmers were also among 300 producers in the 2014 – 2015 crop cycle who received a payout from the R4 initiative.

The R4 Rural Resilience Initiative (R4) is a comprehensive risk management approach to help communities be more resilient to climate variability and shocks. Currently active in Senegal and Ethiopia, WFP is also piloting the initiative in Malawi and Zambia with a goal of reaching 100,000 insured farmers by 2017. The Initiative combines four risk management strategies: improved resource management through asset creation (risk reduction), insurance (risk transfer), livelihoods diversification and micro credit (prudent risk taking) and savings (risk reserves). The people in the Tambacounda region were the first beneficiaries under the risk transfer component of the programme, which started in Senegal in 2012.

The ARC scheme is Africa's first parametric catastrophe insurance pool and was launched in May 2014 to provide at-risk regions with post-disaster financing capabilities. ARC uses a sophisticated software platform to assess and forecast risk. This software, known as Africa Risk View (ARV), detected that the December harvest in Senegal would be affected by the late onset of rain, and the Senegalese government was therefore able to respond by beginning to plan its response as early as September.

The ARC made its first payout, totalling \$25 million, to three participating countries in 2015. The bulk of the pay out, \$16m, was made out to Senegal and

was focused on three kinds of activities as defined in the country's contingency plan; livestock relief, food assistance and supplementary feeding for mothers and children.

By utilizing the ARV software, ARC and the relevant regions are able to assess and prepare a payout many months in advance, meaning that post-event financing and redevelopment can happen fast, and that the most vulnerable people are reached first. The ARC pay out was made out even before relief agencies had fully mobilized resources to respond to the unfolding disaster, a testimony to its effectiveness and its ability to function as anticipated. This potentially reduced the negative impact of the drought on close to one million vulnerable people.

These state-sponsored or multi-lateral institution-supported initiatives respond to The Sendai Framework's Priority 3 on Investing in disaster risk reduction for resilience and specifically part (b) which requires countries

"To promote mechanisms for disaster risk transfer and insurance, risk-sharing and retention and financial protection, as appropriate, for both public and private investment in order to reduce the financial impact of disasters on Governments and societies, in urban and rural areas"

However, promoting mechanisms for disaster risk transfer shouldn't be focused only on the formal instruments, but should include indigenous mechanisms that have been used by communities from time immemorial.

In 2006, the Government of Rwanda through its Ministry of Agriculture implemented a program through which every poor family is provided with a cow to ensure the family has access to milk and a source of income. This program, known locally as Girinka, or One Cow Per Poor Family Program is designed to address child malnutrition and poverty alleviation in the country. One Cow brings

nutrition, sustenance and employment, providing a stable income for a family and is a source of soil nutrients via manure to assist small scale crop production.

The program utilizes an existing and common behaviour in many rural communities across the global south where, due to income uncertainty, the rural poor mitigate disruptions by investing in a safety net device such as holding onto a number of surplus bags of cereal for 'a rainy day' or keeping a family cow to provide milk and possibly to sell as a last resort. Cattle were a central part of socio-economic transactions in traditional Rwandan society and were associated with prosperity. Holding onto a cow therefore serves multiple socio-economic purposes while also addressing very practical nutrition and agricultural needs of rural communities in Rwanda. It is a coping mechanism through which rural communities underwrite their own risk in ways they understand and trust, despite their rudimentary and somewhat ineffective approach. This contemporary Girinka program leverages a better-understood mechanism to deploy a risk reduction and risk reserves approach to resilience building that also acknowledges the symbolism of the cow as a sign of prosperity in traditional culture.

The 5i framework provides us with the basic conceptual framework, which recognizes the important role played by insurance and the centrality of good information in building back better. Without good data, it is impossible for the Africa Risk View software to function. Indeed, a number of countries that are not eligible to participate in the Africa Risk Capacity scheme are locked out by lack of data. Without good historical data and forecast data on weather and agricultural production, weather-based insurance would not be possible.

Information also plays a role in the ability of citizens, and especially smallholder farmers to take steps in activating their indigenous insurance

mechanisms such as withholding a predetermined amount of cereals from the market, or participating in formal insurance schemes in order to build back better once the disaster is past.

Regardless of whether the insurance mechanism being promoted is commercial or state-sponsored, two aspects are of great importance.

Accessibility

It is possible that, in an effort to improve efficiency and reduce corruption or waste, measures can be introduced that reduce the accessibility of insurance schemes and result in vulnerable populations being left behind. In countries with national identity card systems with incomplete coverage, requiring formal identification from beneficiaries can leave them out.

