



COMMUNITY-BASED CATASTROPHE INSURANCE

A model for closing the
disaster protection gap

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KEY TAKEAWAYS

1 Insurance plays a critical role in recovery from natural disasters, but many households and small businesses do not have sufficient coverage to fund repair and rebuilding due to affordability constraints, limited risk awareness, lack of understanding of insurance, or behavioral biases in decision making. There remains a persistent protection gap in the United States, leaving many individuals, businesses, and communities without the financial resources to repair and rebuild after a disaster.

2 Local and regional leaders, other public officials, business leaders, and residents need innovative new models of catastrophe insurance delivery to secure widespread coverage and help sustain communities following a catastrophic event. One such approach is community-based catastrophe insurance (CBCI).

3 CBCI is a disaster insurance program arranged by a local government, a quasi-governmental body — such as a special-purpose district — or a community group covering individual properties within the community.

4 CBCI has the potential to enhance the financial resilience of communities and their residents, provide affordable and reliably available disaster insurance, and create incentives for community-level and individual risk reduction.

5 CBCI can play many roles in the dynamic ecosystem of existing public and private catastrophe insurance mechanisms. It could complement traditional catastrophe insurance markets by providing supplemental financial protection to community members in the event of a disaster or be used as full-limit, single-peril property protection in areas with high risk. In other instances, CBCI can offer the community a means to work with insurance carriers or other private capital providers to rebuild and sustain insurance uptake in the face of loss volatility.

6 There is enormous flexibility in the structure and design of CBCI, allowing it to be tailored for various types of communities and to meet a range of needs. Drawing on research and learnings from interviews with key leaders and stakeholders, this paper outlines four delivery models, with varying roles and responsibilities for the community and other implementation partners.

7 In addition, this paper presents an iterative five-part framework that community officials and their industry partners can use as a roadmap to explore CBCI implementation. The questions to consider and options around each of these steps are outlined.

01

INTRODUCTION

The disaster protection gap

Insurance plays a critical role in the recovery from disasters, but many households and small businesses do not have sufficient savings to fund repair and rebuilding on their own (Bhutta and Dettling 2018). Disaster aid can be insufficient and delayed, leaving victims struggling and with uncertain prospects. Credit can be difficult to access or burdensome for some families. As such, insurance is a vital source of adequate and immediate recovery funds, yet many remain uninsured against disasters — referred to as the protection gap. The impacts of the disaster protection gap can cascade; having the financial resources to repair and rebuild is linked to many aspects of well-being, since the stress of recovery is lessened and funds do not need to be diverted from other essential spending (e.g., McKnigh 2019). Further, as more properties in a community are insured, overall community recovery improves and helps to reestablish the local economy.

Despite the importance of insurance, many households and businesses at risk from disasters around the world are uninsured. According to catastrophe modeler AIR, only about 25 percent of economic losses from natural catastrophes are insured globally, and the uninsured portion could potentially exceed \$US one trillion in a particularly bad year (AIR 2019). Here in the US, where standard property coverage often excludes certain natural disaster perils, many households and small businesses are left without adequate coverage. In California, only slightly more than 10 percent of homeowners have earthquake insurance (Maffei 2019). In Missouri, the state with the third-largest market for earthquake insurance, the take-up rate, or the percentage of properties that are insured, has declined to below 14 percent in 2018 — down from over 60 percent in 2000 (Missouri

Department of Insurance 2019). Take-up rates for flood insurance inside the 100-year floodplain are on average slightly over 30 percent around the country, but with wide geographic variation (Kousky et al. 2018). In addition to low insurance uptake among households, many small businesses do not have adequate insurance coverage against disasters (Collier et al. 2019).

There are myriad reasons for a persistent disaster protection gap in the United States. Those at risk may not be informed about the hazards they face or potential damages. They may have poor financial literacy or not understand the role of disaster insurance in recovery. A large body of research has demonstrated that in situations of risk, people may be prone to many biases in their decision-making that could discourage them from taking proactive risk management measures, including the purchase of insurance (Meyer and Kunreuther 2017). The cost of disaster insurance coverage can either discourage voluntary purchase or be a fundamental barrier for those without sufficient means to pay. Concerns about concentration of risk, adverse selection, and regulatory constraints can impede greater offering of disaster cover from private insurers. These and other factors combine to make attempts at closing the disaster insurance gap an ongoing challenge.

Despite the importance of insurance, many households and businesses at risk from disasters around the world are uninsured.

New models of catastrophe insurance delivery need to be considered that could secure widespread coverage for catastrophes and help sustain communities following a catastrophic event. One such approach is community-based catastrophe insurance (CBCI). In a CBCI program, a community — loosely defined as any community organization, special-purpose district, or public entity — arranges insurance protection on behalf of its members or to the benefit of its members. By securing coverage for a group of properties, CBCI has the potential to help close the disaster protection gap, improving financial recovery for communities. CBCI could also be designed to provide more affordable disaster insurance coverage and could be linked directly to financing approaches for community-level hazard mitigation.

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By securing coverage for a group of properties, CBCI has the potential to help close the disaster protection gap, improving financial recovery for communities.

This report is based on a series of interviews with a range of stakeholders, including various community members, regulators, reinsurers, and risk managers. These interviews explored the concept of CBCI and the opportunities and constraints around implementation

of a community policy. Interviewees' comments contributed to the conceptual development of potential delivery models and to the design of a roadmap to implementation. All the interviewees are listed in Appendix 1. This paper also builds on two earlier investigations of the concept of community-based insurance for floods specifically (Kousky and Shabman 2015; National Research Council 2015).

The focus of this report is on addressing the questions of a wide range of stakeholders, including community officials, members of the insurance industry, and others interested in efforts to promote resilience through risk transfer. The report offers an in-depth introduction to the delivery models so that community officials and risk managers can begin to explore and implement CBCI as part of an integrated risk management strategy. Although the report's focus is on the United States, the models are broad and could be extended to many other regulatory contexts.

The next section of this report provides an overview of the CBCI concept, the potential benefits it could offer communities, and preconditions for its application. Section 3 outlines four delivery models for CBCI: a facilitator model, a group policy model, an aggregator model, and a community captive model, each of which requires increasing levels of community commitment and involvement. Section 4 provides a five-part framework for implementation to guide any community interested in piloting CBCI. Section 5 concludes the report.

02

**OVERVIEW OF
COMMUNITY-BASED
CATASTROPHE
INSURANCE**

For this report, community-based catastrophe insurance (CBCI) is defined as disaster insurance arranged by a local governmental or quasi-governmental body or community group covering a group of properties within the community. There are two key features of CBCI: that it is purchased or facilitated by some type of community entity and that it covers multiple properties. Beyond these two features, there can be enormous flexibility in the structure and design of CBCI.

