

Adaptive Finance to Support Post-Disaster Recovery

Laura M. Hammett

Katy Mixer

ACKNOWLEDGMENTS

This report, authored by Laura Hammett, Yale MEM 2017, and Katy Mixter, Yale MEM and MBA 2017, was supported by Yale Center for Business and the Environment. It received funding from the Class of 1980 Fund at the Yale School of Forestry and Environmental Studies.

The authors would like to thank the following people and groups for their assistance, support, and insights:

- Bradford Gentry, Professor at Yale School of Forestry and Environmental Studies
- Brian Reed, Doctoral Student at Yale School of Forestry and Environmental Studies
- Participants in the Yale Adaptive Financing Design Innovation Session (February 24, 2017)
- The members of the Risk, Resilience, Adaptation and Disasters Student Interest Group at the Yale School of Forestry and Environmental Studies (2016-2017)

In addition, the authors appreciate the support of the editorial team. The report was edited by Kat Friedrich, News Editor at Clean Energy Finance Forum at Yale Center for Business and the Environment. The graphic design was created by Henk van Assen, Senior Critic at Yale University School of Art, together with Meghan Lynch and Igor Korenfeld, Designers at HvADESIGN.

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October, 2017

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EXECUTIVE SUMMARY

In today's rapidly changing world, there are many challenges facing organizations that finance and reconstruct communities after disasters. In an ideal world, the two sets of pre- and post-disaster funding opportunities would be flexible enough to work together to reduce redundancy and provide the greatest aid to victims at the times when they need it most and at a level of risk or repayment that is appropriate for them in the long term.

However, this is not currently the norm. Often funding falls short and arrives at times when the greatest need has passed. For example, in the case of Typhoon Haiyan in November 2013, only 61 percent of requested relief funding had been received by August 2014 (United Nations, 2015, p. 166). In addition to funding delays, local economic regeneration is challenged by newly broken supply chains that constrict operations such as replacing inventory.

To address challenges such as these, we ask: what do key players in the post-disaster financing world such as nonprofit organizations, private financiers, and resilience experts have to learn from each other? And how can these ideas enable better results in the process of recovery and redevelopment after disasters, particularly for small and medium enterprises that form the backbones of local economies?

We propose that the answers lie in approaching a new paradigm of **adaptive post-disaster financing**.

To address hesitation from the private sector as well as the challenges above, a more **adaptive** approach to post-disaster financing is needed. Such an approach provides a way for private financiers to fill post-disaster funding gaps in ways that are designed to be responsive to specific contexts after a disaster.

WHAT IS ADAPTIVE FINANCING?

Adaptive financing is a type of financial product that is flexible enough to adapt to the needs of specific locations in the wake of disasters.

HOW DOES THE PROCESS COME BEFORE THE PRODUCT?

Changing conditions demand flexibility. Some product-development processes create fixed products.

For example, a mortgage is a product that a client can buy. However, if a client wants to change the fixed terms of their contract, they generally have to refinance. In contrast, adaptive financing offers flexible products that can adapt to changes in customer situations. This adaptability depends on flexible underlying processes that allow for finance providers to make ongoing adjustments to products in response to changing client needs. This requires a redesigned product-development process and a new conception that a financial product is a service instead of a commodity.

In this report, we advise that adaptive financing be:

- **Planned:** Adaptive financing products are designed in advance of a disaster event.
- **Integrated:** Thinking about post-disaster financing in isolation is inadequate. Instead, sets of integrated and complementary financial products (like short-term loans) and non-financial programs (like household-reconstruction planning) must be designed to work together to meet the complex needs of clients after disasters.
- **Dynamic:** Adaptive financial solutions must have built-in capacity to scale and adjust to meet the needs of the specific contexts post-disaster.

What is holding back innovative development of effective adaptive financial solutions? In this report, we document the major challenges associated with designing adaptive products for post-disaster relief, such as:

- Complexity of disaster scenarios
- Damage to markets and disruption of supply chains
- Challenge of balancing risk and return in uncertain environments
- Slow and cumbersome product-development processes
- Difficulty of coordinating the deployment of public and private capital
- Lack of trust between financiers, agencies, and recipients after disasters

These challenges and others keep adaptive financing mechanisms from being sponsored by product-development teams at financial institutions that are seeking to maximize value and minimize risk. However, through actions like development of partnerships, use of creative design and research techniques, and adequate consideration of planning, we believe there is room for further adaptation and innovation – as well as new product development that will provide timely, effective relief to people in need.

This document is primarily intended for those stakeholders who participate directly in decision-making processes surrounding post-disaster financing at a public, private, international, or local scale.

The recommendations in this report are based on personal experience working in the field as well as a literature review and interviews. In addition, the report was informed by a workshop with subject-matter experts from the humanitarian-response and private-finance worlds.

The report's challenges and associated recommendations are summarized in the table below. Though this list is intended to aid primarily finance providers and private investors and secondly small businesses, any partner organizations and other concerned stakeholders can benefit from these recommendations. These recommendations and challenges are detailed beginning on page 14 of the report.

Table 1: Recommendations for Adaptive Finance to Support Post-Disaster Recovery

CHALLENGES OF POST-DISASTER FINANCING	RECOMMENDED ADAPTIVE APPROACH
<p>Financing after Disasters Requires New Models</p> <p>Page 15</p>	<ul style="list-style-type: none"> • Research primary financial needs and non-financial needs of clients after disasters. • Preapprove a set of solutions that can be adapted quickly after a disaster. • Use scenario-based planning models. • Create products that have several investors participating at various levels of risk. • Optimize the non-monetary benefits of post-disaster financial deals for investors.
<p>The Case for Private Investment in Disaster Reconstruction Is Underdeveloped</p> <p>Page 16</p>	<ul style="list-style-type: none"> • Calculate all of the benefits of participation for your financial institution. • Ensure that benefits are realized. • Create solutions to reduce risk. • Foster strategic partnerships. • Make the formal business case for market entry. • Track accrued value by participating in post-disaster financing over time.
<p>Disasters Disrupt Supply Chains and Complicate Recovery Logistics</p> <p>Page 18</p>	<ul style="list-style-type: none"> • Create redundant access to customers. • Utilize mobile and flexible technologies. • Prepare for disaster events. • Plan supply-chain responses. • Have a business continuity plan. • Perform risk analysis of supply chains before disasters occur.
<p>Larger Markets Can Be Damaged by Disasters</p> <p>Page 19</p>	<ul style="list-style-type: none"> • Create community associations. • Create flexible financial products. • Understand the community. • Develop contingency plans. • Partner with other providers. • Map and activate networks and diagram supply chains.
<p>Slow and Cumbersome Financial-Product-Development Processes Lead to a Mismatch in Timing Between Need and Available Financing</p> <p>Page 21</p>	<ul style="list-style-type: none"> • Take preventative steps that inform future financing and create new processes for adaption of products after disasters. • Use scenario analysis to understand potential situations. • Meet with stakeholders. • Map out the post-disaster funding opportunities and connect with alternative funding sources. • Pre-structure adaptive products. • Establish a new approvals process.

Table 1: Recommendations for Adaptive Finance to Support Post-Disaster Recovery [cont'd]

CHALLENGES OF POST-DISASTER FINANCING	RECOMMENDED ADAPTIVE APPROACH
<p>Complexity Can Pose Obstacles during Disaster Recovery</p> <p>Page 23</p>	<ul style="list-style-type: none"> • Use collaborative research and innovation methods during the product-development process. • Create strategic partnerships with other organizations. • Map existing resources in communities served before a disaster hits.
<p>Exploitative Behavior Can Affect Community Trust</p> <p>Page 24</p>	<ul style="list-style-type: none"> • Gather feedback from survivors of past disasters on what constitutes exploitative behavior. • Create partnerships before a disaster. • Establish relationships with clients before a disaster. • Create public ethics policies and standards surrounding this issue.
<p>Lack of Preparation for a Disaster Increases the Magnitude of Impacts</p> <p>Page 25</p>	<ul style="list-style-type: none"> • Develop risk education. • Incentivize vulnerability-reduction efforts. • Partner with programs and organizations that are already established to support disaster-risk mitigation.

Our hope is that by breaking down the challenges and solutions to creating adaptive products, our various fields can strive to be more creative and collaborative in developing new adaptive products that serve those most in need after disasters.

INTRODUCTION

The need for post-disaster funding is growing as devastation from disasters is on the rise worldwide. The 2015 United Nations Global Assessment Report on Disaster Risk Reduction estimated that global disaster damages are now around \$250-300 billion USD each year.

While there are options for individuals, businesses, and institutions that want to receive financing for disaster recovery, they tend to be in the forms of insurance markets, relief grants, or public loans. Even with these resources, however, several challenges remain.