Weather-based insurance products provided by the private sector can struggle with accessibility in this way as well. They can also be plagued by poor geographical coverage of agents requiring clients to travel long distances to subscribe to the scheme.

Requirements for a male member of the household to authorise participation are common in many parts of Africa making it difficult for single mothers and widows to access insurance services.

Affordability

Subscription costs to an insurance scheme can be prohibitive, locking out those who need it most despite the obvious benefits of participation. Evidence of trade-off behaviour has been observed among those who live at the base of the pyramid in Africa, a considerable number of whom are smallholder farmers.

When the costs of a product deemed necessary are too high, the individual opts to forego a product/service deemed less necessary in order to purchase the more necessary one. Insurance,

due to its uncertain and delayed benefits, can tend to be on the wrong end of these trade-offs if priced too high. This 'phenomenon', known as basis risk in the industry, the risk of low correlation between insurance payouts and actual crop losses, is potentially a real threat both to demand for, and effectiveness of, index-based micro-insurance.

It's not only about the up-front cost of the premiums but also about the costs of sustained participation when payments are spread out. In insurance schemes where buyers can pay in periodic instalments, models that take into account the uncertain nature of smallholder farmer incomes may have better chances of success than those that are unforgiving in their demand for consistency in payments for premiums. Liquidity constraints therefore pose an existential risk to index or weather-based insurance products for smallholder rural farmers and must be factored into the design of the product's delivery chain.

More profitable investment decisions tend to be riskier than the norm. Index-based insurance can help agricultural households take risks by providing them with a formal risk mitigation mechanism and potentially empower them to create more wealth and employment. Although theoretically promising, take-up of index-based products has grown only slowly despite the common understanding on the benefits vis-à-vis the risks posed by weather on agricultural output and by extension their livelihoods. In addition to basis risk and liquidity constraints, inadequate trust in the provider is also a threat to successful roll-out of insurance interventions making it necessary for insurance industry regulators to encourage actors in the space to invest in civic education and maintain a strong track record in timely and complete pay outs on claims.

For resilience programs in Africa to be effective and sustainable, innovating in design, delivery and packaging of insurance for smallholder and small-scale commercial farmers will be essential.

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The challenge, therefore, is moving from these
compelling words to tangible and life changing
action.”

Margareta Wahlstrom, UN Secretary General’s Special
Representative for Disaster Risk Reduction, 2012

Agriculture And Resilience in Africa

Sixty years ago, Sub-Saharan Africa was composed of two independent nations (Ethiopia and Liberia) and 46 colonies. At independence starting in Sudan in 1956, then Ghana in 1957 and 16 other countries in 1960s, the population growth rate was as low as 1.5%. Africa was a modest net exporter of food (mainly palm oil and ground nuts) and it was a land surplus continent subject to periodic drought (McKelvey 1965). Little or no mechanization, rain-fed farming and a modest exporter of food characterized the agricultural industry at the time.

During the 1950s, one of the critical issues about Africa's economic future debated by economists was the role of agriculture and industry in development and the type of agricultural strategy to pursue - capitalist or socialist (Eicher, 2003). The end of colonialism and the beginning of sovereignty for many African states illuminated the need for economic strategy and growth. As a result, there was a robust effort by African governments to generate a thriving agricultural sector.

Fast forward to 2016, the African picture as we knew it then has drastically changed: Buzzing metropolitan cities, a global export partner, growing infrastructure and a burgeoning population. What hasn't changed though, is the centrality of agriculture to most African economies.

Without a doubt, Agriculture is the mainstay of the African continent. Africa is home to smallholder farmers, a seemingly negligible group but are in essence the real drivers of agriculture in the continent. More than half a billion Africans are smallholder farmers. In some countries they make up as much as 85% of the population. Even in Africa's most urbanised countries that figure only drops to 55% (The Guardian, 2015).

In most African countries, agriculture supports the survival and well-being of up to 70% of the population. Agricultural exports continue to be the single most important source of foreign exchange

for the majority of countries in Sub-Saharan Africa (Gilbert, 2009).

Africa's Export Profile

The cocoa tree is a choice crop for Africa and especially in areas of West Africa with low to slight elevations, good soils, and the constant humidity of the tropics. West Africa collectively supplies 2/3 of the world's cocoa crop, with Ivory Coast leading production at 1.65 million tonnes, and nearby Ghana, Nigeria, Cameroon and Togo producing additional 1.55 million tonnes. In Ghana, cocoa growing offers livelihoods for over 700,000 farmers in the southern tropical belt of the country. It continues to be one of Ghana's main exports and has been central to its debates on development, reforms and poverty alleviation strategies since independence in 1957.

