



RISE: Resilient Infrastructure Swap Exchange

The Opportunity



Vietnam is increasingly threatened by more frequent and extreme weather events resulting from a changing climate

Damages are severe...

1 of 10

countries **most affected** by **climate change** in last two decades

90%

of **population affected** by typhoons and resulting inland flood damages

And resources are scarce...



Limited or Weak Infrastructure



Little to No Insurance Coverage



Lack of Financing



Limited Rebuilding Expertise

Creating significant economic and social consequences over the last two decades

More than 13,000 deaths

1.5% of GDP lost annually

We target economically strategic and highly vulnerable areas, where climate resilience projects can have outsized impacts

Ho Chi Minh City

- Ho Chi Minh City (standing barely above sea level) is **one of the top 10 cities in the world** most likely to be “severely affected by climate change”
- **Accounts for 23% of GDP and 20% of FDI** in Vietnam (5)
- Home to nearly **13 million people**

Areas of Focus:
Mekong Delta & Ho Chi Minh City



Mekong Delta

- Extremely vulnerable to climate change due to **vast expanses of coastline and low-lying land**
- Agricultural production **powers one-third of Vietnam’s GDP**
- **Produces 80% of carbohydrate intake and 40% of protein intake** of average Vietnamese citizen
- One of the **most agriculturally productive regions in the world** (accounts for 20% of global rice production)
- Home to **18 million people** (4)

Accelerating Impact

Objectives: Fund construction of climate-resilient infrastructure to:

- 1 Minimize impacts** of major floods and typhoons on **livelihoods**
- 2 Speed recovery** when storms do occur

The Solution



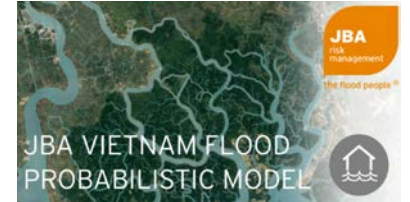
RISE convenes a variety of stakeholders that bring market expertise, financial capital, and climate resilience experience

Role(s)

Illustrative Player(s)

RISE (Market Creator)

- Identifies target investors and markets swaps
- Leverages weather modeling to price swaps based on meteorological risks
- Partners with impact organizations to design and/or implement shovel-ready projects



Investors (Swap Counterparties)

- Selects investment size and tranch based on desired returns and risk profile
- Trades swaps as desired based on market developments and need for liquidity

Hedge Funds

\$10B in hedge fund assets under management focused on ESG

Insurance Companies

\$27B market for insurance-linked securities in Q1 2017 (highest ever)

Foundations

Large US foundations alone gave **\$158M to disaster response** in 2015

Impact Partners

- Conducts expedited damage assessments after storms based on existing models
- Designs and/or implements climate resilience projects
- Reports on selected impact indicators