It should be noted at the outset that CBCI can play many roles in the already dynamic ecosystem of existing public and private catastrophe insurance mechanisms. In most cases, it will make sense for CBCI to serve as a complement to traditional property insurance markets, potentially in the form of supplemental disaster protection. This could either provide small cash payouts to community members in the event of a disaster or offer full-limit, single-peril property protection in areas with high risk. In areas where the uptake of private insurance is low or protection gaps persist for other reasons, CBCI can offer the community

a means to work with carriers or private capital providers to rebuild (and subsequently sustain) insurance uptake while facing loss volatility. Even in circumstances where a community elects to pursue CBCI as a replacement to existing private coverage, this is likely to present partnership opportunities to carriers or reinsurers in the form of providing risk capital to the CBCI program.

POTENTIAL BENEFITS OF CBCI

CBCI has the potential to deliver three important benefits, as shown in Exhibit 1:

- Enhances the financial resilience of communities and their residents
- Provides affordable and reliably available disaster insurance
- Creates incentives for community-level and individual risk reduction

Exhibit 1: Potential benefits of CBCI

Enhances financial resilience	Provides affordable and available coverage	Creates incentives for community-level and individual risk reduction
<ul style="list-style-type: none"> • Reduces the community's contingent disaster liabilities • Enhances the community's credit risk profile • Speeds the recovery of insureds • Supports the community's post-disaster economic revitalization 	<p>Reduces premium costs by:</p> <ul style="list-style-type: none"> • Increasing buying power and securing volume discounts • Enhancing data provision for risk analysis • Reducing administrative costs • Supporting means testing <p>Increases insurance availability by:</p> <ul style="list-style-type: none"> • Lowering premium costs • Guaranteeing coverage post-loss 	<ul style="list-style-type: none"> • Enables capture of premium discounts for community-scale and household mitigation efforts • Supports financing of risk reduction activity via premium surcharge • Enhances decision-making around risk reduction through risk analytics and pricing

Source: Marsh & McLennan

Enhances financial resilience

There is a robust body of literature indicating that individuals and communities with insurance recover better and faster from disaster events than those without insurance (Kousky 2019). Insurance is especially critical for lower-income households without other options to fund recovery (Comerio 2014). Beyond the individual level, as insurance funds come into an area, rebuilding speeds up (Nguyen and Noy 2018); and as the share of total damages that are insured increases, economic output post-disaster improves (von Peter et al. 2012; Melecky and Raddatz 2014). This can also help maintain tax receipts and protect communities against credit downgrades (Kraemer et al. 2015). Alternatively, communities that rely on disaster relief rather than insurance following a loss event face significant uncertainty and complexity as well as limited ability to control recovery for both community and survivors.

Provides affordable and available coverage

The second benefit is that CBCI could potentially lower premiums through five possible mechanisms, which collectively increase the affordability and availability of coverage:

- By securing broader participation in a risk pool, including among lower-risk individuals, necessary premiums could fall. (Of course, CBCI also has the potential to concentrate risk, a point discussed in Section 4).
- A community could provide improved data and information to an insurer that could help indicate where the risk is lower and thus where lower rates are warranted. This may be especially true for a peril such as flood, for which small changes on the ground, local public policies, and mitigation investments can have significant impacts on risk levels.

- Because CBCI is administered by a community with broader social goals, a means-tested affordability or other targeted assistance program could be incorporated into the design.
- CBCI can be tied to community investments in risk reduction, such as improved levees or green infrastructure, which in turn can generate lower premiums.
- Certain models of CBCI can reduce administrative costs by lessening the costs of marketing and distribution and possibly of claims administration. These cost savings could be shared with the insured.

Addressing coverage affordability also addresses coverage availability. Specifically, lowering premium costs makes coverage affordable to a wider spread of the population on a voluntary basis. Coverage availability could also be increased through incentives built into the CBCI program, such as making coverage a condition of community membership or offering it as an “opt out” to all residents. Moreover, since one of the primary purposes of a CBCI program is to offer and sustain coverage within a given community, it should be a reliable source of insurance for community members after disasters, when private carriers may either move out of markets or increase their premium rates significantly.¹ The partnership that a CBCI program creates between the community and private carriers or capacity providers can equip the community with a mechanism to proactively strive to offset the impact of severe loss volatility.

CBCI can play many roles in the already dynamic ecosystem of existing public and private catastrophe insurance mechanisms.

¹ This is a general statement. It is important to recognize that there are many differences in private market responses to catastrophic events that vary across admitted and non-admitted markets, based on the peril involved and depending on state regulatory action.

Creates incentives for community-level and individual risk reduction

The alignment with community-level risk reduction is the third potential benefit of CBCI. Because standard disaster insurance policies apply at the level of individual properties, using insurance to incentivize mitigation of community-scale hazards, such as levees or ecosystem-based interventions (e.g., restored wetlands²), creates inherent difficulties. Yet community-level risk reduction can often be the most effective and cost-efficient means of managing a given risk. Additionally, such interventions can create a variety of co-benefits that support other community goals. Unlike property-level coverage, a CBCI program creates a mechanism to provide financial incentives for community-scale mitigation. This is important, since monetization of avoided losses is otherwise difficult to achieve or warrant in an open market system.

CBCI policy could be for a single hazard, such as flood, or for multiple hazards, such as both flood and wildfire.

CBCI could also provide incentives for individuals to engage in location-specific risk reduction efforts in the same manner as do existing private/public insurers (e.g., by offering premium reductions for elevating a home as in flood insurance) but also by potentially enhancing or creating social capital in a

given community (Hudson, Hagerdoon and Bubek).³ Accessing these benefits is an exciting prospect. However, getting to the point where these benefits are delivered requires a concerted effort on behalf of communities alongside various stakeholders, including risk modelers and other levels of government engaged in disaster risk management. Possible models for the delivery of CBCI are explored in Section 3, and Section 4 provides a roadmap to implementation.

PRECONDITIONS FOR CBCI

The CBCI concept is indifferent to how “community” is defined. The community could be an agency in the municipal government. It could be a special-purpose district. It could even be a neighborhood association. One interviewee noted that a business improvement district may be interested in CBCI. Overall, a community is any entity that has the authority to secure or facilitate insurance coverage on behalf of multiple properties. In many instances, the existing financial and service relationships between resident and community may serve as a sufficient means for the community to secure or facilitate access to insurance on residents’ behalf. CBCI will be easier to implement if the community has an existing financial relationship with community members (e.g., tax or levy authority). Ideally, to link risk transfer with risk reduction, the community should also be able to implement risk reduction measures or to work with others having that implementation ability.

2 For more information, see: [The value of coastal wetlands for flood damage reduction in the northeastern USA](#)

3 Findings on the role of social capital in incentivizing or disincentivizing risk reduction have been mixed and appear to be conditional on the risk context.