The first challenge is that a gap remains between the financing needs of individuals and businesses after disasters and the funding mechanisms that exist to cover them. While public and foundation funds are often available, private-sector funding is much less plentiful or accessible. Often, the amount of funding needed far exceeds what is available (United Nations, 2015, p. 166).

This funding gap is exacerbated for businesses by other factors; this is especially true for smaller enterprises. Small businesses often do not have the resources to complete effective contingency plans or do not prioritize this effort. A recent poll showed over 68 percent of businesses lack disaster plans (Nationwide, 2017). This lack of planning capacity concurrently increases their exposure to disasters and their reliance on grant and aid funding after the events. In addition, these small businesses are often ineligible for relief financing that is targeted at the household level.

In addition to a mismatch between funding needed and funding available, a second challenge is timing. Post-disaster financing tends to be slowly activated (Mahul & Ghesquiere, 2010). Reasons for this delay include the challenge of assessing financial risks after disasters, need for legislative approval for public funds, a lack of products designed to address constantly changing or chaotic situations, and the extended product-development time of large institutions.

KEY CHALLENGES FACING POST-DISASTER FINANCE

1. **Availability:** Gaps remain between the financing needs of individuals and businesses after disasters and the availability of funding.
2. **Timing:** Financing is too slow to respond to disaster events and support the critical needs of individuals and businesses (especially ones in the private sector).

The need for financing is critical in the first moments after disasters as well as in the medium and long term (United Nations, 2015). While market systems may not exist for a few days after storms or earthquakes, once they do, certain critical resources and services such as food or construction materials are often scant (Cavallo, Cavallo, & Rigobon, 2014). Furthermore, prices can skyrocket; both consumers and businesses can fall prey to price gouging in the wake of disasters (CNN, 2017).

Moreover, difficulty accessing cash can constrain a market's liquidity. This is true either for citizens when banks are down or for city or national governments when capital budgets are inflexible to demands for disaster appropriations. This makes transactions for both products and services difficult in the immediate aftermath of a shock event (Mahul & Ghesquiere, 2010).

Fast access to financing can determine whether small businesses transition through shocks without folding. These businesses' inability to recover can cripple a local economy. In the United States, almost 40 percent of small businesses affected by disasters never reopen their doors (FEMA, 2016).

For this reason, there is a huge opportunity for the private sector. But there is a lingering reticence to enter the post-disaster financing market. Due to the complexity of post-disaster response, effectiveness in providing economic relief from private entities generally requires collaborative partnerships – often public-private – between financiers, investors, and responders (World Bank, 2014). For example, appropriate information may not be available and financiers may struggle to assess their risk. In particular, credit information is often unavailable after disasters (World Bank, 2014). Many who need financing may not have formal credit ratings, so investors may need to find alternate ways of assessing risks. This takes additional effort and due diligence. But such partnerships can help financiers and other service providers create collaborative solutions to overcome information gaps, logistical challenges, and risk/return hurdles to offer financial products in the aftermath of a disaster (World Bank, 2014).

A MODEL FOR ADAPTIVE FINANCING

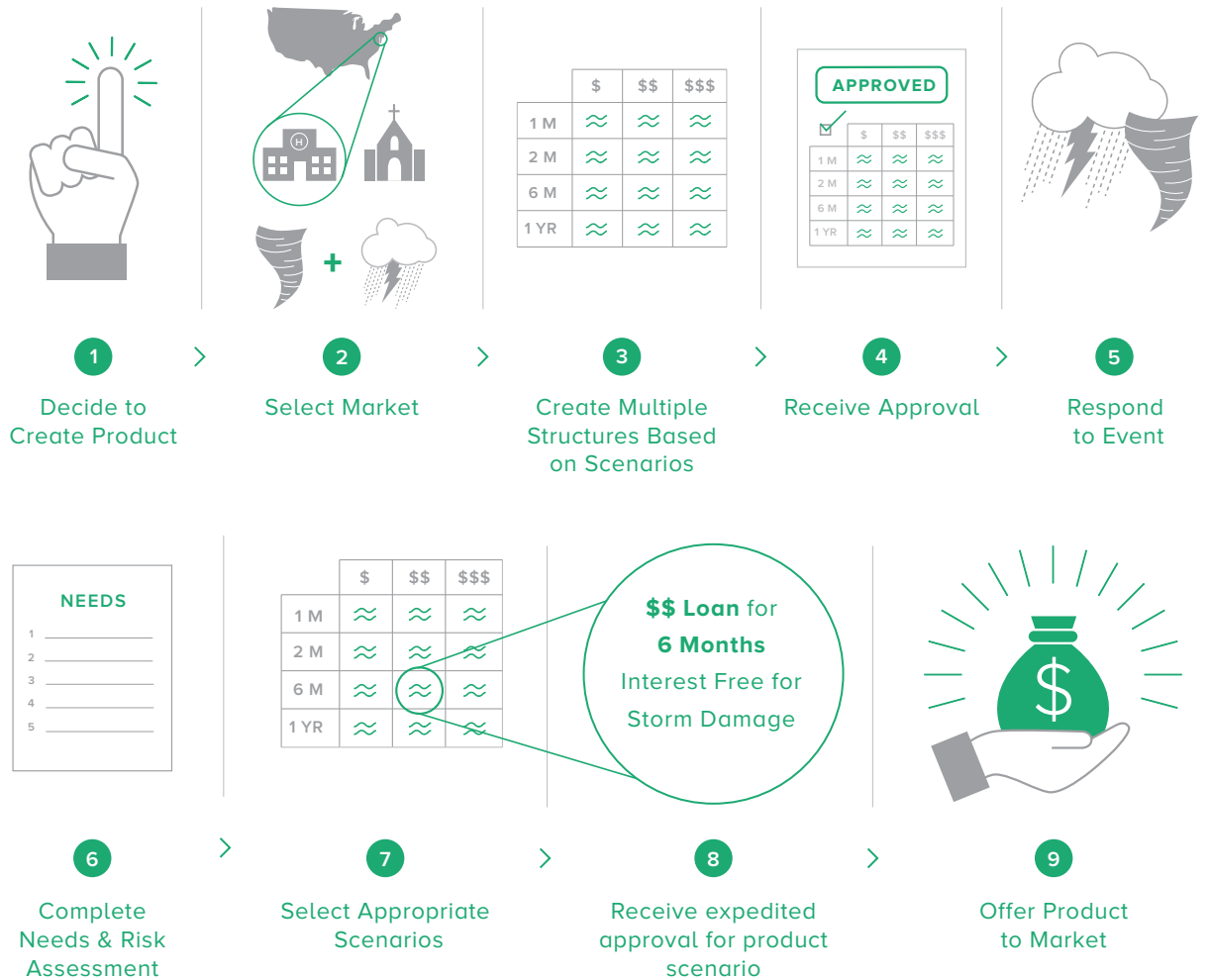
What if the financing that we used to support people and systems after disasters was as resilient as those people and systems themselves? In order to address hesitation from the private sector as well as the challenges above, a more *adaptive* approach to post-disaster financing is needed. Such an approach provides a way for private financiers to fill post-disaster funding gaps in ways that are designed to be responsive to specific contexts.

As an alternative model, we propose finance and aid providers focus on *adaptive financing* mechanisms, developing financial products that are flexible enough to adapt to the needs of specific locations in the wake of disasters.

This model is necessary because changing conditions demand flexibility. Adaptive financing efforts offer *flexible* products instead of relying on product-development processes that create *fixed* products such as mortgages which clients must refinance if they want to change their terms. Such adaptability depends on flexible underlying processes which allow finance providers to make ongoing adjustments to products in response to changing client needs. This requires a redesigned product-development process and a new conception of what a financial product is as a service instead of a commodity.

To illustrate how flexibility comes from process, imagine a loan that is designed for small businesses after disasters. The loan product has had 12 variations approved with three options for loan size and three options for loan tenor. For each of these variations, the financing requirements (rates, etc.) have been pre-calculated so that when a disaster hits, the product can be sized appropriately for the needs of the affected small businesses and run through an accelerated approvals process to immediately be offered to the market. This product would be more adaptive than a traditional loan product that offers only one or a few variations.

Figure 1: Example of Adaptive Financing Loan-Product Development



As the image above illustrates, a loan or other product designed intentionally in an adaptive manner can quickly adjust to the needs of the market in the event of a disaster scenario.

In addition, adaptive financial products incorporate these three dynamics:

1. These products often require changes to their development and approval processes so they can become more adaptive.
2. These products are often traditional financial products that are adapted to be flexible.
3. Because the entire market is often damaged by disasters, products often need to be offered with other complementary programs to support the recovery of the local ecosystems and economies.

This report will explore each of these dynamics in greater depth.