'Got roses this Valentine's Day? They probably came from Kenya' A CNN Article by Milena Veselinovic in 2015 read. The country is the third largest exporter of cut flowers in the world, accounting for around 35% of all sales in the European Union. According to the Kenya Flower Council more than 500,000 people in the country depend on the trade, with roughly half of the country's 127 flower farms concentrated around Lake Naivasha, around 90 kilometres northwest of the capital city, Nairobi. It is estimated that over 500,000 Kenyans depend on the floriculture industry 90,000 of whom are flower farm employees. According to the Kenya National Bureau of Statistics, Kenya exported 125,000 tonnes in 2013 valued at US \$507 million!

Still in East Africa, Ethiopia is the birthplace of Arabica coffee, and is home to some of the most diverse varieties on the planet. Ethiopia remains the largest producer of coffee in Africa and is the fifth largest coffee producer in the world next to Brazil, Vietnam, Colombia, and Indonesia, contributing about 4.2 % of total world coffee production. Providing income for approximately

8 million smallholder households and generating about 25-30% of the country's foreign exchange earnings.

A random Google search on the world's largest exporter of tea has Kenya all over it. With more than 111,000 hectares of land for tea production, Kenya ranks highest on the list of the largest exporters of tea around the world. Contributing from 17-20% of the country's total export revenue, Kenya exports 396,641 metric tonnes of tea annually, a number that has grown by about 39% over a decade. 80% of the total tea produced in Kenya comes from small-scale farmers, with the remaining a product of large-scale operations. The teas are very bright, colourful, with a reddish coppery tint and a pleasant brisk flavour.

Africa is also growing its dairy, beef and leather export markets to the EU, United Arab Emirates among other markets.

Challenges for the Green Revolution in Africa

The Green Revolution that began in the 1960s to 1980s in Asia and Latin America was a sweeping effort to transform farming methods and improve staple crops such as maize, wheat, and rice. The Revolution led to a two fold increase in food production and saved hundreds of millions of lives. Posthumously, the father of the Green Revolution Norman Borlaug is credited for developing high yield disease resistant strains of wheat and rice that produced dramatic gains in harvest.

Unfortunately, upon replication on African soil, the Green Revolution had no such success. Here, the climate was too varied, the soils too degraded. Africa lacked infrastructure such as roads, or India's railway system that helped farmers to commercialize their grain. We did not have a network of companies to sell farmers the hybrid seeds for the high-yield varieties, nor the fertilizer

and pesticides necessary to take full advantage of those seeds (New York Times, 2014).

Africa's agricultural yields are less than half the global average, and about 25 % of what we could potentially yield. Agricultural productivity in Africa is growing at about half the rate the population is growing. We have 25 % of the world's arable land, yet that generates only 10% of global agricultural output (Jayaram et al, 2010).

Smallholder farmers in Africa produce 60% of the world's food. We are a continent of small-holder farmers, half of them women, growing maize with no fertilizer, pesticide or irrigation, on a tiny plot with a hoe. Small-holder farmers are particularly vulnerable to climatic and economic shocks, with many living from one harvest to the next. Poor harvests, or sudden massive price drops, can and do have catastrophic effects.

Climate change is making Africa's weather more extreme and erratic. Africa loses about a fifth of its maize crop because of drought. In many years, the loss is near total. A survey of farmers in 12 countries found that in the last decade, they averaged about three wipeout years [New York Times, 2014].

Former Nigerian agriculture minister and sitting President of the Africa Development Bank Akinwumi Adesina, in reference to Agriculture in Africa once stated that "potential is important, but nobody eats potential", thereby summarising one of Africa's key problems – unlocking its agricultural potential to allow the continent's growing population to fully benefit from the available resources.

The nexus between Disaster Risk Reduction and agriculture and the formidable (but not insurmountable) barriers to achieving sustainable development in Africa cannot be overstated. Disasters jeopardize agricultural production and

development and often have cascading negative effects across national economies.

How then do we unlock Africa's agricultural potential whilst ensuring that it is;

1. *Competitive*; system actors are able to effectively innovate, upgrade, and add value to their products,
2. *Inclusive*; delivering a sustainable flow of benefits to a range of actors, including the poor and otherwise marginalised and most importantly
3. *Resilient*; system actors are able to address, absorb and overcome shocks in the market, policy environment, resource base?