The CBCI policy could be for a single hazard, such as flood, or for multiple hazards, such as both flood and wildfire. Although the community insurance concept can extend to any risk — for example, community health⁴ — this paper focuses on natural disaster cover. Some communities may face substantial risk or insurance gap issues for only one peril, while many other communities may be at risk from multiple disasters and have limited insurance coverage for all of them. We heard from at least one local stakeholder that uniting flood and earthquake, for example, could make the product more attractive to communities and their residents. A multiperil approach may also integrate better into an overall program of disaster risk management.⁵ This is critical since insurance is most effective when it is tightly coupled with risk reduction and risk communication programs, as shown in Exhibit 2. Risk reduction should be seen as a complement to insurance, since lowering a risk can make insurers more willing to insure a peril at a cost to the insured that is affordable. Risk communication supports both risk reduction and risk transfer by improving awareness among those at risk and helping community leaders understand the nature of the peril and how to protect against it. Importantly, science-based risk analysis is central to informing all three elements in this process and is explicitly a byproduct of investing in risk transfer.

Exhibit 2: An integrated program of risk management



Source: Marsh & McLennan

⁴ For more information, see: [Community-based health insurance](#)

⁵ In other situations, for perils like wildfire or wind that are normally covered under standard homeowners policies, it may make sense for a CBCI program to offer homeowners coverage. Providing full HO3 coverage (the most common type of homeowners insurance offering replacement cost coverage), could be significantly more challenging for some of the delivery models we discuss, since it will require ongoing claims administration for a wide range of perils, larger coverage levels, additional risk modeling, greater regulatory scrutiny, and could raise issues of competition in the marketplace. In addition, lenders require (and many homeowners need) full indemnity coverage up to replacement cost for their home; this is in contrast to some of our delivery models for CBCI in which a small layer of disaster coverage could be provided, perhaps even parametrically. For a fully formed public insurer, though, such as state wind pools, which are already equipped to provide such policies, a community option could be a useful addition to their product line.

BOX 1

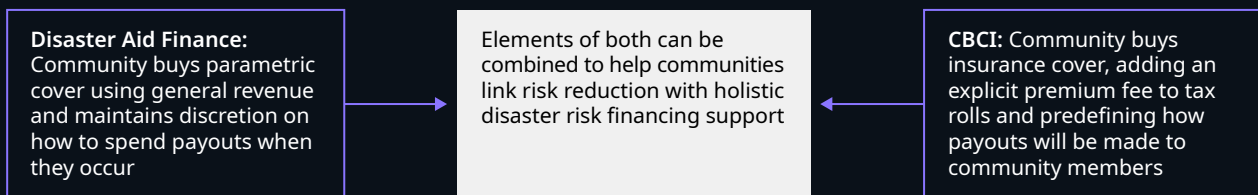
Disaster aid financing or CBCI?

Local governments often choose to assist residents in the aftermath of a disaster through a disaster aid program. Such a program could be (fully or partially) financed through risk transfer. For instance, a local government could choose to purchase a catastrophe bond that triggers when a certain magnitude disaster impacts their location. The funds received from such a bond could be used to cover any immediate needs of the community, including providing relief to victims. Such an arrangement, while potentially useful as a means of pre-event financing and worth exploring at the community level, technically is not CBCI unless there is an awareness by the individual community member of the program and a guaranteed amount of funding available post-disaster. That is, the community must establish an obligation to pay post-event. Most disaster aid programs are uncertain ex-ante if or how much assistance any victim will get: that is not insurance. To be CBCI, the individual community member should be aware of a CBCI premium charge, and claims payout parameters should be predetermined. If these factors do not exist, then the program is disaster aid and not insurance.

Both approaches to community-level risk financing generate benefits. In certain circumstances, however, CBCI may be simple unworkable. In those cases, the community may wish to supplement federal disaster aid with a disaster risk financing program at the local level. Doing so can provide a community with a host of fiscal benefits, including an ability to speed recovery of community members, which can lessen the long-term economic impact as well as lower reliance on post-disaster debt to finance recovery and rebuilding.

A CBCI program generates these benefits as well but goes one step farther by clearly defining before the disaster what type of support will be given to individuals. This facilitates better individual risk management and planning than reliance on uncertain aid. In addition, the inclusion of a risk signal in a CBCI program — for example, via a risk reduction surcharge — requires and supports raised awareness of the risk issue among community members. Moreover, providing community members with direct loss payments after an event allows them to put the dollars to their most immediate and beneficial use (e.g., if the coverage is parametric).

Exhibit 3: Disaster aid financing versus CBCI



Source: Marsh & McLennan

03

**POSSIBLE
CBCI STRUCTURES**

Four broad institutional structures for CBCI illustrate the different roles and responsibilities of the community and other partners:

- A facilitator model
- A group policy model
- An aggregator model
- Purchase through a community captive

The community's role and responsibility increase from lowest to highest moving from the first to the fourth model. In the first model, the community is more of a facilitator and a negotiator. In the second model, the community takes on a role in distribution, choosing

insurance options and collecting premiums. In the third model, the community has a dual role: as the insured on a community contract with a reinsurer and as the disburser of claims funds. The fourth model harnesses an existing institutional structure — an insurance captive — that enables the community to provide disaster policies. In all cases, the community could offer the coverage for a property owner to voluntarily decide to purchase, or there may be a few instances where a community would compel residents to purchase coverage. When coverage is voluntary, however, a community would likely need to offer purchase incentives to achieve goals of widespread take-up of the coverage.

Exhibit 4: CBCI delivery models

Models	Description	Community roles
<p>Facilitator</p>	<p>The community helps to establish a beneficial arrangement with an insurer for community members. Community members contract directly with the insurer.</p>	<p>Member education; data provision; engage and educate members; administer means-testing program (if any); adopt regulations to encourage or compel purchase; and negotiate discounts for community resilience enhancements.</p>
<p>Group policy</p>	<p>The community arranges a group policy on behalf of its members (e.g., similar to an employee benefit arrangement). Community may facilitate premium payment, but the community members maintain a relationship with the insurer for claims management.</p>	<p>Same as facilitator model; plus management of enrollment/distribution negotiations of premium; and facilitation of payment.</p>
<p>Aggregator</p>	<p>The community buys bulk parametric catastrophe insurance and makes community members aware of this community benefit, charges for it, such as via taxes, and ensures claims are distributed to members after qualifying events.</p>	<p>Obtain adequate coverage to meet community member recovery needs; ensure premium charge and claims payment mechanisms are in place; and raise awareness of benefit amongst community members.</p>
<p>Community captive</p>	<p>The community establishes its own risk-bearing entity (e.g., a captive) and uses it to administer policies for members.</p>	<p>Same as group model plus capitalize and govern risk bearing entity; finance portion of risk; purchase reinsurance; manage claims payments; and set insurance policy terms and conditions¹.</p>

Degree of community control, resources and expertise required: Low High

Note: Depending on community objectives, implementing a captive may require licensure procedures or a fronting carrier
 Source: Marsh & McLennan

BOX 2

Public insurance programs

Standalone flood insurance is provided in the United States through the federal National Flood Insurance Program (NFIP), housed in the Federal Emergency Management Agency (FEMA). Communities voluntarily join the program, adopting minimum floodplain management regulations, and then the residents become eligible to purchase a policy. In its 2011 investigations of NFIP reform options, FEMA considered theoretically the possibility of offering community flood insurance, finding that although it would be effective in managing flood risk, it would face high hurdles of administrative feasibility and political acceptability if implemented federally (FEMA 2011). FEMA has not gone forward with any community insurance offerings.