Throughout this report, we will also return to the case study of adaptive financing for small businesses in particular. Small businesses can greatly contribute to a community after a disaster by:

1. Restarting their operations to continue the services they provided;
2. Continuing to maintain employment opportunities (but being flexible to support employees' recovery);
3. Helping employees by ensuring that they have a places to stay, etc.; and
4. Serving as local leaders and using their connections, skills, networks, electricity, supplies, etc. to help the community (Nwatu, 2016; The National Academies, 2010).

However, small businesses also are often underserved by aid organizations and public institutions that traditionally direct recovery dollars to the household and individual level. This could be because many businesses in developing-country contexts may be informal and thus unregistered or because aid dollars are earmarked for primary response efforts like securing the health and safety of the affected population (Patel, Walker, Bhatt, & Pathak, 2017).

AUDIENCE AND INTENTION

This report is organized around challenges, opportunities, and solutions. It is designed for several audiences working on the challenge of connecting private capital to post-disaster needs.

One main audience is financiers who are looking to creatively support resiliency initiatives.

In addition, this may also be useful for practitioners – community planners, first responders, government agencies, and others – who would like to partner with other practitioners to create financing programs after disasters.

The report focuses on private financing rather than government financing because there are many options currently available through government-to-government funding, multilateral development banks, and private financial institutions.

METHODOLOGY

This report began as a Master's project at the Yale School of Forestry and Environmental Studies. Through background research and interviews with experts in humanitarian response, emergency management, resilience theory, and recovery finance, we mapped the existing challenges in the field of post-disaster financing.

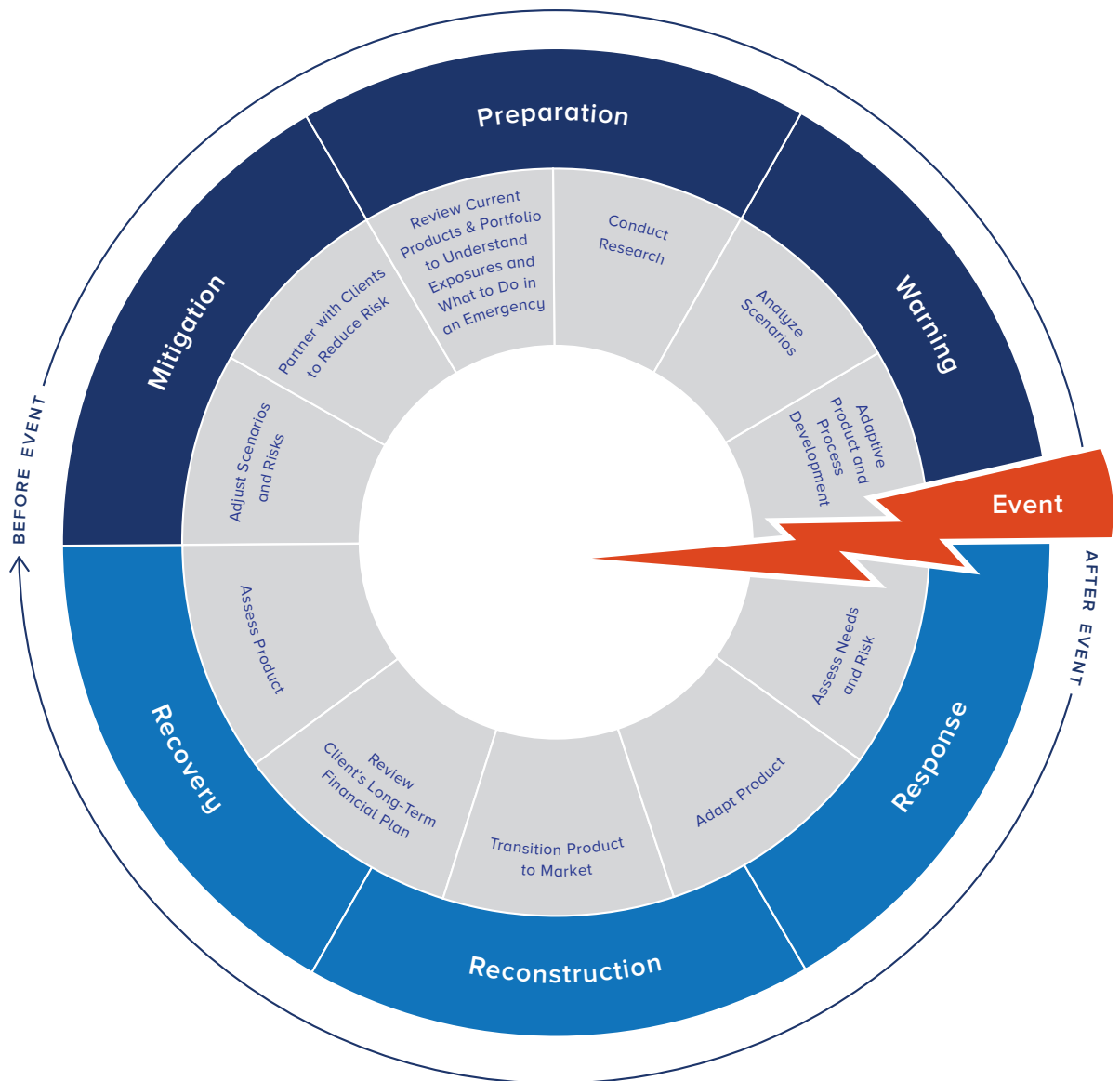
To fully develop and test the idea of adaptive financing and the potential for design thinking, we hosted a one-day workshop in February 2017 to bring together humanitarians and financiers and ideate solutions. Data from this event informed this report.

CONTEXT

Post-disaster financing is not the only kind of financing related to disaster events. Disaster risk planning encompasses the entire lifecycle of a disaster including the phases of preparedness, warning, forecasting, event, response, recovery, and reconstruction. (See the image below, which was created by the authors of this report and adapted from Khan & Vasilescu, 2008.)

In this report, we are discussing the financial products that are activated in the wake of a disaster during response and recovery to provide relief.

Figure 2: Disaster Cycle



EXISTING DISASTER-RELIEF AND RECOVERY-FINANCING OPTIONS

To support all phases of this disaster cycle, there are many options in the world of post-disaster financing. There are many factors that dictate the efficacy of such funding options.

In general, two main categories exist. “Ex-ante” funding arranges for resources before disasters based on predictions for the area. These measures include risk-transfer methods like disaster insurance where premiums are paid in advance. In addition, there are “ex-post” options where funding is arranged in the wake of the disaster itself (Clarke, Mahul, Poulter, & Teh, 2016). Ex-post financing is often provided by national governments, development agencies, global charities, and relief organizations in the form of grants, congressional appropriations (in the United States), and provision of essential goods and services.

When individuals, businesses, cities, and nations plan for disasters, they often layer these different options to attempt to take advantage of variations in timing of funding availability after disasters. However, from the financier perspective, it can be difficult to diversify risks when talking about disasters because they affect so many people and businesses in the same place at the same time. By providing financing to individuals in a variety of different locations, they can achieve a more diversified set of opportunities within their total portfolio.

The chart below shows many of the existing options for disaster financing. Each type is discussed in detail below.

Table 2: Funding Available for Disasters

FUNDING TYPE	EXAMPLES	TIMING	ACTORS INVOLVED
Risk Transfer	Flood insurance, Catastrophe bonds	Ex-ante/before an event	Insurers, Re-insurers, National governments
Credit	Loans	Ex-post/after an event	Financial institutions
Grants/Aid	Relief funding, Federal disaster block grant \$ in the US	Ex-post/after an event	National governments, Charities
Remittances	Money sent by family or friends	Ex-post/after an event	Household members, Financial institutions
Other/Hybrid	Forecast-based financing	Ex-ante/before an event	Risk modeling agencies, Insurers, Re-insurers, NGOs

Risk Transfer

Risk-transfer instruments are tools that transfer risk to a third party such as an insurance provider or re-insurer. These systems also include parametric insurance where insurance payouts are triggered through pre-defined threshold measurements such as that of the wind speed of a hurricane (Mahul, 2011).

Forecast-based financing, a method similar to parametric insurance, triggers payouts to vulnerable communities in advance of a predicted disaster. Catastrophe bonds fall in this category. These insurance-linked securities spread risk to a variety of investors beyond a single insurer. Bond principal is transferred to the insurers in the event of a disaster (Oppenheimer Funds, n.d.).

Currently insurance options are available to many small businesses and households, but due to challenges like limited availability, high costs, and inadequate marketing, many companies, individuals, and households often do not adequately use this opportunity to reduce their risks. Insurance for businesses experiencing disasters may not exist. Or it may be restricted to only pay for what was there before rather than funding moving businesses to new locations out of harm's way. And, if it is available, insurance may not be attuned to cover all business costs. Businesses in the Houston, Texas area in the wake of Hurricane Harvey discovered gaps in what the National Flood Insurance Program will and will not pay for, such as costs associated with remaining closed during the storm and recovery (Simon & McWhirter, 2017).