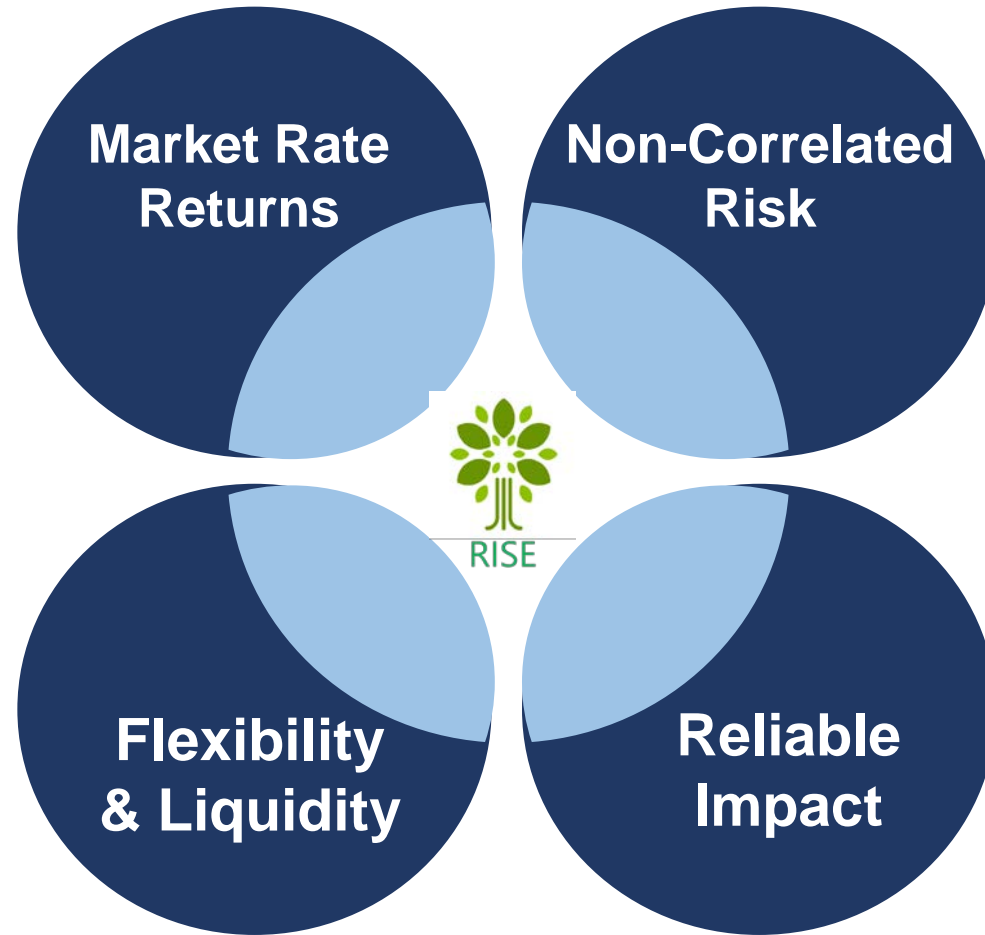
THE WORLD BANK



GREEN CLIMATE FUND

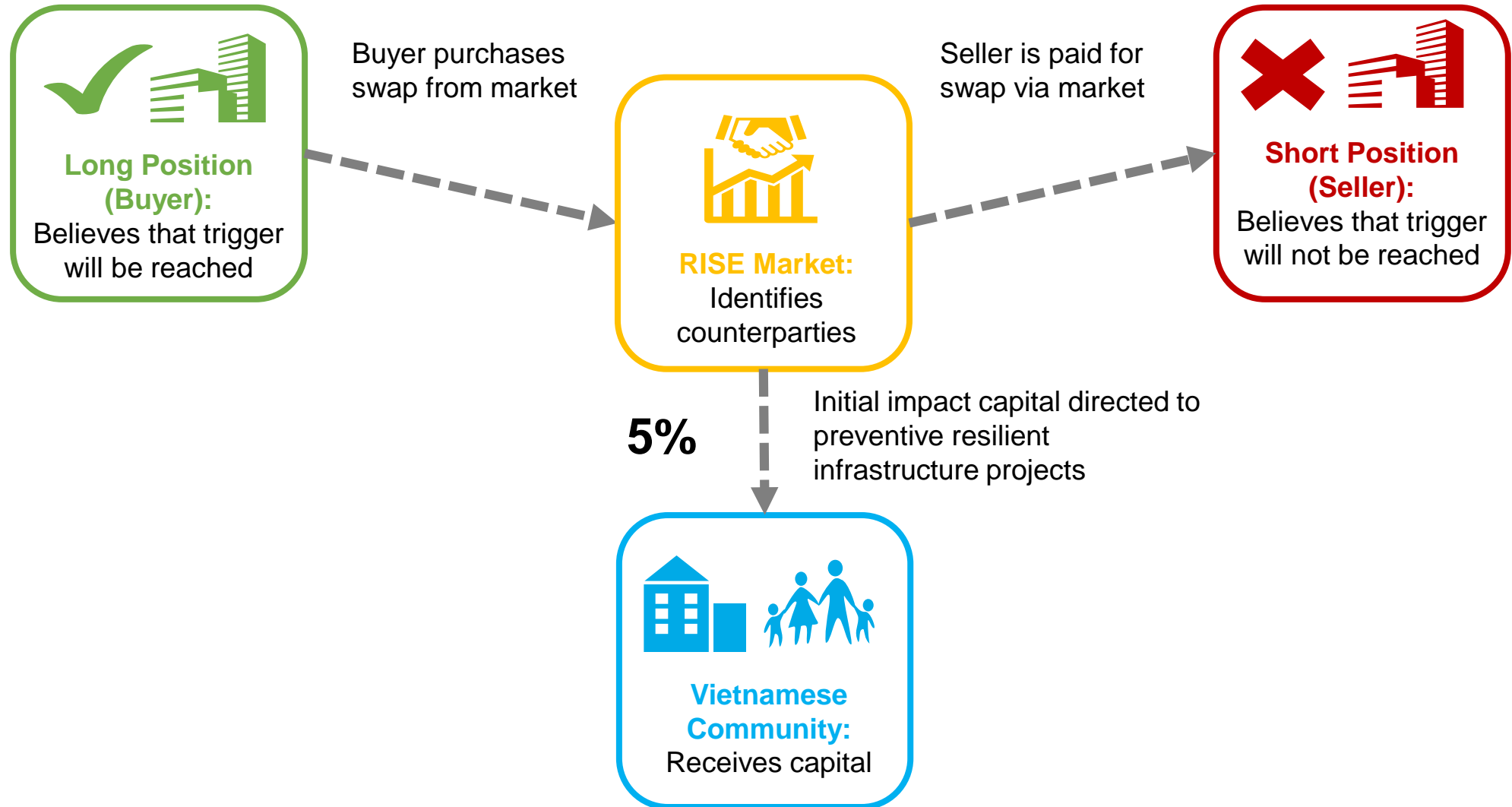
Our solution brings capital to an underdeveloped market by creating an innovative swap instrument to share risk