Research interviews suggested that if a private insurer could offer flood insurance at lower prices or more favorable terms than could the NFIP through CBCI, many communities might be interested. However, any private sector policy would need to satisfy the mandatory purchase requirement: the federal regulation that properties in the 100-year floodplain, as mapped by the Federal Emergency Management Agency (FEMA), with a federally backed loan or secured with a loan from a federally regulated lender must purchase flood insurance for the life of the loan. Also, worth noting is that the community definition for the NFIP need not be the same for a community purchasing a flood-related CBCI policy.⁶

Many states have residual market insurers that are designed to provide high-risk properties with access to coverage if they cannot obtain coverage from the private market. Although there is some nuance in how these plans are structured, most are typically described as the “insurer of last resort” in each state. In this role, residual market insurance is generally more expensive or more limited in breadth than private insurance under normal market conditions. These insurers can also provide coverage following catastrophic events that lead to insurer pullback, with policyholder rolls tending to balloon after large-scale events.

CBCI offers community members, particularly those in higher-risk or disaster-impacted areas, a mechanism ahead of reliance on an “insurer of last resort” and can help manage the populations of state residual market programs, which insurance regulators and state legislators may view as a benefit. Since the sole purpose of a CBCI program would be to offer insurance in a given community, the program would be incentivized to continue offering coverage to community members even after large events. Premium rates could also be designed for stability after events to the extent the community controls the rate-setting mechanism, as may be possible in Model 4: Community Captive.

⁶ The NFIP defines a community as: “... any state, or area or political subdivision thereof, or any Indian tribe or authorized tribal organization or Alaska Native village or authorized native organization, which has authority to adopt and enforce floodplain management regulations for the areas within its jurisdiction.” This is essential, since NFIP communities are mandated to adopt floodplain regulations as a requirement of joining the program.

Model 1: Facilitator model

This first model is the simplest for the community. In this approach, the community helps to facilitate its residents' widespread purchase of catastrophe insurance. Residents then work with an insurer, and the insurance contract is between the insurer and the household or business. The community is not involved in paying premiums or distributing claims, although it will work with the insurer to secure a beneficial policy for residents and undertake targeted outreach in the community to secure greater demand.

The community role in facilitating more widespread purchase of catastrophe insurance could simply be one of outreach and education, through, for example, a concerted education campaign to teach households about the disaster risks they face and the value of disaster insurance to the individual and community. Beyond education, however, the community could offer incentives for the purchase of insurance, such as a property tax break or a free disaster kit. More research and stakeholder engagement are needed to determine what incentives would be more impactful in different communities. There may also be a few communities that have the political support and authority to mandate coverage.

To encourage greater demand, the community would also work with the insurer or reinsurer and/or broker to develop favorable policy terms for residents. This could include negotiating a lower rate if a certain share of residents agrees to purchase a policy or premium discounts on behalf of properties that adopt certain mitigation measures. To assist with pricing, the community could also provide the insurer with better data on properties at risk,⁷ local topography, local flood mitigation, or other relevant factors. The community could then work with the insurer to identify community-level mitigation measures that would lower premiums for all residents and then implement these projects or programs in parallel.

Finally, the community could choose to adopt a local means-testing program to offset the costs of insurance

for lower-income households. Although not offered in the context of a CBCI initiative, an example of a local affordability program comes from Syracuse, New York: Following a 2016 update to FEMA flood maps, which added 800 Syracuse homes to the Special Flood Hazard Area (SFHA) — many of which were located in the city's lower-income neighborhoods — in January 2019 the New York State Legislature passed a property tax exemption to alleviate the cost of federal flood insurance. This bill allows low-income Syracuse residents or those living in economically stressed areas to receive up to an \$81,000 exemption on their property taxes. Approximately 40 percent, or 636 out of the 1,602 households in the SFHA, are eligible for this exemption.

Model 2: Group policy model

In this second model, the community arranges catastrophe insurance on behalf of its members: negotiating policy terms with the insurer, collecting fees or taxes, and paying the premium to the insurer. However, the policy contract is written between the property owner and the insurer, and the insurer pays claims directly to the property owner. (See Box 3 for discussion of a Massachusetts town that is currently exploring this model.)

The approach is similar to employee-provided health insurance, or group health insurance policies, where employers negotiate an insurance policy with an insurer and arrange for premium payment (e.g., via payroll deduction), but employees establish a direct relationship with the insurer and the insurer pays claims to the individual. Because employees typically share the cost of health insurance with their employer, this could also be a model for CBCI by which the cost is shared between property owners and public funds if the community feels that some assistance with premiums should be provided to certain residents, for example, lower-income households.

⁷ This need not violate privacy laws but would be sharing public information on building stock and building footprints, for example.

The group policy model could be designed as voluntary or mandatory for the individual property owner. If voluntary, it could be designed as an opt-out or opt-in model, depending on whether the initial default choice is to enroll the property owner or not. The premium would be collected as either a fee for each property owner or as an increase in property taxes. In theory, the community could work with one insurer or reinsurer or with several. Brokers, managing general agencies (MGAs), or others may also assist. The policy would be written between the community and the insurer, likely with a minimum threshold of members needed to participate. The total premium paid by the community would be the sum of the individual policies and there could be one offered policy or tiers of coverage. Claims administration would not involve the community.

This approach requires more effort on the part of the community than the facilitator model, since the community will need to work with the insurer to develop or outsource a platform for providing information about the coverage, letting property owners enroll, and then consolidating premium. Staff time and/or funding is needed as well as support from residents that this was an added value to the community. It may be most feasible for a special purchase district, such as a levee district or a geological hazard abatement district (GHAD; see Box 3), which is already accustomed to taxing residents to pay for risk management services.

An analog model of how this could work comes from community choice aggregation (CCA) programs, which are an institutional arrangement for local governmental agencies to choose a power generation source and create a contract on behalf of consumers. Established by legislation,⁸ CCAs are structured as not-for-profit public agencies. Residents can purchase electricity from this agency, and the agency can find energy contracts with utilities to meet community needs such as lower prices or a greener source of power. The program can be either opt-in or opt-out depending on differences in state-level enabling legislation. If the CCA receives excess funds, it can invest the money in related projects, such as grid resilience. In this arrangement, the utility company handles billing and customer support responsibilities, which may be slightly different than the arrangement for group health policies or for this CBCI model.

This institutional design could work for a CBCI group policy delivery model. CCAs demonstrate a successful approach for a local agency facilitating purchase of a good and tailoring that product to the needs and preferences of the community. They showcase how the program could be opt-in or opt-out and how complementary activities, such as mitigation, could be funded. This structure, while providing benefits, does require enabling legislation from the state, which might be needed to provide the authority for CBCI as well.