Credit Options

Credit options are loans such as traditional mortgage refinancing, small-business loans, and microfinance options. The United States Small Business Administration offers low-interest disaster loans for businesses to use for repairs or replacement of inventory (US Small Business Administration, 2017).

A good example of localized disaster-recovery lending is the Vermont Farm Fund (VFF). The VFF was inspired by one farm's fire emergency and the community's response of monetary support. A community member sourced funds to create a revolving loan fund to support farms after disasters. VFF uses payments made by one set of loans to finance the next set of loans. The fund is capitalized by farmers themselves as well as community members and foundations. Most importantly, the fund focuses on deploying funds in a timely manner without red tape, providing liquidity for Vermont farmers when they need it most ("Vermont Farm Fund-Loans for an Agricultural Economy," n.d.).

Post-Disaster Grants/Aid

Post-disaster aid in the form of grants is the most well-known and widespread form of disaster financing. Organizations like the United Nations or national governments will perform post-disaster needs assessments to determine the payout amounts (The World Bank GFDRR, 2017).

In the United States, the Community Development Block Grant Disaster Recovery Program is one of the main aid instruments activated in the wake of disasters that meet national state-of-emergency threshold levels (HUD Exchange, 2017).

Remittances

Payments sent to family members in affected areas are one of the hardest post-disaster financing mechanisms to track. However, multi-country studies have confirmed that remittances generally rise after a catastrophic event (Bragg, Gibson, King, Lefler, & Ntoubandi, 2017).

This type of funding does not benefit everyone equally and also preferences individuals with stronger social networks. In addition, remittances can only provide so much. A study showed that remittances often increase sharply in the wake of a disaster, but then fall off after a short time as the financial situation of the person providing remittances often is not able to support a long-term expense (Bragg et al., 2017).

HYBRID AND EMERGENT MODELS

In addition to the models above, there are hybrid and new models of post-disaster financing emerging. Most are still built on existing platforms but incorporate elements of multiple models or are exercised in combination with other approaches.

For example, NGOs such as Mercy Corps are experimenting with ways to support entire local markets in recovery from disasters via a combination approach and a focus on helping ease the flow of funds into an area through educational and support programs for banks and local lenders (Anderson, Ling, & Onder, 2017). They are combining training with capital influx to aid longer-term money management.

In many areas, barter or non-cash systems are the first to emerge post-disaster. Some organizations are encouraging the lasting development of such systems to enhance resilience in the face of natural disaster events – either short-term shocks or longer-term stress events like droughts. One example is Goats for Water, which helps areas in need of water gain services in an exchange for livestock (Zahid, 2016).

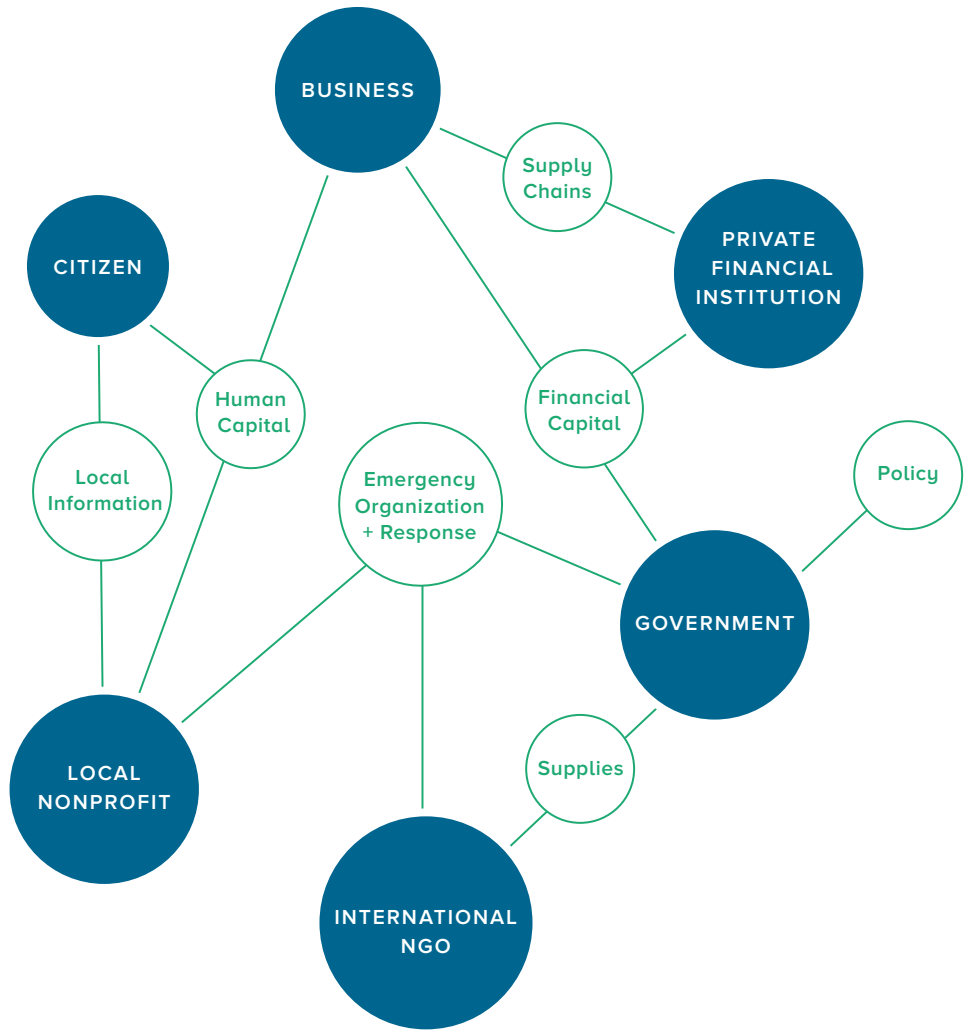
INTERNATIONAL AND REGIONAL STAKEHOLDERS

Amidst this complex world of post-disaster financing, there are many actors of international and regional scope. However, the burden of response for most disasters – especially those that don't attract national or international attention – lies with the local communities.

Most funding options are not tailored to the context of the communities themselves. Funds from international donor agencies or NGOs may be earmarked for certain uses only or may be subject to particular timelines. This limits the ability of the local government to have flexibility (Center for International Disaster Information, 2014).

Each stakeholder group has a different role to play in the wake of disaster events and has access to different resources. The image below provides a broad look at this distinction.

Figure 3: Stakeholder Resource Map



FINANCIAL-PRODUCT-DESIGN PROCESS

Financial products are traditionally developed and released using long processes that include many iterative steps of market testing, risk analysis, and approval decisions (see image below). This process often takes many months or years.¹

Figure 4: Financial-Product-Design Process



1 There are many different models of new product development. This represents just one example. For more see: Cooper, Robert G., and Elko J. Kleinschmidt. (1995.) "Benchmarking the Firm's Critical Success Factors in New Product Development." *Journal of Product Innovation Management* 12 (5): 374–91. doi:10.1016/0737-6782(95)00059-3.

Corporate and manufacturing product–development research generally supports our hypothesis that there is value in the consistent application of processes that bring players along the value chain together in the research phase to discuss challenges and possible solutions.

This increased engagement can improve financial institutions’ understanding of markets and needs and give them a ready audience for early product-testing.

Forward-thinking, design-oriented behavior allows key considerations to be designed into the original structure of a financial product. This ideally reduces the need for intensive product iterations and reduces the overall cost of developing financial solutions for complex social issues.

ADAPTIVE FINANCING BENEFITS AND OPPORTUNITIES

The need for post-disaster funding is growing as devastation from disasters is on the rise worldwide. Although damages in terms of dollars are higher in developed countries, they are often more acutely felt in the developing world, where damages proportional to GDP are much higher, public-sector relief support is limited, and policy incentives or insurance access are often sparse (World Bank, 2011). Climate change also plays a role in exacerbating the effects of disasters such as storms and floods.

The United Nations’ Global Assessment Report on Disaster Risk Reduction in 2015 lists over 60 countries that would face a large gap in finding the resources domestically to absorb a 1-in-100-year disaster event and says there are many more without adequate records to predict such gaps (United Nations, 2015).

Though need for disaster finance is not standard across all countries, adaptive financing fueled by private-sector entities can provide relief in both developing and developed economies. For example, global estimates put only 20-40% of those affected by disasters as having any insurance at all (Schnarwiler, Trüb, Fehr, & Reichenmiller, 2011). In the wake of Typhoon Haiyan in the Philippines, the global risk analysis firm AIR estimated that of the approximately \$6.5-\$14.5 billion USD in damages, only \$300-\$700 million USD was insured (AIR, 2013). Coupled with a limited availability of state reserves to provide local response, this leaves the global uninsured exposed and dependent on foreign aid and relief funding.