- Investors can match risk appetite with return profile by selecting trigger point
- Long investors can earn up to 4X initial investment while short investors benefit from upfront payments
- No long-term lock-ups; investors can enter and exit the market as desired
- Enables investors to make decisions based on current risk management needs



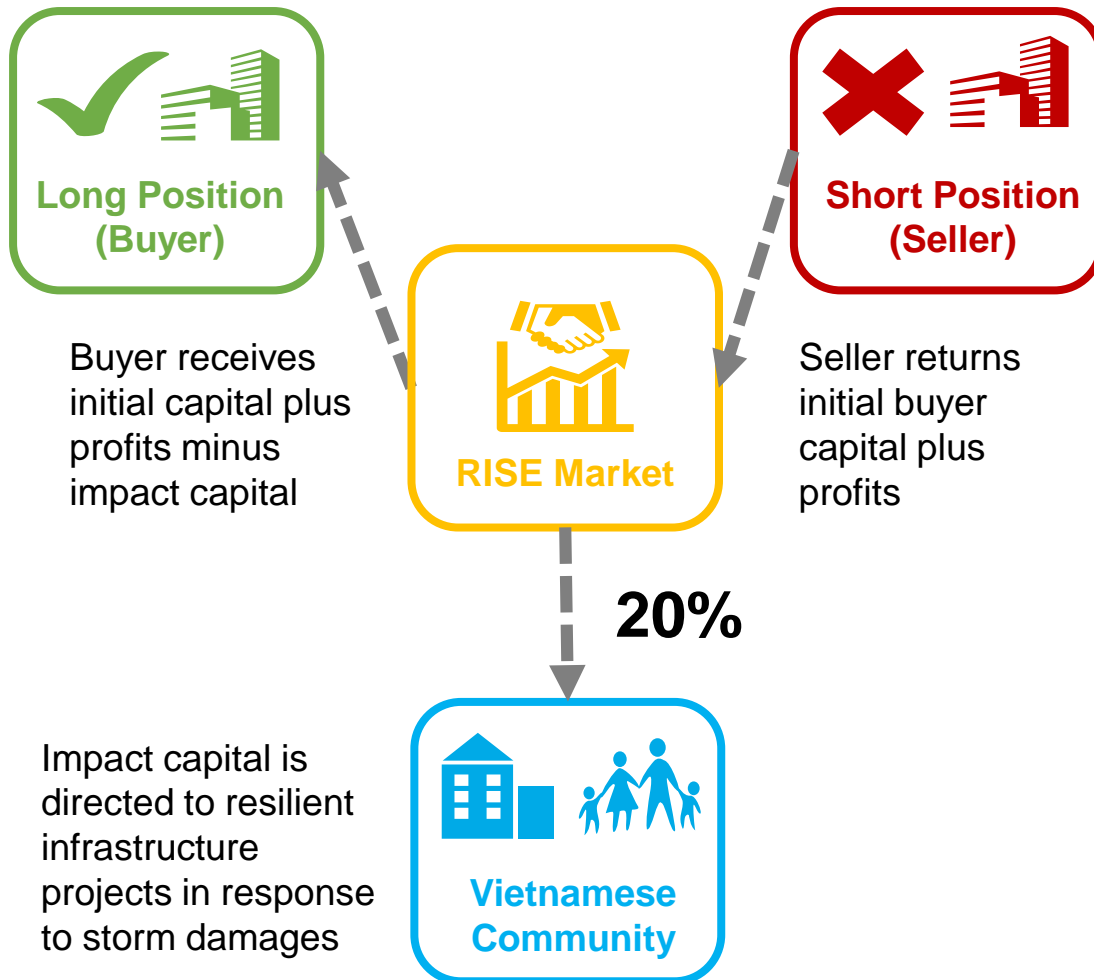
- Swap price not correlated with the risks of other global investment vehicles
- Allows investors to diversify portfolio risk
- Funding for preventive projects as well as post-disaster recovery capital
- Credible and experienced impact partners
- Pipeline of shovel-ready projects in need of funding