⁸ CCAs currently exist in California, Illinois, Massachusetts, New Jersey, Ohio, and Rhode Island.

BOX 3

Developing the CBCI concept for Marshfield, Massachusetts

Marshfield, Massachusetts, is located on the coast, directly above Cape Cod Bay. Just under 40 percent of residents have flood insurance from the NFIP, and the town is interested in expanding take-up rates. An MGA representing an existing pool of reinsurers has proposed a community insurance product that is similar to the group policy model.

The town was able to provide detailed building data, and a modeling firm chosen by the reinsurers was able to help develop a premium structure for offering a flood policy to each building in the town. To help meet the federal mandatory purchase requirement for flood coverage, the policies replicated NFIP coverage terms. Each property owner would choose its coverage, deductible, and other endorsements, and then the sum of all the individual premiums would be paid by the town. The town would secure the funds through an addition to property tax bills, an enterprise fee, from general revenues, or a combination of sources. Each property owner would get its own policy, with coverage backed by an assemblage of reinsurers, and coordinated by the MGA. The extent of the town's responsibility would be assuring that a minimum number of property owners, spread over the town, agreed to purchase coverage, and paying for the annually renewable policy premium. The insurer would retain all responsibility for claims adjustment and payment.

The proposal expects that that the town would secure purchase of policies for about 10,000 dispersed properties. This scale of purchase would reduce concentration of risk (not all properties in Marshfield flood in the same event) and spread the fixed administrative cost over a large enough number to make the per-property premiums less than the cost of NFIP coverage. At this time, Marshfield has the preliminary description of the policy proposal, and community discussion is focused on several still-to-be-answered questions. Given the coverage goal of around 10,000 widely dispersed policies, a key question is whether property owners would be asked to opt in to coverage or would be automatically covered and would have to pay for coverage unless they opt out. An opt-in design may create an adverse selection problem. Also, if not many property owners are willing or able to opt in and pay, the 10,000-policy threshold would be missed. But more residents may resist the opt-out design.

Among other questions being asked are: Would promoting increased NFIP purchases be more cost-effective and practical than closing the gap through a facilitator model or placement of a group policy? How will the town collect the funds to pay the premium? Will there be any means-tested discounts offered to those who would be covered? How will property owner and community mitigation actions be reflected in the premiums charged? Will the current design be acceptable to state regulators?

Model 3: Aggregator model

In this third model, the community purchases a policy directly from an insurer or reinsurer to cover a group of properties in its jurisdiction. The community, such as through a particular agency, is thus the policyholder. The contract would further specify that the insured parties are the individual properties. The community would then also be responsible for disbursing funds according to an agreed-upon approach in the contract. Similar models have been used in developing countries to provide coverage to smallholders, and the group holding the policy on behalf of many individuals is referred to as the aggregator (Mapfumo et al. 2017).

This third model adds a layer of responsibility to the community: disbursing claims, which would necessitate a clearly documented procedure for doing so that is communicated to residents in advance of any disaster. For CBCI to provide maximal benefits to insureds, the individual property owners need to be aware of, and fully understand the coverage being provided to them by the community policy. The premium could be collected via taxes or fees, with each community choosing the mechanism that works best for its circumstance. The level of coverage provided and approaches to claims handling could vary. For some communities, it may make sense to hire a third-party administrator to handle the claims adjustment process.

One approach to reducing the burden on the community of administering claims would be to provide a base level of coverage to residents, such as \$10,000. The community would need to decide if this would be a

parametric coverage — that is, a fixed amount offered to residents whenever a certain disaster parameter is met or exceeded — or indemnity based, meaning the claims are distributed to cover damage sustained. The challenge with an indemnity model is that it requires a more robust loss adjustment process, potentially including site visits to every property. In some instances, the administrative costs could be so high as to offset any benefits of the product.⁹ In an indemnity situation, while an insurer may agree to cover all the properties in a given community, it may also require a catastrophe loss occurrence cap, which would leave the community and its members retaining tail risk from an extreme event. If the coverage was a parametric product, consumers would need to be educated about the exact circumstances in which they would receive the funds. This model may work better as a way to cover below-deductible expenses and other non-insurable disaster costs, such as evacuation expenditures, cleanup, lost work, and so forth, and not as a replacement for a standard property insurance policy for disaster risk.¹⁰

Model 4: Community captive

In the final model, a local government could create its own insurance captive. A community captive is an insurance company that is fully owned and controlled by the local government. Many municipalities already have their own captives to help them access capital for protecting municipal assets through risk transfer or to provide difficult-to-obtain coverages. Some municipalities, cities, or regional transportation authorities leverage captive structures to place coverages

9 It is important to note that innovation in disaster loss adjustment is being employed variously around the world. For instance, use of remote sensing technology to support claims adjustment is becoming a more widespread practice (Adams 2017), in some cases negating the need for in-person loss adjustment. Additionally, several public-private disaster insurance programs are already in place globally where loss payouts are determined based on a “light” loss adjustment process. For instance, coverage offered under the Taiwan Residential Earthquake Insurance Fund (TREIF) offers a two-tiered payment based on a qualified loss adjuster:

Total: The damaged building is not fit for habitation, and should be demolished as announced by the government or civil authorities or adjusters or licensed inspectors.

Constructive Total: The damaged building should be repaired, and the repair cost equals or exceeds 50 percent of the replacement cost when the loss occurs on the insured risk.

10 For greater discussion of a parametric, base level of flood coverage for a community, see Kousky and Shabman (2015).

otherwise not offered in private property insurance markets or to receive preferable pricing and coverage through direct access to reinsurance. We spoke with one city that leveraged its captive to provide affordable coverage to healthcare nonprofits when malpractice coverage was not widely available or affordable.

Captives operate like standard insurance companies: collecting premiums, issuing policies, paying claims, accessing reinsurance or excess insurance, or issuing insurance-linked securities as needed. Any unspent premium revenue is retained by the captive and controlled by the local government to potentially contribute to reserves or for other uses, such as a mitigation program or rebates to community members. The governance and legal structure of a captive is well tested, and the community has direct control over most aspects of the CBCI program.

Using a captive, a community could offer policies to all members. A benefit of this model is that a captive is an entity that is logistically and legally able to offer coverage, and yet would give the community a high degree of control over the policies and the pricing.¹¹ For instance, the community could choose whether to offer a full-indemnity disaster policy, a “mini-policy” that provides only first-layer protection, or a parametric policy as a complement to standard property coverage. As another example, if the community wanted to offer lower premiums for a certain group, such as low-income residents, it could do so. It could also supplement premium revenue with funds from other sources. For instance, a community could leverage state contingent credit for capital relief in initial stages, or federal pre- or post-disaster grant dollars in implementation of a captive to fill existing insurance protection gaps in private market product offerings.