The approximate \$200-\$300 billion USD needed each year to fund disaster response and recovery represents a potential market opportunity for the private sector to close the gaps in what local governments can provide. By creating adaptive-financing mechanisms, companies can provide more post-disaster resources for residents, cities, and other stakeholders. This can help close the gap and reduce strain on local and national government budgets in the wake of disaster events, stabilizing overall economic recovery.

CHALLENGES

Design of adaptive-financing programs requires understanding of complex challenges and productive responses. The following section looks at identified implementation challenges and actions that can be taken to solve these problems. These challenges and recommendations have also been summarized by stakeholder in the Appendix.

FINANCING AFTER DISASTERS REQUIRES NEW MODELS

Individuals, households, businesses, and institutions all rely on complex support systems to maintain business as usual. After a disaster, the status quo shifts and everything from communication systems to labor prospects changes.

Therefore, it can be very difficult for a financier to assess the risk of repayment even for a known customer, as the challenges that they face are very different from before. Moreover, the obstacles that survivors face can change dramatically from situation to situation. This can make anticipation and prediction of post-disaster needs quite tricky. It also makes it hard for solutions to be highly replicable.

Case Study

In 2016, the Natural Capital Declaration and the German government's Emerging Markets Dialogue on Green Finance launched a joint project to pilot scenario modeling to stress-test corporate lending portfolios for environmental risk. The pilot project will develop an analytical framework to enable bank stress-testing models to include scenarios of the economic resilience of major industries to the risk of extreme droughts.

The banks involved with this pilot through the Natural Capital Declaration include Citi, UBS, ICBC, Banamex, Banorte, Caixa Econômica Federal, Itaú Santander, and FIRA. They are working with RMS, a global catastrophe-modeling firm, as well as academics from leading European universities and global research centers, to develop a drought model that they hope will enable financial institutions to better understand their exposure to environmental risk.

The project is advised by an expert council consisting of specialists from rating agencies like S&P, global initiatives like the UNEP Inquiry into the Design of a Sustainable Financial System, and scientific institutions like Cambridge University (Natural Capital Finance Alliance, 2016).

Recommendations:

To address this challenge via adaptive financing, other companies seeking to build similar programs can:

- **Research the primary financial and non-financial needs clients will have.** Research the most common hazards in a geography and identify the most common patterns of needs after disasters (with the understanding that these may change in the face of shifting climate patterns).
- **Pre-approve a set of solutions that can be adapted quickly after a disaster.** They can be engaged to address the needs of individuals and businesses.

Recommendations [cont'd]:

- **Use scenario-based planning models.** These can combine the latest scientific research for anticipating the impacts that various disasters can have on economies with financial models that anticipate a financial products' performance.
- **Create products that have several investors participating at various levels of risk with some willing to take a first loss on defaults.** This can help reduce the risk of an overall investment and attract more institutional investors.
- **Optimize the non-monetary benefits of the deal.** For example, this could include a United States investor's ability to earn credits under the Community Reinvestment Act so that there is additional value on the table that will not be lost if unexpected risks or defaults occur. (See the next case study below).

THE CASE FOR PRIVATE INVESTMENT IN DISASTER RECONSTRUCTION IS UNDERDEVELOPED

Currently there is a defined case for private-sector entities to avoid investing in disaster reconstruction for individual clients or small businesses as risk levels are hard to assess. Private insurance companies and other entities already serve a critical role in risk-backing for large-scale, dispersed portfolio products that are often regional or national - such as re-insurance options or catastrophe bonds (World Bank, 2014). However, for smaller markets there is less of a business case for private-sector investment in disaster recovery, especially outside the insurance industry. In addition, the products that can best serve small business clients at the local level can be costly to develop in rapidly changing environments. And these clients often need a greater amount of individual support - thus driving up the overhead costs of product management.

However, small businesses are the backbone of local economies and are critical to longer-term recovery (The National Academies, 2010). Our research shows that this is an opportunity for private entities that should engage in post-disaster financial investment at this level. Advantages to this approach include:

- **Client solvency:** By offering products to existing clients after disasters, financial providers can help their clients avoid default, which is costly to both the clients and providers.
- **Customer loyalty:** By helping customers when they need it most, companies can strengthen their brands' reputations.
- **Client acquisition:** By offering flexible products that fit the needs of clients after disasters at a time when not many products are available, organizations can recruit new clients and, after the situation stabilizes, develop the relationship further through selling standard products.
- **Skill and information development:** By offering products and services after disasters and by developing pilot products that embrace innovation and the idea of flexibility, firms can develop knowledge, know-how, and information that can provide a competitive advantage over peer firms as the demand for flexible products in the market grows. This can be helpful to public-sector entities that may not be able to innovate quickly (World Bank, 2014).

- **Reputational benefit:** By offering needed products after a disaster, institutions can increase goodwill with those directly involved as well as with others who learn about the support.
- **Strategic partnerships:** By creating partnerships, important stakeholders like governments, nonprofits and businesses can provide necessary financial solutions for local communities after a disaster that can result in successful long-term relationships.

Case Study

After Hurricane Sandy, Citigroup responded in a variety of ways that helped support its client base, recruit new customers, maintain market access, and receive positive brand recognition.

For example, Citigroup has long had a Community Development team which focuses on investing in communities in return for required Community Reinvestment Act (CRA) credits.² After Hurricane Sandy hit New York and the surrounding coast, the team developed small business loans that they were able to offer affected business owners. This enabled them to support these businesses, receive CRA credits, and recruit new customers.

Mobile ATMs were moved into the area to allow current customers and others access their cash and to provide liquidity to the market after the disaster. Mortgage customers were also offered relief programs, enabling customers to postpone payments and suspend foreclosure sales. Finally, the Citi Foundation donated \$1 million dollars to the American Red Cross (Citigroup, 2012).

Recommendations:

To address the challenge of creating a sufficient business case to inspire private-sector investment in post-disaster finance, companies and individuals can:

- **Calculate all of the benefits of participation.** Estimate the current and future strategic and reputational benefits of developing new products for disaster recovery.
- **Ensure that all benefits are realized.** All too often, benefits are calculated that rely on communications and publicity. However, if companies do not make the extra effort to make sure that all of the necessary internal teams are included in the process of developing and publicizing the products, then the organizations as a whole will not realize the full benefits. Therefore, it is important to determine upfront when and how necessary stakeholders should be included in the process and then follow through.
- **Create solutions to reduce risk.** For the main areas of risk, think of solutions to reduce the risks associated with the transactions and lower the costs associated with the deals. See our other challenge recommendations for specific ways to reduce risk.
- **Foster strategic partnerships.** Strategic partnerships – whether with other investors at various risk tolerances or with experts on disaster reconstruction – can enable private-sector institutions to reduce barriers to entry by bringing in necessary expertise to problem-solve and off-take risk.

² See https://www.federalreserve.gov/consumerscommunities/cra_about.htm for more information.

Recommendations [cont'd]:

- **Make the formal business case for market entry.** For new projects with distributed value across a company, it is often important to design the business case, put it into writing or on slides, thoughtfully map out whose support is critical, make the case to them initially and on-goingly, and send the case to those key supporters so that they too can easily share it with any of their stakeholders to explain why this effort is receiving their support. It is also critical to continue to make this case over time and evaluate the benefits of providing disaster relief/recovery products.
- **Track accrued value.** Use the same methodology used to calculate the hypothetical value of the product to track the complete accrued value over time. This will provide insight into where the greatest costs are being incurred, where the greatest value is being realized, and how companies can improve and support future product iterations.

DISASTERS DISRUPT SUPPLY CHAINS AND COMPLICATE RECOVERY LOGISTICS

After a disaster, it can be much more logistically challenging to offer financial products to clients that need them most than before. Everything from communication systems like the internet and postal system to roads and infrastructure is often damaged or hazardous.

Supply chains in today's world are increasingly complex and global, so a disaster in Thailand can be disruptive to businesses as far away as Nebraska or Germany. The global ripple effect of disasters means that funding to support disaster relief needs to be seen as a global priority.

Especially for small businesses that provide goods or services, the resulting disruptions to supply chains after disasters can be crippling. Businesses local to the disaster zones may have to spend reserves making repairs. If they are not able to get supplies or distribute their wares to continue to stay open, they will struggle or shut down.

In addition, enterprises that depend on businesses in the disaster zone for their supplies will suddenly have to find alternate suppliers. In contrast to small businesses, larger enterprises with wider supplier options and redundancy in their procurement can often withstand large shocks like disruption of material flows and product delivery.

Financial institutions and fund distributors can be among those businesses downed, leading to challenges related to getting funding in the right hands post-disaster. Adaptive financing should endeavor to alleviate this impact where possible.³

Case Study

Global shipping company Deutsche Post DHL Group lends its expertise in logistics to countries in need of such support in the wake of disasters. Pre-disaster, DHL works with clients to ensure they have adequate reserves and that they have planned for emergencies.