In Year 0, RISE facilitates the creation of a swap and ensures a percentage of funds flow to prevention projects



At liquidation, the short investor or the long investor gets a return, depending on whether the trigger has been reached

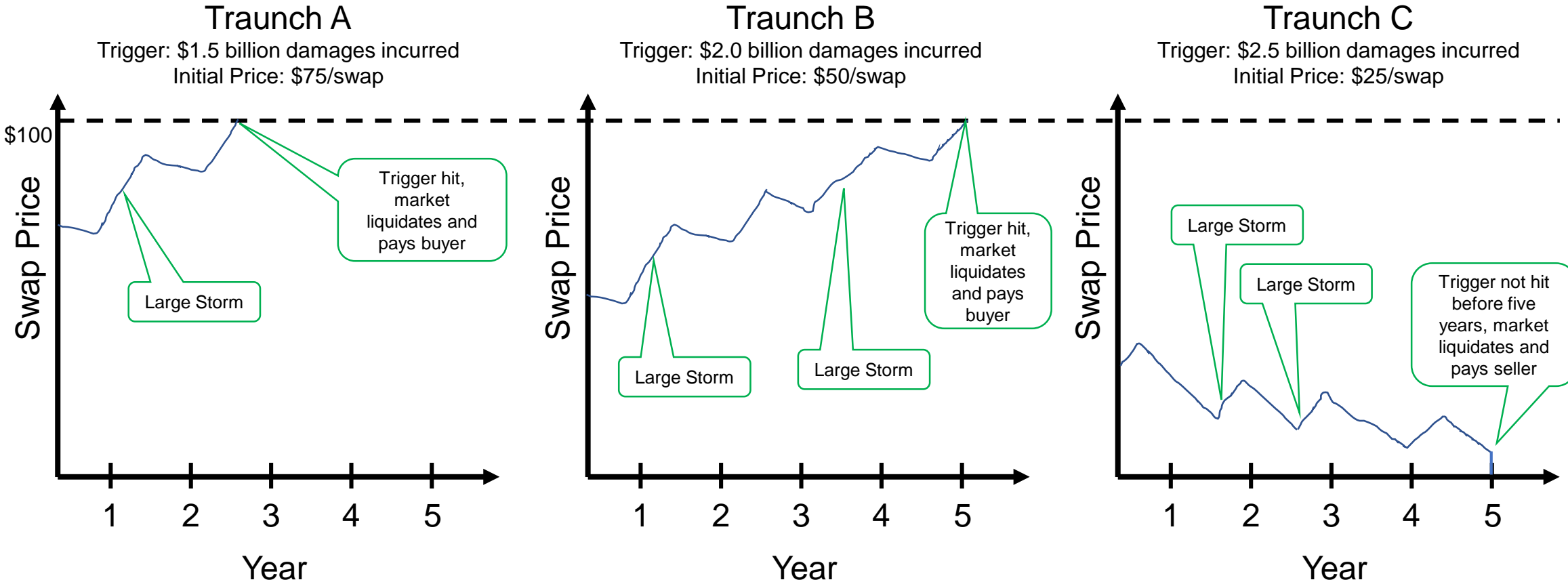
Trigger Reached



Trigger Not Reached (Year 5)



The price of the swap is derived from the probability that cumulative storm damages will hit the trigger

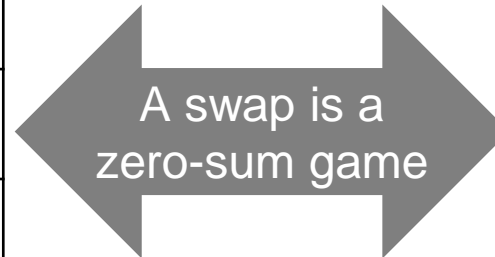


The size and trigger points of the tranches are determined by analyzing a probability distribution of damage outcomes from an existing actuarial catastrophe model. AIR Worldwide, the leader in ILS catastrophe modeling has a model for Southeast Asia (including Vietnam).

Investors can select their investment size, position, and traunch based on desired levels of risk and return

IRR if the long position (buyer) pays out in a given year

Traunch	Year				
	1	2	3	4	5
A (Trigger: \$1.5B)	19%	8%	5%	3%	2%
B (Trigger: \$2B)	67%	28%	18%	13%	10%
C (Trigger: \$2.5B)	210%	75%	45%	32%	25%



IRR if the short position (seller) pays out (requires five years to pay out)

Traunch	Year				
	1	2	3	4	5
A (Trigger: \$1.5B)	N/A	N/A	N/A	N/A	50%
B (Trigger: \$2B)	N/A	N/A	N/A	N/A	50%
C (Trigger: \$2.5B)	N/A	N/A	N/A	N/A	50%