¹¹ Due to insurance regulations, the community is unlikely to be able to offer coverage as an unlicensed carrier in the state via a lightly capitalized captive. The community will thus need to find funds for capitalization or engage a front (e.g., state national). It remains unclear if federal disaster grant funding could be eligible for this purpose.

BOX 4

Could GHADs in CA purchase CBCI?

In California, Geologic Hazard Abatement Districts (GHADs), enabled by the Beverly Act of 1979, can be formed to manage long-term risks to land and property from geologic hazards. Led by publicly elected boards of directors, GHADs are independent entities created through either a petition signed by 10 percent or more of property owners in the proposed district or a resolution by a local legislative body. Once formed, GHADs have the authority to issue municipal bonds, levy and collect taxes, sue or be sued, engage in infrastructure improvements, and purchase and dispose of property, including through eminent domain. Today, there are more than 35 GHADs throughout the state.

GHADs could be a useful “community” to purchase a CBCI given their multidecade history of administering

hazard-abatement activities, and a GHAD would be uniquely positioned to tightly link investments in risk reduction with insurance to protect residents against residual risks. The GHAD would be able to levy a property tax on the properties to fund the purchase of insurance coverage, which could either be written into the plan of control as part of the base property tax levied by the district or offered by GHAD via an opt-in or opt-out scenario. For example, property owners in the district could opt-in to the insurance premium on top of the base tax levied by the district or choose to benefit only from the risk reduction activities provided by the GHAD without the additional tax to cover the insurance premium. A GHAD CBCI program could also be set up for multiple GHADs to create a larger risk pool.

Other types of special purpose districts exist around the country, such as levee districts and soil and water conservation districts. Any of these entities might be well-positioned to harness CBCI.

04

ROADMAP TO IMPLEMENTATION

A five-part framework for CBCI

Once community officials, staff, or residents are interested in further considering CBCI, there is an iterative five-part process that can guide them as they consider possible implementation. As shown in Exhibit 5, these are not necessarily sequential steps; it may be necessary to go back and forth among them multiple times. Before arriving at the decision to pursue these steps, the community may need a local champion or leader who believes CBCI could secure local benefits.

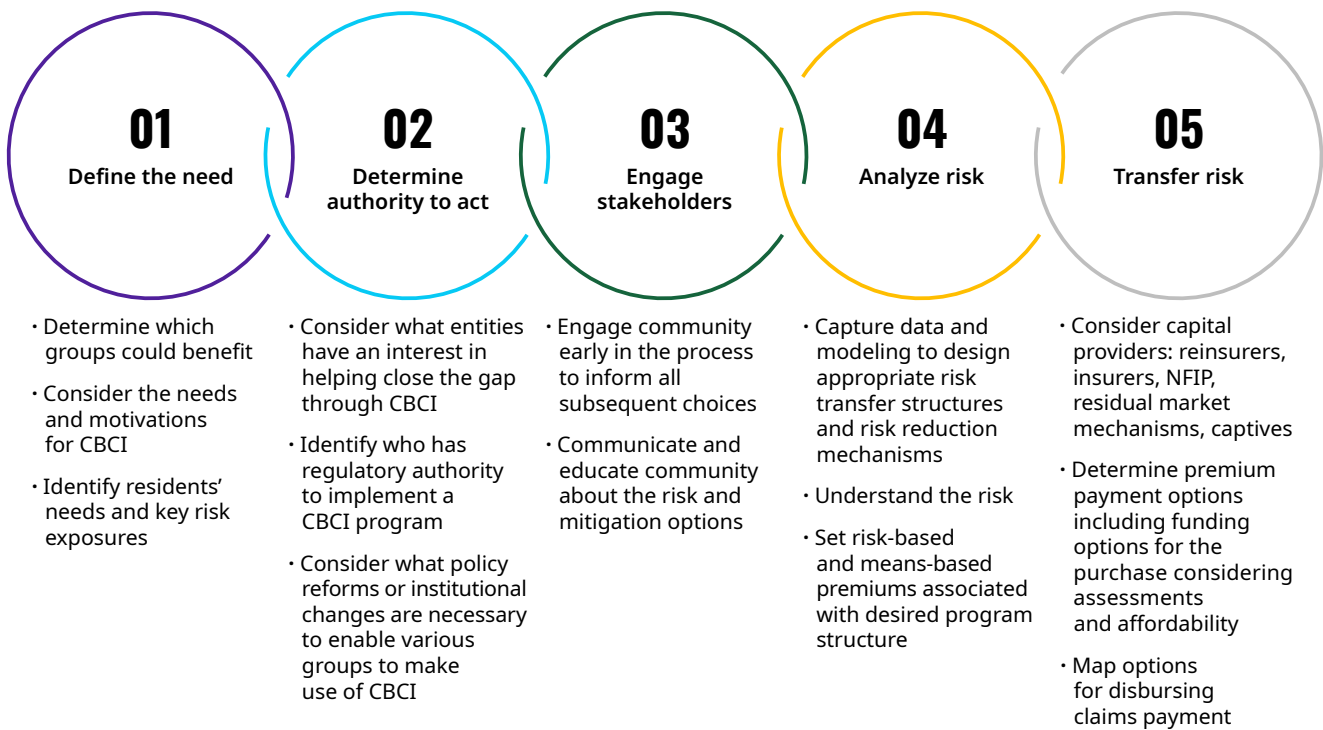
DEFINE THE NEED

The first step is to define the need or the problem that the community is trying to solve. CBCI is enormously flexible and can be tailored to the perils and specific population of interest to the community. For instance, is coverage needed for pluvial floods outside FEMA's Special Flood Hazard Area? Is earthquake coverage desired? Wildfire? A multiperil policy? Does the community want to provide a base level of coverage, or more? Does it want to offer

a policy for property damage or to cover other disaster costs? Is the targeted population small businesses? Renters? Low-income owners? An affluent neighborhood? Specifically identifying the risk and population is an important step that informs other aspects of program design. Defining the need also includes ascertaining the current take-up rates of coverage or interest in coverage among residents, and their willingness and ability to pay for the coverage.

Note, as stated above, this framework is iterative. It may be that risk analytics are needed to fully define the need. The community may need a better understanding of the disaster risks in the community before it can fully articulate the specific groups and types of coverage needed. For example, a community may know that it has experienced flooding beyond the high-risk areas on FEMA maps but may not have a clear idea which areas in the community are most at risk and what that full risk profile is for different types of flooding.

Exhibit 5: Potential roadmap to implementation



Source: Marsh & McLennan

The interviews showcased several cases where a community had spent considerable time understanding the need, to the point where the focus became one of “admiring the problem,” which over time became insurmountable. While a community’s needs and interests may be diverse, the implementation of CBCI should focus on a protection need that will have an immediate and measurable impact on the community’s resilience. Narrowing the focus to an implementable solution brings into play other elements of the iterative process but, most importantly, stakeholder engagement to establish near-term and long-term community objectives. Even a modest initial CBCI can still deliver considerable benefits to a community by raising risk awareness and mobilizing resources to support risk mitigation.