3 For additional information: <http://voxeu.org/article/natural-disasters-and-supply-chain-disruptions-mitigating-propagation-negative-shocks>

After a disaster, by mobilizing disaster-response teams (DRT) and sending trained logistics professionals to airports in areas of need, DHL can help ease the flow of relief materials and sensitive equipment. This capacity mobilization is planned well before a disaster strikes and can be easily deployed at that time (Deutsche Post DHL Group, 2017).

This kind of preparation and system design help ease the logistics of recovery and the disruption of supply chains through minimizing logistics bottlenecks. Similar solutions exist in the financial sector. Western Union has often freed up its services in the wake of disasters. After earthquakes in Pakistan in 2010, the money-transfer service offered no-fee transfers to the disaster zone (Western Union Foundation, n.d.).

Recommendations:

To address this challenge via adaptive financing, companies can:

- **Create redundant access to customers.** For example, perhaps mobile solar-powered terminals can be distributed to an area of anticipated impact so that people can request new loans if they need them.
- **Use mobile and flexible technologies.** Provide access to financial products through mobile technology so that once cell and data service are restored to an area, people can communicate with financial institutions through their devices.
- **Prepare for disasters.** If there is a way to manage risk, financiers could offer opportunities for organizations to get pre-approval on financing they anticipate needing. This could alleviate challenges for local businesses that may lose critical documents or have trouble proving creditworthiness after a disaster.
- **Plan supply chain responses.** Analyze supply-chain networks. Focus on restarting entire supply chains after disasters.
- **Have a business-continuity plan.** Many businesses do not take the time or resources to plan for disasters. Having a plan in place can be helpful to understand what actions to take in the wake of a storm or an earthquake.
- **Perform risk analysis of supply chains before disasters occur.** Understanding where weak points are can help organizations plan for redundancy and backup that will help with business continuity after disasters. This can be considered both for clients and suppliers.

LARGER MARKETS CAN BE DAMAGED BY DISASTERS

Along with destroying infrastructure and other systems that individuals and organizations rely on to recover, disasters can also create massive disruptions to larger markets and ecosystems that can hinder recovery for any individual people or organizations.

Therefore, it is important that solutions be focused not only on providing businesses with financing but also on helping their customers and suppliers recover. For example, if governmental systems are not running effectively, there could be less protection of personal property, which might force people to spend more time at home protecting their belongings.

Or if local supply chains have not been restored, it might be very difficult for local stores to reopen even once the buildings have been repaired and employees are ready to return to work. Therefore, attention needs to be given to not only the beneficiaries of the financing but also to restoration of the other elements of the systems upon which the beneficiaries most rely. These may include utilities, workforce, distribution, and other systems.

Case Study

After Typhoon Haiyan in the Philippines, the United States Agency for International Development (USAID) partnered with Procter & Gamble (P&G) and Coca-Cola to support economic activity and livelihoods in one of the provinces hardest-hit by Super Typhoon Yolanda.

Sari-sari stores — small community stores — are the backbone of the Philippines consumer economy and a large supplier of P&G and Coca-Cola products to the local market. Therefore, to help rebuild the local economy and jump start sales, the two companies helped establish new sari-sari stores and rehabilitate damaged or destroyed stores located in public marketplaces.

The organizations additionally facilitated sari-sari store owners' access to microfinancing loans. According to Sumeet Vohra, President and General Manager of P&G Philippines, "In addition to the emergency response and disaster relief, there is need for a longer-term effort to restore livelihoods and regenerate the economy of Leyte. Through this partnership with USAID, P&G will leverage its portfolio of well-known household brands, its extensive distribution network, its commercial expertise, and its long history of partnership with micro-entrepreneurs who operate sari-sari stores to achieve this goal. P&G and its employees and retirees from all over the world are contributing to this effort." (USAID, 2013)

Recommendations:

To address this challenge via adaptive financing, companies can:

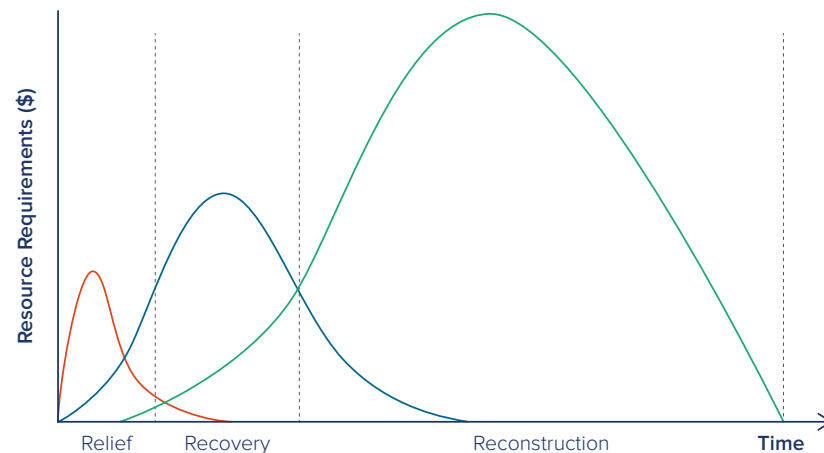
- **Create community associations.** These organizations can aggregate small businesses for larger finance opportunities.
- **Create flexible financial products.** This can be accomplished by integrating planning for disaster contingencies into typical financial product arrangements.
- **Understand the community.** There is a need to know the community from a financier's perspective. Any solution aimed at small businesses needs to be locally-focused and understand the role such enterprises play.
- **Develop contingency plans.** Work with critical communication, logistics and supply-chain providers — as well as potential clients — to develop short-term contingency plans to build their capacity to recover quickly after disasters.
- **Partner with other providers.** Develop adaptive-finance products that meet not only the financial needs of clients but also the needs of their broader ecosystems by partnering with other service providers.
- **Map and activate networks and diagram supply chains.** Before a disaster, mapping the broad web of players and their relationships will help companies to better understand which will be most critical to jump starting the economy after a disaster. Mapping is just the first step, however, as these networks will be most valuable and responsive if they are continually updated and engaged (or "activated"). This will build trust over time.

SLOW AND CUMBERSOME FINANCIAL-PRODUCT-DEVELOPMENT PROCESSES LEAD TO A MISMATCH IN TIMING BETWEEN THE NEED FOR RESOURCES AND THE AVAILABILITY OF FINANCING

After a disaster, financial aid is needed as soon as the local market has been restored and, at times, even before then to help jump start the economy. However, often post-disaster aid funding arrives in a way that is too little and/or too late. Gaps in funding and a lack of ability to get the funds to the right hands are consistent challenges. In January 2016, the United Nations estimated the global gap in existing versus needed humanitarian aid to be over \$15 billion USD (Belanger et al., 2016).⁴

At the local level, the challenges detailed above make the distribution of aid funding complicated so that many times, funding does not arrive in a usable manner or at the time it is most needed. Electronic bank accounts may temporarily not be accessible. This also results in delays often several weeks or months after an event when rebuilding is in full force. Timing is a challenge because disasters are often forgotten during the recovery phase when money is critical, but the media coverage or flow of donations to aid the effort may be small (see image below).

Figure 5: Main Phases of Post-Disaster Funding Needs



Source: Mahul, O., & Ghesquiere, F. (2010). Financial protection of the state against natural disasters: a primer (No. WPS5429) (pp. 1–26). *The World Bank*. Retrieved from <http://documents.worldbank.org/curated/en/227011468175734792/Financial-protection-of-the-state-against-natural-disasters-a-primer>

In addition to funding delivery gaps and delays, traditional financial-product-development processes can take months to years to develop a new product - thus adding to the challenge of adapting existing financial products to fit evolving needs.

Moreover, the process of creating products can be very costly for financial institutions. If the risks of transactions are underestimated during expedited product-development processes, the impact of these shortcuts can create long-term vulnerabilities for the institutions offering the financial solutions.

⁴ More information is available from the World Bank: <http://documents.worldbank.org/curated/en/227011468175734792/pdf/WPS5429.pdf>

Adaptive financing can create products that provide a steady stream of need-aligned funding which can alleviate this timing gap. The flexibility of adaptive products and the ability to respond to changing market dynamics can also increase funders' willingness to pay during the reconstruction phase as well as during the relief and recovery period.

This could include separately financing coping/response mechanisms and longer-term recovery – both in a single product or delivery method. However, product-development processes need to change in order to catch up to the existing needs and be quicker to adapt.

Case Study

Global Development Banks have created a variety of products to try to address the challenges for government recipients, such as the timing of disaster financing.

For example, the World Bank helped the Caribbean Community (CARICOM) establish the Caribbean Catastrophe Risk Insurance Facility (CCRIF), a joint reserve facility intended to offer 16 countries exposed to earthquakes and hurricanes liquidity coverage akin to insurance. The facility was funded by participating countries and donor partners and the World Bank. By using the financing tools of the World Bank to create a self-funded parametric insurance instrument and an accompanying process for the deployment of this funding, participating countries are now able to access relief funds immediately after disasters, reducing the likelihood of a mismatch in timing (Mahul & Ghesquiere, 2010).