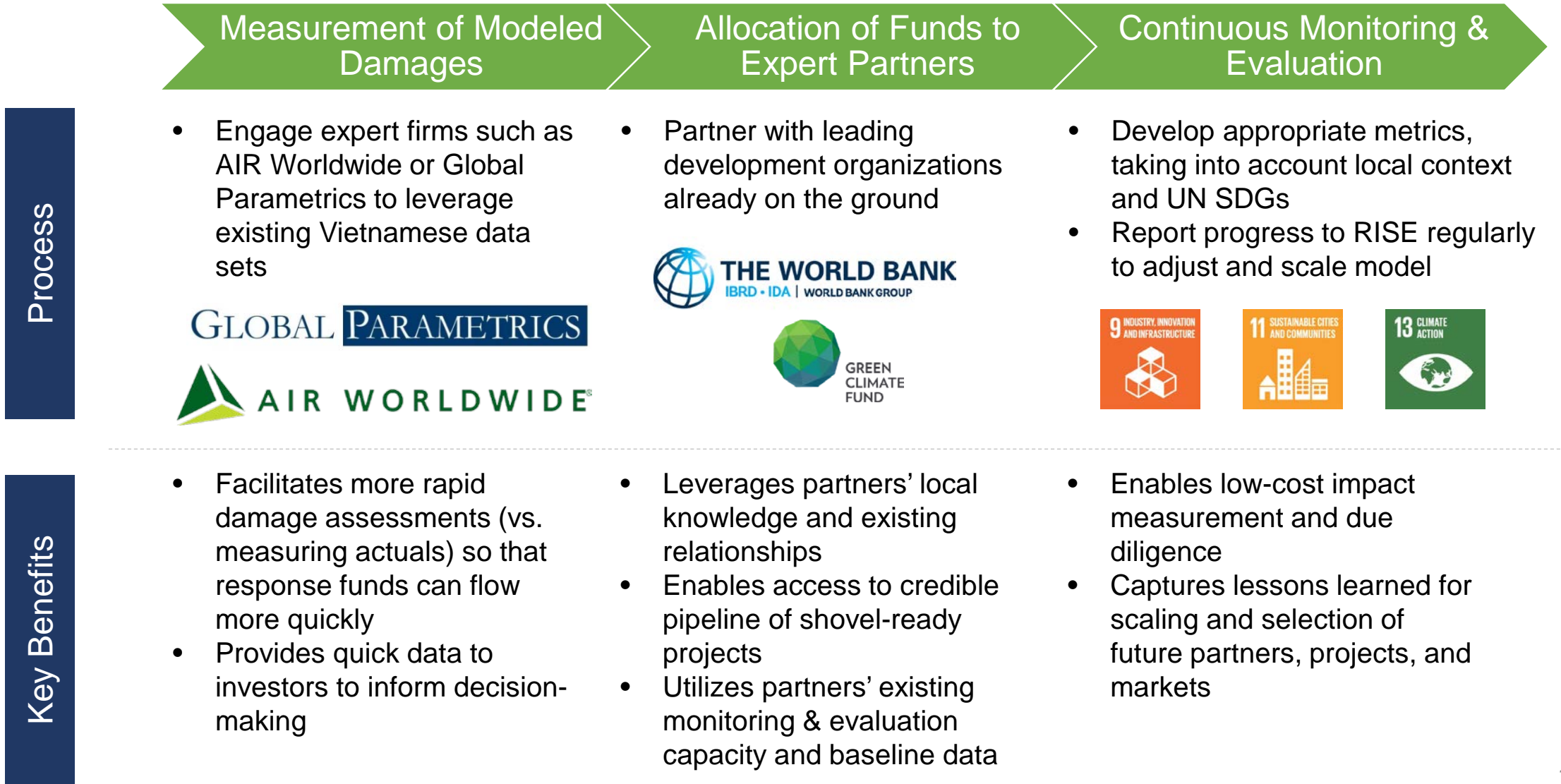
But if the attachment point is not hit, the long position loses all of its initial capital

But if the attachment point is hit, the short position must pay out the long position

The Impact



RISE convenes a diverse set of players to rapidly get funds to where they are needed the most



RISE is positioned to create immediate impact in Vietnam, with significant potential for growth as additional capital is invested

Objectives

- 1 **Minimize impacts** of major floods and typhoons on **livelihoods**
- 2 **Speed recovery** when storms do occur

Example Projects

- Training construction workers on resilient, sustainable building techniques
- Building seawalls and other protective infrastructure
- Rebuilding and restoring mangrove trees to protect coastlines

Immediate Impact and Growth Potential

\$37.5M

Maximum impact capital generated by RISE based on \$150M initial market investment

