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From Disaster to Development: Finance provides a platform to empower technology for resilience to climate change

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Abstract

The Sendai Framework for Disaster Risk Reduction emphasizes four principles: understanding risk; strengthening governance; investing in resilience; and building back better. Parametric insurance, offered to nations, provides a financial platform to pool and transfer risk from the regional to the global marketplace. The Caribbean Ocean Assets Sustainability faciliTy (COAST) expands upon the prior success of parametric insurance by providing a new platform to more fully link policy and technology with the aim of increasing disaster resilience. COAST focuses upon the nexus among food and nutrition security, the health of the ocean, and the occurrence of severe weather in the Caribbean Sea. The benefits of COAST - linking the technologies highlighted in the Climate-Smart Agriculture Sourcebook and the goals of the Caribbean Community Common Fisheries Policy - are examined using ghost fishing and spiny lobster as an example. This study points to the potential of using finance to provide a platform to empower technology to increase resilience in the face of a changing climate.

Keywords: disaster risk management; climate change; food security; climate smart agriculture; Caribbean; ocean; fish; COAST; sustainability

1. Introduction

During 2015, four major international agreements provided an important path forward towards global development by 2030. The United Nations [UN] Sustainable Development Goals [1], the Sendai Framework for Disaster Risk Reduction [2], the Addis Ababa Action Agenda on Financing for Development [3] and the 21st Conference of Parties (COP21) to the UN Framework on Climate Change (UNFCCC) offered to the world an opportunity to link the policies and technologies of ‘first world problems’ and ‘third world problems’ under a common agenda in recognition of the increasing interconnectedness of the global community. In particular, climate change offered a common threat and a fresh opportunity to engage in policy, finance, and technology solutions that can be scaled among the needs and actions of those living on less than $1.25 per day and the ‘global one percent’.

With the continued growth in the global population, migration of the human population towards the coasts, and increasing concentration of people in urban environments, the risks are increasing to the infrastructure upon which humanity depends [4, 5]. While the total number of deaths from natural catastrophes has decreased over the past century, much of this gain is related to the control of epidemics and flooding; whereas deaths due to earthquakes and storms have remained relatively consistent, and the periodic deaths due to droughts (and related reduction in food security) still occur but with moderately lower impacts [6]. In contrast, the absolute number of disasters reported, the number of people reported as affected, and the monetary damage associated with disasters have risen dramatically [6]. In addition, disasters have a disproportionate impact on the poor as they often lack the technology, financial resources, and institutions to rapidly recover from a set back. Furthermore, few countries have the technical knowledge or financial resources to systematically identify risk, to develop and execute plans for risk reduction, and to coordinate agencies for proper preparations ahead of a disaster.

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In recognition of these conditions, the Global Facility for Disaster Reduction and Recovery (GFDRR) was created in 2006 with the goal of 'mainstreaming' disaster and climate risk management into the financial policies and strategies of developing countries [7]. GFDRR provides grants, technical assistance, training, and knowledge sharing with the support of 34 donor countries and 9 international organizations through a partnership hosted by the World Bank and deploying a resource pool of more than $500 million in cumulative pledges and contributions. As noted in the 2015 Guide to Developing Disaster Recovery Frameworks [8], "Enabling communities to recover from disasters requires both good preparedness before the disaster and ensuring that recovery measures are aligned with ongoing development following the disaster."

In parallel to the work of GFDRR, additional development efforts have explored regional financial solutions to address the challenges presented by disaster recovery. For example, in 2007 the insurance company, Caribbean Catastrophe Risk Insurance Facility (CCRIF), was formed as the first-ever multi-national risk pool [9, 10]. Backed with financial contributions of approximately $60 million, CCRIF has served as a global model of a successful company using parametric insurance as a means of providing financial liquidity to Caribbean nations after a devastating tropical cyclone (aka, hurricane), an earthquake, or excess rainfall. The policies offered by companies such as CCRIF offer an opportunity to link technology innovation and good governance through actuarial science to monetize risk as well as to monetize the use of technology and the use of good governance to reduce and manage risk (i.e., an example for individuals is the Snapshot device from Progressive Insurance [11]).

2. The Example of Insurance

Insurance provides a means of hedging against a future, uncertain financial loss through a transaction in which the policyholder pays a premium and the insurance carrier promises to indemnify the potential loss. The process of indemnification requires the insurance carrier to know the value of the asset, to estimate the likelihood of potential loss, and to verify the value of the claim. This process of indemnification is data and labor intensive, and therefore the associated overhead costs can represent a substantial portion of the premium.

One approach to reduce these costs is through the use of a deductible where future losses below a predetermined threshold are not submitted as a claim. By negotiating the value of the deductible, the costs of the premium may be adjusted [12]. A second approach to reduce these costs is through collecting additional information about the likelihood of potential loss [11]. For example, the Snapshot device offered by Progressive Insurance collects information on the driving patterns of an individual and allows the insurer to calculate the premium based upon the driving profile of an individual rather than upon an aggregate profile of other drivers sharing similar traits (i.e., just because a 16 year old male is driving a red sports car, does not necessarily mean that he has a 'lead foot' and 'drives fast and breaks hard') [13]. A third approach to reduce the costs of the data and labor necessary for indemnification is to use parametric insurance [14]. The payout for a parametric insurance plan is not directly related to the specific value of the asset, but rather an ex ante payout is issued upon the occurrence of a triggering event. Often, the triggering event is selected based upon a high probability of damage occurring to the asset, and therefore parametric insurance provides an alternative means of hedging.

The difference between indemnity insurance and parametric insurance can be clarified with an example. An indemnity type collision insurance policy for an automobile would provide a payout in the event of ramming an automobile into a utility pole. Before issuing a policy, the insurer would determine the value of the automobile, and the insurer would determine information about the driver such as age, gender, and prior driving record. Actuarial science would be used to relate the cost of the policy to the value of the automobile, and the cost of the premium would be calculated using the information collected about the driver (i.e., younger, male, and past driving infractions resulting in a higher premium). After the policyholder rammed into the utility pole and submitted a claim, the insurer would determine the amount of damage to the automobile and might investigate the primary and contributing causes to the accident ultimately resulting in an adjustment (i.e., settlement and payment). Depending upon the value of the automobile and the details of the driver, the costs associated with the process of indemnification might represent a substantial portion of the premium.

A parametric insurance policy for the same automobile and the same driver could be structured differently. For example, while many drivers would likely avoid ramming into a utility pole in good weather, the probability of ramming into a utility pole increases when the roadway is covered in snow and ice during congested traffic of the regular workweek rush hour. Therefore, a parametric insurance policy might be designed to offer a payout to the policyholder when more than one inch of snow accumulated over a period of one hour at a nearby regional weather station between the hours of 7am and 7pm on Monday through Friday. The cost of the premium and the value of the payment would be determined using information about the predominant weather patterns in the region, the typical rates of automobile accidents, and the typical values of automobiles. While the parametric policy is intended to have a relationship to the asset and the loss, there is no explicit link for the parametric policy as can be found for the indemnity policy. The parametric policy can be constructed without the overhead costs associated with necessary data and labor-intensive activities required for the indemnity policy.

A hybrid approach may combine all three methods – higher deductible, improved data on the likelihood of loss, and a parametric product—to reduce the cost for insurance coverage.