Though this parametric model was designed to help governments, similar models could be used to provide payouts directly to insured small or medium enterprises. Governments receiving funding could utilize payouts to stabilize and support the private sector post-disaster.

Recommendations:

To address this challenge via adaptive financing, companies can:

- **Take preventative steps that inform future financings and create new processes that allow for adaption of products after disasters.** This could include:
 - *Use scenario analyses to understand what situations might arise for sets of clients.* Use this analysis to identify what responses could be valuable. Then take steps to prepare your organization to have an appropriate response in case of emergency.
 - *Undertake risk analyses.* This will help financiers understand what challenges clients may face and what measures banks could take to mitigate risks.
 - *Meet with stakeholders.* This will help to understand how other organizations can simultaneously support your clients in case of emergency. You can identify steps that each organization can preventatively take to accelerate that response after a disaster. Preemptively formalize partnerships with peer financiers, local leaders, and other organizations that can help support clients after disasters.
 - *Map out the post-disaster funding opportunities and connect with alternative funding sources.* This will reveal opportunities to partner in post-disaster financing. Draw up partnership contracts that can be easily modified to the specifics of a particular deal after a disaster.

Recommendations [cont'd]:

- *Identify local organizations, institutions, community leaders, and others that, in the event of a disaster, the financial institution could roll out and deploy financing through.* This would connect beneficiaries to funding. Confirm the communication mechanisms that will be employed with contingency plans in case traditional communication networks are down.
- **Pre-structure adaptable products.** Create preliminary product structures that can be adapted after disasters.
- **Establish a new approvals process.** Alter product-approvals processes to accelerate the speed of the process after disasters.

COMPLEXITY CAN POSE OBSTACLES DURING DISASTER RECOVERY

The difficulties of the days and weeks following disasters are multifaceted and complex. Where to dedicate resources can be confusing, as there are many competing priorities. This makes assessing risk and creating tailored solutions challenging.

As a result, the barriers to creating new financial products can be much higher for financiers who want to try to find efficiencies and meet community and business needs.

Such custom products, tailored to specific situations and clientele, will be both more complex and in higher demand than other products. They will require additional resources to manage, driving the cost of product development and the risk of failure both sky-high.

This is not a risk landscape many financiers are willing to enter. Therefore, it is helpful to invest product-development resources to design products in advance of a disaster that are standardized yet can allow for variability based on individual situations during the response phase.

Case Study

In Ethiopia, the Productive Safety Net Program established by the national government and several NGOs helps to alleviate food insecurity brought on by droughts and build resilience in rural areas. This program was designed in advance of droughts. Funding was set aside into a trust fund for activation during times of food deficit.

Through multi-annual distributions of food and/or cash to rural families, the program helps chronically food-insecure people survive slow harvest periods and avoid depleting their productive assets while attempting to meet their basic food needs.

This is a program designed to provide disaster relief in a flexible, context-dependent manner that is easily activated during or in the wake of a drought event without need for much additional risk assessment in the moment. This process streamlines the distribution of aid, avoiding the impact of complexity (UN World Food Programme, 2012).

Recommendations:

To address this challenge via adaptive financing, financial-service providers can:

- **Use collaborative research and innovation methods such as design-thinking strategies during the product-development process.** Employ design thinking strategically during the research phase of financial-product development. These processes add value by including stakeholder input early in product development. They help remove market barriers to innovation. Design thinking is a process of utilizing elements from the design field like empathy and experimentation to quickly innovate and iterate solutions (“Design Thinking,” n.d.). Through implementing this and other participatory research techniques, product-development teams can help galvanize stakeholder buy-in through holding collaborative workshops, gathering information about users and their needs, understanding challenges and the drivers of financial need post-disaster, or helping brainstorm ways to address such challenges and come up with innovative financing ideas.
- **Create strategic partnerships with other organizations that focus removing obstacles to repayment.** This can be taken to another level by creating a digital or other marketplace to connect service providers to those that are in need after disasters.
- **Map existing resources in communities served before a disaster hits.** Create a preparation map that registers existing resources and connections before a disaster to help businesses, financiers, and responders understand an economy after a disaster.

EXPLOITATIVE BEHAVIOR CAN AFFECT COMMUNITY TRUST

After a disaster, the vulnerability of individuals, organizations, businesses, and institutions goes up because of the chaos and uncertainty that results (United Nations, 2015). People and businesses may migrate away from their original locations and be in unfamiliar territory. This disorganization and displacement can adversely affect available information and accountability mechanisms.

Consequently, it can be hard to know whom to trust, as there is a large opportunity for exploitative behavior in post-disaster scenarios. Without proper trust mechanisms in place and information to understand the context, partnerships and sales can be difficult.

Case Study

To create greater trust between humanitarian donors and fund recipients, the United Nations Office for the Coordination of Humanitarian Affairs (OCHA) created the Financial Tracking Service.

This is used by humanitarian donors and partners to exchange data and information about humanitarian needs, relief actions, and funding gaps after emergencies and in times of need.

It is a comprehensive platform that creates a marketplace of donors and disaster response actors. When a disaster strikes, members can use the platform to direct money to trusted partners that have been previously vetted. Trust is maintained by the transparency and accountability that is created by the platform’s reporting requirements (UN OCHA, 2017).

Recommendations:

To address this challenge via adaptive financing, companies can:

- **Gather feedback.** Partner with survivors of past disasters and supporting organizations to identify what predatory behavior would look like after a disaster and measures that can be taken to prevent it.
- **Create partnerships before a disaster.** And create accountability mechanisms that maintain trust during the response to a disaster.
- **Establish relationships with clients before disasters.** This can be accomplished through existing-product promotion, risk-reduction trainings, or emergency-services marketing.
- **Create public ethics policies and standards.** These can serve as an internal and external checklist to internally insure and externally guarantee that the business is not taking part in predatory behavior. Understand what predatory behavior looks like and create public policies to prevent such behavior in your organization.

LACK OF PREPARATION FOR A DISASTER INCREASES THE MAGNITUDE OF IMPACTS

If disasters strike communities that have prepared for them, vulnerability to intense destruction can be mitigated, the financial impact can be reduced, and the recovery can be accelerated.

However, often individuals, households, and businesses do not have the knowledge, incentives, or structures in place to take preventative actions like contingency planning, insurance purchasing, business continuity planning, and other steps.

Case Study

The United States Small Business Administration offers many important services to small businesses in the nation after disasters including emergency loans (capital), financial advice, and contract assistance. However, while the agency has a strong response protocol, it also has a strong disaster-preparedness program.

For example, the Disaster Preparedness and Recovery Plan (DPRP) mandates regular work before disasters with agencies that are involved in emergency response for small businesses. This is to ensure that after a disaster, the involved agencies have a coordinated response. Additionally, it offers services for small businesses themselves such as an online emergency preparedness trainings to help small businesses reduce the vulnerability to damage that they face from future disasters (US Small Business Administration, 2016, 2017).

Recommendations:

To address this challenge via adaptive financing, companies can:

- **Develop risk education.** Offer trainings to clients on how to prepare for disasters. Create programs that teach clients how to take necessary steps to reduce their vulnerability through their current products, services, and relationships.
- **Incentivize reduced vulnerability.** Offer incentives for clients who take steps to reduce their vulnerability to relevant hazards both personally and in the greater systems or supply chains they rely on. For example, risk-reduction measures can be a prerequisite for special benefits. These might include lower insurance premiums, lower interest rates on loans, additional dedicated funding pools, or other options. In the United States, a public-sector example of this is FEMA's Community Rating System.
- **Partner with programs and organizations that are already established to support disaster-risk mitigation and education.** Work with third-party organizations to improve prevention activities.

DISCUSSION

The feasibility of creating more adaptive financing for post-disaster relief is a function of trust, risk, need, and context. Balancing these factors and enabling actions by private financiers are key to promoting innovation in the post-disaster finance sector.

After consulting with experts and analyzing the main barriers to innovation in the post-disaster financing world, our conclusion is that it is possible to design a financial product that is able to be deployed in different contexts around the world during disaster scenarios and be contextually aware and integrated.

Current trends show that innovation in post-disaster financing is happening. Newer products such as parametric insurance and catastrophe (or “cat”) bonds emerged in recent years and are gaining in popularity (Scism & Das, 2016).

Positive examples of successful creative, adaptive financing mechanisms are emerging. For example, in the wake of the 2014 flooding and forest fire in the Santa Clara Pueblo region of New Mexico, federal funding was not sufficient to meet the needs of the resident Native American community. FEMA coordinated a roundtable with local and regional philanthropists to mobilize additional private funding to meet key needs. Foundations agreed to dedicate funds to the region in ways that met their strategic goals of early childhood education and other objectives. Federal agencies that might have supplied similar funding agreed to repurpose that funding to support supplemental flood-relief appropriations. Therefore, the area was able to gain further relief funding and FEMA and others were still able to work within their mandates (Casper, 2016).