1,000ha

Area that can be redeveloped by planting mangrove trees for \$3M, protecting 10km of coastline

125km

Length of coastline that can be protected by resilient infrastructure using RISE funding

How to Measure Success: Illustrative Indicators

% of major road mileage functioning	Business continuity (e.g. number of days without power)	Number of people unemployed
% of new buildings incorporating resilient design	\$ Amount of damages from typhoons	Change in rice production output & export levels

RISE can be scaled to other developing countries impacted by more frequent disasters resulting from a changing climate



Natural disasters caused \$550 billion of damages in developing countries between 2003 and 2013

Scaling up is feasible

within the \$33B insurance-linked security (ILS) market across both underinsured and developed insurance markets

Significant market needs

mean that return non-correlation, expected loss, and capital intensity can be customized

Selectively Diversified Geography

Incentives for Loss Avoidance

Lower Expenses than Insurers

Economies of Scale for Pricing

Earthquake

Longevity Swaps

Hail/ Severe Storm

Wildfire

Our Advisors

Finance

Yiorgos Allayannis, Professor of Finance

Dan Bierenbaum, Global Parametrics (in process)

Bob Bruner, Distinguished Professor of Business, Dean Emeritus

Sam Chen, Deutsche Bank

Karen Karniol-Tambour, Bridgewater Associates (in process)

Sam Kramer, Goldman Sachs

Elena Loutskina, Bank of America Associate Professor of Business Administration

Mary Margaret Frank, Associate Professor of Business Administration

Pedro Matos, Director of Mayo Center for Asset Management

Richard A. Mayo, Mayo Capital Partners / Grantham Mayo van Otterloo

Diego Oliveira, Credit Suisse

Jerry Skees, Global Parametrics (in process)

Impact

Rashad Badr, ImpactBeta

Andrea Barrios, Rockefeller Foundation

Greg Bennett, Working Capital

Carolyn duPont, Quantified Ventures

Chad Reed, TerraForm Power / Blue Forest Conservation

Local Experts

Vietnam National Reinsurance Corporation

Dzung Van Nguyen, Ministry of Foreign Affairs of Vietnam



RISE Team



Promoting Innovation in Regulatory & Financial Services Technology



A sunset scene over a body of water. The sun is low on the horizon, partially obscured by a layer of clouds, creating a golden glow. The water reflects the light from the sun. In the foreground, there are silhouettes of people in two small boats on the water. The background shows a dark silhouette of a shoreline with trees and buildings.

Questions?

An aerial photograph of a coastal region. In the foreground, there are green agricultural fields with some scattered buildings. A winding river or canal flows through the middle ground, bordered by more fields and some residential areas. In the background, a large body of blue water stretches to the horizon, with several islands and a mountain range visible in the distance under a clear blue sky with a few clouds.

Appendix

Sources

1. German Watch, Global Climate Risk Index 2017
2. World Bank, Vietnam Initial Market Assessment
3. World Bank PCG Country Note on Vietnam, 2013
4. World Bank Vietnam Emergency Flood Disaster Reconstruction Project, 2017
5. World Bank GEF Mekong Delta Integrated Climate Resilience and Sustainable Livelihoods Project, 2017
6. Climate Change News, 2018
7. Asian Development Bank Ho Chi Minh City Adaptation to Climate Change Report, 2010
8. Impact investing A sustainable strategy for hedge funds, Deloitte Center for Financial Services, 2016
9. Q1 2017 Catastrophe Bond and ILS Market Report, Artemis, 2017
10. Philanthropy News Digest, “Large U.S. Foundations Gave \$158.1 Million for Disaster Relief in 2015,” October 2017
11. Logo by FreePik
12. Climate Finance Lab, 2016
13. Green Climate Fund/UNDP Funding Proposal, 2016
14. Insurance Sector Update, VietCapital Securities, 2016

Traunch A Model

Assumptions	
Long Impact % Profit	25%
Short Impact % Profit	5%
Cap	\$100.00
Initial Price	\$ 75.00
Origination Fee	5%
Management Fee	1.50%