DETERMINE THE AUTHORITY TO ACT

The community group interested in pursuing CBCI must assess its authorities for related activities. This will vary by the delivery model; indeed, existing authorities might dictate which model is the best approach for a given local entity. For example, do they have the power to tax residents or assess fees? Are existing institutions in place, or does CBCI require policy reforms, legislation, or other changes? Is there political support for the effort? Engaging with state insurance regulatory agencies early in the process is an important step toward understanding any applicable requirements in offering coverage to constituents.

If a municipality is considering CBCI, they will have their own administrative processes that will govern how they can proceed. For example, in New York City, any benefit program must go through rulemaking to determine beneficiaries and the amount they receive. This would likely apply to a CBCI program. A rule is a type of law that is proposed and adopted by a city agency. Rules are distinguished from other forms of laws by the process that agencies must follow to enact or amend them. In New York City, this process is known as the City

Administrative Procedure Act. The rulemaking process generally takes a minimum of 60 days, and during this period agencies are required to provide New Yorkers with an opportunity to review and comment on the proposed rules, including through a public hearing.¹² Other cities will likely have slightly different processes that would be activated when considering CBCI.

ENGAGE STAKEHOLDERS

CBCI requires the support of many different stakeholder groups. An interested community will need to engage, likely repeatedly, with these groups. First, CBCI will require understanding of the need from the potential insureds. Such support may need to be developed through education, and outreach campaigns that inform residents about the disaster risks to the community, and the financing options to build resilience and to prepare for such events. Second, CBCI will require support from a willing insurer or reinsurer. Research interviews indicated that it may be challenging to convince traditional reinsurers and investors to allocate capital to a new product that is unproven, perhaps not well understood, and potentially not well diversified. The community will thus have to identify an insurer partner interested in innovating and piloting a new concept to enhance resilience. Our interviews identified interest from some reinsurers in CBCI as a portfolio of risks that could supplement/complement their natural catastrophe business. The risk assessment, pricing, and product structuring could leverage existing reinsurer capabilities and approaches, which would be informative to communities as they consider CBCI options.

CBCI requires the support of many different stakeholder groups.

¹² Rulemaking requirements are described in Chapter 45 of the New York City Charter. Charter section 1041 provides that the standards for granting benefits must be accomplished by rule. For more information, see: [Understand the Rulemaking Process](#).

The community may also need support from agents and insurers to make sure the community does not upset other firms that may see CBCI as a violation of fair competition. Such issues can likely be avoided if the CBCI program uses existing distribution channels or positions coverage as a supplement to existing private coverages on offer; balancing these interests in developing the solution is essential toward creating a sustainable program. Fundamentally, CBCI solutions are centered on helping communities and industry work in partnership to close protection gaps and better manage their risk, not swinging the balance of power and removing market opportunity.

Communities may also benefit from engaging with state and federal partners. For example, federal grant programs could potentially be leveraged to support CBCI in various ways when a CBCI solution aligns with state and community risk management priorities. Federal grant dollars could support capitalization and formation of a captive, for example, or pay for the modeling and design work to develop a community policy. They could also be harnessed to support a linked affordability program. FEMA Hazard Mitigation Assistance grants could potentially be harnessed for these uses, perhaps through the new Building Resilience Infrastructure and Communities (BRIC) program,¹³ as could potentially HUD Community Development Block Grant-Disaster Relief funds. The most promising application of these federal grant dollars will be in instances where community, state, and federal agency priorities align. For flood-related

CBCI, the National Flood Insurance Program is also a key consideration. A community offering flood coverage will need to consider satisfying the mandatory purchase requirement tied to federally backed mortgages (Shabman et al. 2019) or design coverage as a complement to NFIP coverage.

QUANTIFY RISKS

To determine needs and design an effective CBCI policy, data and modeling are needed to quantify the risks at a fine degree of spatial resolution. This could be provided by private modeling firms, academics, reinsurance brokers, or others with the relevant expertise. Such modeling would look at the full range of possible disaster events and estimate probabilistic impacts at a property level. Such modeling can also be used to identify mitigation measures that a community could adopt to lower the probable maximum loss sufficiently to improve insurability or pricing.

A concern that came up repeatedly in research interviews was the extent to which a community policy might concentrate risks versus offer diversification benefits. Modeling and appropriate analytics could inform this issue. There may be some communities where disaster risk is highly correlated across properties; for instance, a smaller coastal community might all be at risk for storm surge damage from a hurricane. In other

¹³ The main goal of the BRIC program is to encourage proactive rather than reactive investment in community resilience by providing grants to compelling projects in states and territories with major disaster declarations in the past seven years, thus reducing future federal spending on response and recovery.

places, this might not be the case, such as a community in California that faced coastal flood risk, riverine flood risk, and pluvial flood risk but not in the same locations. Concern about risk concentration varies across the value chain of insurance. Many primary insurers are more sensitive to this concern, while global reinsurers, and those in the insurance-linked securities market are confident about the ability to diversify even correlated community risk across the world. Accessing those global markets, however, is not free, and could drive up the cost of community insurance. This is not trivial, as many local communities around the country are struggling financially with meeting even basic community services.

Including multiple perils in the community policy, such as earthquake and flood, could also potentially help with diversification. Finally, if the “community” in CBCI

was sufficiently small, such as a business improvement district, the insurer could write many such policies in different places around the country, thus creating a set of independent risks. In the end, however, this is likely an issue that will have to be addressed on a case-by-case basis with detailed hazard modeling for the specific location and the size and scope of the group of communities being considered by the insurer.

Data and modeling are needed to quantify the risks at a fine degree of spatial resolution.

BOX 5

Differences in risk analysis methods

Many communities are accustomed to modeling their risk for emergency management or other purposes related to disaster resilience using government modeling tools (e.g., HAZUS) or engineering-based modeling methods, which can be highly granular but often deterministic (e.g., looking at specific scenarios to support risk reduction). While these risk modeling methods are very important and may well be essential to unlocking some of the benefits of CBCI (such as premium discounts for risk reduction),

they will need to be supplemented by probabilistic catastrophe modeling approaches to which insurers and reinsurers are accustomed in order to move on to part five of the CBCI implementation framework — detail the risk transfer solution. Converting existing engineering-based assessments of risk into catastrophe models — or running catastrophe models from scratch — requires technical expertise not usually maintained at the community level. Instead, communities will likely need to rely on partners for this work, namely specialist organizations like catastrophe modeling firms, (re)insurance brokers, and/or (re)insurers.