It is our hope that models of creative financing such as this can be organized in advance of future disasters to bolster options for those in need after disaster events. As in the example above, it is important to think about existing resources, platforms, and structures and how they can be adapted to support each other. We encourage flexibility in the wake of disasters and recognize that it is not always necessary to create something new. Tweaking existing models can make all the difference.

In addition, we stress that when referencing financial products, we are not always talking about the need for a loan, grant, or insurance product. We include in this definition the mechanisms, partnerships, and processes that enable money to flow. The Western Union example above illustrates this distinction. By allowing money to flow more easily, the company was providing funding without giving any dollars as an institution.

As referenced above, we hope to distinguish between process and product. It is important when talking about adaptive finance to look beyond the product and emphasize that flexible products necessitate setting up processes that make them possible. In addition to examining the mechanisms that get funding from point A to stakeholder B, it is also critical to look at the processes internal to organizations that support financial-product development and use.

For this reason, we advocate for the use of creative research strategies in product development to enable creativity and quick, in-depth feedback from many stakeholders at an early stage of the product-development life cycle. In addition, including the entire disaster cycle shown above in Figure 2 into the product-development-process planning can help products address the entire disaster lifecycle rather than only investing before or after the event.⁵

Our focus in this document on private-sector financing shows that it is both a challenge and opportunity for post-disaster recovery. This is a challenge because there is an embedded risk aversion in the sector, exacerbated by the fact that in post-disaster scenarios beneficiaries or clients are often hard to reach, have many needs, are risk-averse, and are sometimes “in it for the money.” In addition, sometimes they are focused on a return on investment that can inhibit flexibility. However, private capital presents an opportunity because private entities can help provide lasting recovery to the local economy. They have broad networks in the community and can provide needed support post-disaster for recovery.

The risks involved in entering the market of post-disaster financing range from a potential small or negative return on investment that could cripple a financial-services venture to a large-scale failure of a market-based product. However, there are reputational benefits and opportunities for risk distribution that can reduce vulnerability that outweigh the existing risk. Distributing risk through partnership between different kinds of financial institutions (philanthropic, private, etc.) can help alleviate this challenge and help enable market entry.

5 For more information, see: <http://disasterphilanthropy.org/issue-insight/the-disaster-life-cycle/>

CONCLUSION

The road ahead for post-disaster financing is complex. The multitude of stakeholders involved in recovery processes, the high-stakes and often chaotic nature of disaster response, and the fiscal risks involved in taking on such projects mean that innovation is slow and often uncoordinated.

However, when diverse stakeholder groups are able to come together, there is a keen interest in pursuing this kind of collaborative product development and incorporating adaptive financing models into existing options.

What are the next steps? We hope that this inquiry will result in a call for future changes to existing financial-product-development processes and increasing cross-sector collaboration between public and private entities.

There is a wealth of resources for organizations to draw on that are researching and innovating in the world of post-disaster financing. Those organizations that are leading the way can provide assistance and inspiration for others. In addition, further research in the area of creative post-disaster financing, fiscal disaster resilience, and financial-product-development-process disruption will be helpful in informing the future of this field.

APPENDIX: RECOMMENDATIONS SUMMARY BY STAKEHOLDER

The recommendations organized by challenge above are combined below and arranged according to which stakeholder group may benefit from putting the recommendations into practice.

STAKEHOLDER GROUP PROVIDING POST-DISASTER FINANCING	TRADITIONAL FUNDING RESPONSE TO DISASTERS	OPPORTUNITY FOR INCREASED ADAPTIVE FINANCING
<p>International Funding Partners (NGOs, Donors, Multinational Development Banks)</p>	<p>Relief funding and assistance</p>	<ul style="list-style-type: none"> • Consider longer-term funding and market-based funding mechanisms that support recovery and reconstruction as well as relief. • Research primary financial and non-financial needs of clients after hazard events. • Work with critical communication, logistics and supply providers – as well as potential clients – to develop short-term contingency plans to build their capacity to recover quickly after disasters. • Create accountability mechanisms with partners before disasters. • Offer trainings to beneficiaries on how to prepare for disasters.
<p>National Governments</p>	<p>Relief funding and disaster grants, safety-net programs, insurance</p>	<ul style="list-style-type: none"> • Consider longer-term funding and market-based funding mechanisms that support recovery and reconstruction as well as relief. • Research the primary financial and non-financial needs of clients after hazard events. • Map the supply chains and larger economy to understand which businesses are most important to jump starting the economy after a disaster. • Work with critical communication, logistics and supply providers – as well as potential clients – to develop short-term contingency plans to build their capacity to recover quickly after disasters. • Create accountability mechanisms with partners before disasters. • Offer trainings to beneficiaries on how to prepare for disasters.

Recommendations Table [cont'd]

STAKEHOLDER GROUP PROVIDING POST-DISASTER FINANCING	TRADITIONAL FUNDING RESPONSE TO DISASTERS	OPPORTUNITY FOR INCREASED ADAPTIVE FINANCING
<p>Large Multinational Corporations</p>	<p>Relief funding, assistance with supplies and logistics</p>	<ul style="list-style-type: none"> • Create redundancy in ways to supply customers with post-disaster funding. • Have a business-continuity plan that includes ways to finance the business. • Perform risk analysis of supply chains before a disaster event and map supply chains to understand which areas are most important to jump starting businesses after the disaster. • Create strategic partnerships. • Research primary financial and non-financial needs of clients after hazard events. • Work with critical communication, logistics and supply providers – as well as potential clients – to develop short-term contingency plans to build their capacity to recover quickly after disasters. • Preemptively formalize partnerships with peer financiers, local leaders, and other organizations that can help support clients after disasters. • Understand what predatory behavior looks like and create public policies to prevent such behavior in your organization. • Create accountability mechanisms with partners before disasters. • Offer trainings to clients on how to prepare for disasters.

Recommendations Table [cont'd]

STAKEHOLDER GROUP PROVIDING POST-DISASTER FINANCING	TRADITIONAL FUNDING RESPONSE TO DISASTERS	OPPORTUNITY FOR INCREASED ADAPTIVE FINANCING
Private Financiers/Banks	Loans	<ul style="list-style-type: none"> • Map and make the case for entry into the post-disaster funding market. • Employ design thinking and other strategies strategically during the research phase of financial-product development. • Create strategic partnerships to layer risk and enable product adoption. • Research primary financial and non-financial needs of clients after hazard events. • Develop a suite of products with pre-approval that can be adapted and fast-tracked after disasters. • Create preliminary product structures that can be adapted after disasters. • Alter product-approvals processes to accelerate them after disasters. • Develop adaptive-finance products that meet not only the financial needs of clients but also those of their broader ecosystem by partnering with other service providers. • Undertake risk and scenario analysis to identify steps that can be taken to de-risk an investment before a disaster and to accelerate the risk assessment after a disaster (esp. by building the necessary risk models). • Understand what predatory behavior looks like and create public policies to prevent such behavior in your organizations. • Create accountability mechanisms with partners before disasters. • Offer trainings to clients on how to prepare for disasters.

Recommendations Table [cont'd]

STAKEHOLDER GROUP PROVIDING POST-DISASTER FINANCING	TRADITIONAL FUNDING RESPONSE TO DISASTERS	OPPORTUNITY FOR INCREASED ADAPTIVE FINANCING
Insurers	Insurance, catastrophe bonds	<ul style="list-style-type: none"> • Create strategic partnerships. • Research primary financial and non-financial needs of clients after hazard events. • Develop a suite of products with pre-approval that can be adapted and fast-tracked after disasters. • Develop adaptive-finance products that meet not only the financial needs of clients but also those of their broader ecosystem by partnering with other service providers. • Undertake risk and scenario analysis to identify steps that can be taken to de-risk an investment before a disaster and accelerate the risk assessment after a disaster.
Local Governments	Coordination of assistance in helping distribute and plan for use of national aid	<ul style="list-style-type: none"> • Map existing resources in communities served before a disaster hits. • Foster strategic partnerships. • Formalize partnerships preemptively with peer financiers, local leaders, and other organizations that can help support citizens after disasters. • Offer trainings to local residents and businesses on how to prepare for disasters.
Local/Small Businesses	Receipt of aid and provision of community assistance	<ul style="list-style-type: none"> • Have a business-continuity plan that includes ways to finance the business. • Perform risk analysis of supply chains before a disaster event. • Formalize partnerships preemptively with peer financiers, local leaders, and other organizations that can help support clients after disasters. • Participate in disaster-preparation trainings and help share learnings with peer institutions.

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