Cash Flows for Long Investor (Buyer)						
5-Year Scenario	Y0	Y1	Y2	Y3	Y4	Y5
Investor Flows	\$ (78.75)	\$ (1.13)	\$ (1.13)	\$ (1.13)	\$ (1.13)	\$ 93.75
Impact Flows	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 6.25
IRR	2.5%					
4-Year Scenario	Y0	Y1	Y2	Y3	Y4	Y5
Investor Flows	\$ (78.75)	\$ (1.13)	\$ (1.13)	\$ (1.13)	\$ 93.75	
Impact Flows	\$ -	\$ -	\$ -	\$ -	\$ 6.25	
IRR	3.4%					
3-Year Scenario	Y0	Y1	Y2	Y3	Y4	Y5
Investor Flows	\$ (78.75)	\$ (1.13)	\$ (1.13)	\$ 93.75		
Impact Flows	\$ -	\$ -	\$ -	\$ 6.25		
IRR	5.1%					
2-Year Scenario	Y0	Y1	Y2	Y3	Y4	Y5
Investor Flows	\$ (78.75)	\$ (1.13)	\$ 93.75			
Impact Flows	\$ -	\$ -	\$ 6.25			
IRR	8.4%					
1-Year Scenario	Y0	Y1	Y2	Y3	Y4	Y5
Investor Flows	\$ (78.75)	\$ 93.75				
Impact Flows	\$ -	\$ 6.25				
IRR	19.0%					

Cash Flows for Short Investor (Seller)						
Year	Y0	Y1	Y2	Y3	Y4	Y5
Investor Flows	\$ 67.25	\$ (1.13)	\$ (1.13)	\$ (1.13)	\$ (1.13)	\$ (1.13)
Impact Flows	\$ 4.00	\$ -	\$ -	\$ -	\$ -	\$ -
IRR	50%					

Traunch B Model

Assumptions	
Long Impact % Profit	25%
Short Impact % Profit	5%
Cap	\$ 100.00
Initial Price	\$ 50.00
Origination Fee	5%
Management Fee	1.50%

Cash Flows for Long Investor (Buyer)						
5-Year Scenario	Y0	Y1	Y2	Y3	Y4	Y5
Investor Flows	\$ (52.50)	\$ (0.75)	\$ (0.75)	\$ (0.75)	\$ (0.75)	\$ 87.50
Impact Flows	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 12.50
IRR	10%					
4-Year Scenario	Y0	Y1	Y2	Y3	Y4	Y5
Investor Flows	\$ (52.50)	\$ (0.75)	\$ (0.75)	\$ (0.75)	\$ 87.50	
Impact Flows	\$ -	\$ -	\$ -	\$ -	\$ 12.50	
IRR	13%					
3-Year Scenario	Y0	Y1	Y2	Y3	Y4	Y5
Investor Flows	\$ (52.50)	\$ (0.75)	\$ (0.75)	\$ 87.50		
Impact Flows	\$ -	\$ -	\$ -	\$ 12.50		
IRR	18%					
2-Year Scenario	Y0	Y1	Y2	Y3	Y4	Y5
Investor Flows	\$ (52.50)	\$ (0.75)	\$ 87.50			
Impact Flows	\$ -	\$ -	\$ 12.50			
IRR	28%					
1-Year Scenario	Y0	Y1	Y2	Y3	Y4	Y5
Investor Flows	\$ (52.50)	\$ 87.50				
Impact Flows	\$ -	\$ 12.50				
IRR	67%					

Cash Flows for Short Investor (Seller)						
Year	Y0	Y1	Y2	Y3	Y4	Y5
Investor Flows	\$ 45.00	\$ (0.75)	\$ (0.75)	\$ (0.75)	\$ (0.75)	\$ (0.75)
Impact Flows	\$ 2.50	\$ -	\$ -	\$ -	\$ -	\$ -
IRR	50%					

Traunch C Model

Assumptions	
Long Impact % Profit	25%
Short Impact % Profit	5%
Cap	\$ 100.00
Initial Price	\$ 25.00
Origination Fee	5%
Management Fee	1.50%

Cash Flows for Long Investor (Buyer)						
5- Year Scenario	Y0	Y1	Y2	Y3	Y4	Y5
Investor Flows	\$ (26.25)	\$ (0.38)	\$ (0.38)	\$ (0.38)	\$ (0.38)	\$ 81.25
Impact Flows	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 18.75
IRR	25%					
4-Year Scenario	Y0	Y1	Y2	Y3	Y4	Y5
Investor Flows	\$ (26.25)	\$ (0.38)	\$ (0.38)	\$ (0.38)	\$ 81.25	
Impact Flows	\$ -	\$ -	\$ -	\$ -	\$ 18.75	
IRR	32%					
3-Year Scenario	Y0	Y1	Y2	Y3	Y4	Y5
Investor Flows	\$ (26.25)	\$ (0.38)	\$ (0.38)	\$ 81.25		
Impact Flows	\$ -	\$ -	\$ -	\$ 18.75		
IRR	45%					
2-Year Scenario	Y0	Y1	Y2	Y3	Y4	Y5
Investor Flows	\$ (26.25)	\$ (0.38)	\$ 81.25			
Impact Flows	\$ -	\$ -	\$ 18.75			
IRR	75%					
1-Year Scenario	Y0	Y1	Y2	Y3	Y4	Y5
Investor Flows	\$ (26.25)	\$ 81.25				
Impact Flows	\$ -	\$ 18.75				
IRR	210%					