DETAIL THE RISK TRANSFER SOLUTION

As noted above, there are many possible ways to choose the delivery model and design the risk transfer solution (the insurance product), taking into account the condition of the existing insurance market, constituent needs, and the risk profile of the area. Designing the product would be done by the community in consultation with a broker and the insurer participants, as well as other stakeholders as appropriate. In the initial stages of the structuring, this group of experts would support the community in defining the appropriate level of coverage, asking such questions as: Are they seeking to provide full indemnity coverage to residents or just a layer of financial protection? Additionally, the community would need to determine if they were going to assess properties risk-based fees for the coverage and/or introduce subsidized coverage for certain residents, such as low income residents located in high risk areas. Beyond the details of the coverage and price, the community should consider what public policies could be adopted to incentivize insurance uptake. All these decisions would be guided by iterative analysis of pricing and risk analytics.

Assessing insurer, reinsurer, or capital market capacity can present varying benefits and efficiencies depending on the characteristics of each risk transfer solution,

including the peril covered, the specific geography, and the degree of risk concentration. Just as there is an expanding community role across the spectrum of the four CBCI models discussed earlier, there are varying levels of efficiency in accessing these alternative forms of capacity. Balancing the risk appetite and budget with the foundational authorities to act at the community level will help in selecting the appropriate model and structure. With the facilitator model, the insurer will allocate capital and reinsurance costs as a component of the premium; whereas with the captive model, the community managers will need to make decisions about reinsurance and could potentially leverage capital and administrative efficiencies to tailor a solution. Fundamentally, the efficiency in potential premium or administration cost of the CBCI program will hinge on the risk characteristics and product design to provide the most targeted relief to concentration risk.

Decisions would be guided by iterative analysis of pricing and risk analytics.

BOX 6

The resilience of private market capital

While concerns regarding the selective appetite of private markets for backing catastrophic risk have unfolded in areas with large losses in recent years, the reinsurance market has become well-versed at overcoming major losses and has navigated a number of capital challenges following major disasters, such as the September 11th attacks, Hurricane Katrina, and the succession of catastrophic loss events in

2017 (Hurricanes Harvey, Irma, and Maria). On each occasion, the reinsurance market responded by innovating, consolidating, and attracting more capital. Since 2012, dedicated reinsurance capital has increased by more than \$100 billion and is now estimated at \$471 billion in fall 2020.¹⁴ Although initial hesitations may persist as CBCI solutions move toward implementation, the long-term potential of CBCI programs presents promising relationship benefits for insurers, reinsurers, and capital markets investors alike.

¹⁴ [Guy Carpenter & A.M. Best published estimates from September 16, 2020](#), inclusive of both traditional and alternative capital.

The design of a CBCI risk transfer solution will need to provide value both to the community and to risk transfer partners. Communities will need to determine if they are willing and able to pay the costs of a CBCI program — through assessments and/or other public funds — in exchange for the broad benefits. This includes not just the primary benefit of improved financial recovery from disasters but also benefits from heightened understanding of the risks the community faces, larger incentives for risk reduction, and a more comprehensive risk management program. An important consideration for the community in quantifying the true value of the CBCI program will be the “cost of risk,” or how much they can expect to expend on disasters based on current and future levels of insurance protection. Where protection gaps persist, the long-term cost of risk — coupled with uncertainty in reliance on other forms of relief and disaster suffering — could significantly exceed the implementation cost of a CBCI program. The insurers or reinsurers that partner with the community will need an adequate return and may also obtain benefit from supporting community resilience and affecting large-scale disaster risk reduction.

There is significant risk transfer capacity available to communities if the solution is structured to appeal to a broad diversified pool of capital providers.

There is significant risk transfer capacity available to communities if the solution is structured to appeal to a broad diversified pool of capital providers. The ability to accurately quantify risk is a key factor in attracting all forms of capacity. The extent to which a community is able to parametrize the community's risk

profile — e.g., link the occurrence of a given catastrophe event to a given physical phenomenon like wind speed or flood depth — will have direct bearing on the solution set to be considered and on the cost of risk transfer. A solution designed around a parametric trigger can in some instances attract more capacity and less implementation risk than solutions requiring a more granular risk assessment (while potentially introducing basis risk, as discussed below).

At the union of both defining the need and analyzing the risk is developing the appropriate risk appetite. This is central to determining the desired level of protection offered and perils to be covered and is foundational toward aligning private market capacity. Risk appetite is determined by comparing the outputs of risk quantification with the financial resources available for recovery, which identifies the magnitude of the protection gap. The community's capability or willingness to accept this protection gap and the threat to their resilience is defined as its appetite.

The community should think of risk appetite in terms of the degree of basis risk (i.e., the correlation between a triggering event and actual losses) and tail risk (i.e., the probability of a rare but severe loss event exceeding the coverage limit). These risks should be explained to the community and carefully considered in design of the product. For example, a community with a significant protection gap may accept more basis risk to incrementally improve financial resilience through a broader assistance program for those in need rather than pursue a full indemnity-style insurance offering. In such instances, the acceptance of significant tail losses should be clearly considered along with the appropriate forward-looking public policies to improve uptake of both traditional and parametric insurances or to reduce risk. With this approach, it is important to establish an equitable formula for distributing recoveries and to widely communicate a distribution plan ahead of a loss event.

It is also important that communities view CBCI as a concept that is continually adjusted. They could start with a pilot program and then make changes as they learn from disasters that occur. Basis risk and the level of protection can then be managed and improved over time depending on the long-term risk management objectives of the community. Selecting the approach that best fits — whether the facilitator model or a community captive that offers more comprehensive coverage — can be accomplished by following this five-part framework to build long-term risk management partnerships between the community and industry.

With any public initiative, the community managers have an obligation to be good stewards of community resources, follow required procurement processes,

and provide community members with maximum transparency. The insurance and reinsurance industry along with capital markets investors have indicated broad support for solutions to address protection gaps. As communities embrace CBCI solutions as part of disaster management and resiliency — and as transactions are brought to market — the risk transfer industry must operationalize this strategic intent, allocate capacity, and leverage authority to align transactional criteria with longer term strategy.

CONCLUSION

Closing the disaster protection gap will require innovation. CBCI, a new model for disaster coverage, has the potential to be one important tool for improving community resilience to disaster events. Ensuring widespread coverage for residents can lead to faster and stronger recoveries. There is the potential in some communities for CBCI to help offer that coverage at a more affordable price point or to provide supplementary or base coverage for residents. One of the benefits of CBCI is that the structure of the policy is highly flexible, able to be tailored for various types of communities and to meet a range of needs.

In all cases, however, CBCI would be enhanced by being part of a comprehensive risk management program and not an isolated risk transfer solution divorced from other

risk management activities. This can help create a culture of risk management (Muir-Wood 2016). Outreach and education around disaster risk, as well as financial literacy, will support risk-related decision-making. Investments in risk reduction at the property and community level can both improve insurability and lower prices.

While CBCI is a new form of risk transfer, it draws on many well-tested models. It is time for a few communities to pilot these models.

APPENDIX 1: INTERVIEW PARTICIPANTS

We thank the following individuals and organizations for contributing their feedback and insights in the development of the community-based catastrophe insurance concept and this paper.

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