In many of the countries most vulnerable to natural hazard-induced disasters, agriculture is the main source of livelihoods and food security, and a key driver of economic growth. Of all natural hazards, floods, droughts and storms affect the agriculture sector the most, showing the severe impact of climate-related disasters on the sector. These disasters thus undermine efforts to eradicate hunger and food insecurity, and build sustainable, prosperous futures.

According to a study released by FAO in 2015 at the United Nations World Conference for Disaster Risk Reduction, nearly a quarter of damage wrought by natural disasters on the developing world are borne by the agricultural sector. These damage and losses are often incurred by poor, rural and semi-rural communities without insurance and lacking the financial resources needed to regain lost livelihoods and build back better. Yet only 4.5 percent of post-disaster humanitarian aid in the 2003-2013 period targeted agriculture.

The final tally on damages to crops and livestock over that 10 year period was \$70 billion. Asia was

the most affected region, with estimated losses adding up to \$28 billion, followed by Africa at \$26 billion. The high impact of natural hazards and disasters on agriculture calls for enhanced mainstreaming of disaster risk reduction (DRR) and resilience building within the agricultural sectors.

Building greater disaster resilience into the agriculture sector in Africa must begin with an understanding of the likely added risks and vulnerabilities the sector faces. Disaster risk reduction comprises a series of management actions that require the involvement of communities and various stakeholders and partners. Information and communications management play a crucial role in this process. The ability of people to take informed actions to secure their safety during disasters also depends on availability of timely and targeted information on disaster risk reduction.

In 2003, African heads of state signed the Maputo Declaration pledging to increase their spending on agriculture development to 10% of their national budgets within five years. Thirteen years later, just eight out of over 50 countries have achieved this goal. A vibrant, sustainable and resilient agriculture sector is vital for sub-Saharan Africa's economic future. Unfortunately, disaster response activities remain largely divorced from mainstream development activities in Africa.

Risk reduction begins with risk identification and assessment, including early warning. However, the practice of risk identification is limited in Africa. The continued focus on emergency response on the continent results in greater emphasis on post-disaster loss assessment than on anticipatory risk assessment.

The 5i framework approach to assessing the extent to which DRR and resilience programs cover all

the bases provides us with a lens through which to consider priority efforts for the agriculture sector.

- **Information** on risks, disasters, contingencies, mitigation and adaptation can provide communities with the ability to make corrective adjustments to their habits and investments in order to reduce the impact of natural disasters on livelihoods. This can include information on impending adverse weather, such as the El Niño phenomenon so they can plant crops that can weather the period or new building technology to adopt in securing their infrastructure and homes.

- **Investments** by state and non-state actors can determine how effective or sustainable resilience building efforts are. Some types of investments can only be made by the state, such as road infrastructure necessary for delivering goods and services to marginalised areas. Or health centres equipped with the staff, equipment and medicines to deal with an outbreak of a highly communicable disease such as Ebola or Cholera. These investments have to be made as part of an integrated resilience strategy and not simply intermittent and haphazard reactionary initiatives.

- **Interdependence** in the agriculture sector, as we have seen, is extremely high. Efforts by the energy sector, the transport sector, the ICT sector or even the education sector affect and are affected by agriculture. DRR & resilience programs must deliberately leverage this interdependence not just acknowledge it.

- **Interventions**, within the 5i framework, allows us to assess the extent to which the design and implementation of interventions is inclusive, allows communities to access the maximum amount of information necessary and is responsive to the various demographics in the region to ensure those who need access

to the interventions, especially the most vulnerable, are not left behind.

- **Insurance** provides states as well as their small-scale and smallholder farmers with an instrument through which they can rapidly build back better after a catastrophic event. Although interventions like the Africa Risk Capacity provide member states with insurance, the private sector's insurance products/services for smallholder farmers need to be improved, incentivized and rolled out in Africa's rural areas. Planet Guarantee and Acre Africa are examples of providers who are rolling out services in sub Sahara Africa in response to the need to protect livelihoods, build resilience and sustainably make a profit in rural Africa.

The relationship between agriculture, livelihoods and disaster risk reduction is Gordian in nature making it necessary for stakeholders to develop resilience interventions that respond to the challenges faced by the agriculture sector. With economies on the continent and the vast majority of rural communities so highly reliant on agriculture it is imperative that the agricultural transformation agenda recognises resilience and for governments to prioritise resource allocation to it.

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