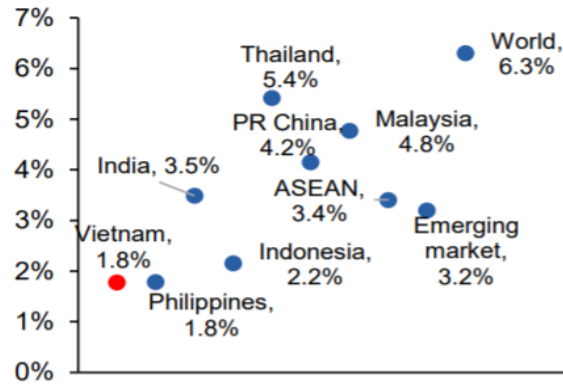
Cash Flows for Short Investor (Seller)						
Year	Y0	Y1	Y2	Y3	Y4	Y5
Investor Flows	\$ 22.75	\$ (0.38)	\$ (0.38)	\$ (0.38)	\$ (0.38)	\$ (0.38)
Impact Flows	\$ 1.00	\$ -	\$ -	\$ -	\$ -	\$ -
IRR	50%					

Why RISE Is Innovative

- Leverages lower cost capital of ILS market, relative to the 30%+ expense ratios of insurers that inflate the cost of risk transfer
- Collective, risk-pooling structure gets around tragedy of the commons and principle of indemnity, allowing investors to internalize risk prevention infrastructure investment on the front end
- Binary parametric structure is logistically less complex
- ILS has not advanced into integrated ESG/SRI vehicles despite hedge funds and other providers of capital's interest in the space
- Captured momentum of the wave of interest from various parties on climate change preparedness and resilience, for example the World Bank, Nephila (in which KKR is a shareholder), and others

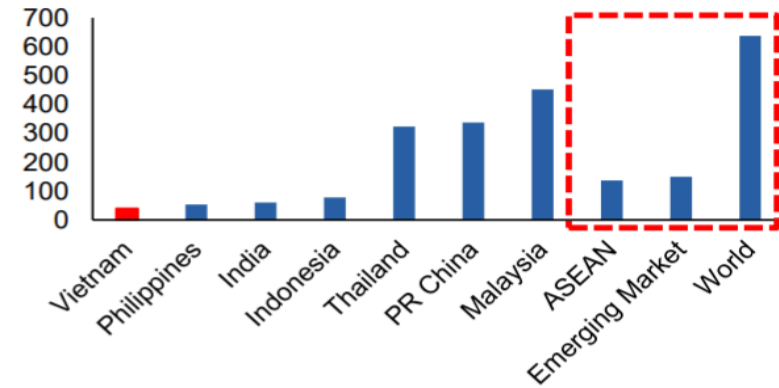
Scalability: Insurance Penetration

Figure 12: Insurance penetration, 2016



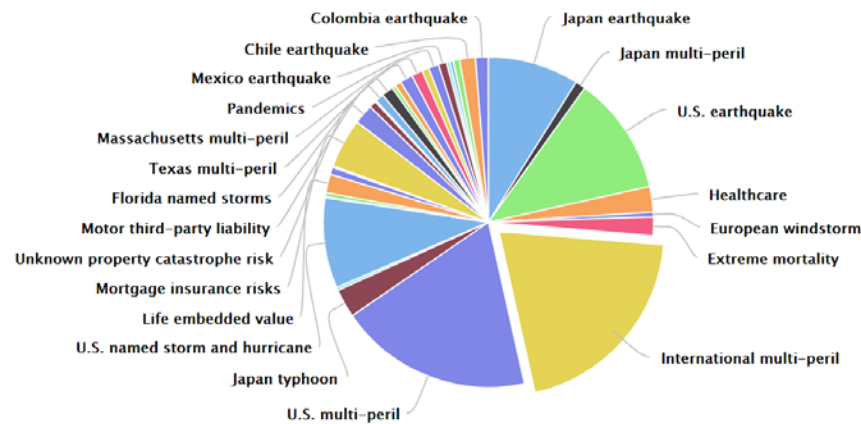
Source: Swiss Re Institute

Figure 13: Premia per capita in USD, 2016



Source: Swiss Re Institute

Catastrophe bonds & ILS risk capital outstanding by risk or peril



Source: www.Artemis.bm Deal Directory

Diversity of existing ILS perils and low insurance penetration in Southeast Asia suggests this product has significant runway