

ASEAN STORM RESILIENCE FUND

KOPONAN HAIYAN







SE Asia is the most climate-vulnerable region in the world

4 out of **10** ar

most climate-vulnerable countries are in SE Asia

30

tropical cyclones per year – projected to increase by 14% in magnitude and 22% in frequency

640mil

population, of which addressable market is 300mil living in rural areas or small townships

350k

killed in natural disasters over 10-yr period

\$2_{bil}

average annual losses from cyclones



ASEAN member states' combined cyclone mortality and flood mortality risk : UNEP/GRID-Geneva Global Disaster Risk Platform



Climate disasters cannot be solved through emergency relief alone

5 billion emergency relief needs every year in Southeast Asia*



*Emergency relief needs are estimated based on annual lost due to typhoon plus indirect expenses that cover affected population's shelter and basic living needs.

to "shrink the needs"

Reference: Global Assessment Report on Disaster Risk Reduction – GAR 2013 Probability Modelling of Natural Risks at the Global Level: Global Risk Model



We look to "shrink the needs" by enabling communities to reinforce their homes..

Configure

Connect

Construct

Housing types in South East Asia were found with serious construction defects and are vulnerable to storms



Withstand **200 mph**—adequate for the winds encountered even in the "storm of the century" type event





Reference Post-Disaster Reconnaissance Report Damage Assessment and Housing and Markets Survey 2013 Bohol Earthquake and Typhoon Yolanda 31 January 2014, revised 5 February 2014 © 2014 Build Change



..Through the use of microfinance and co-operatives





Providing strong value-add to all stakeholders involved



nvestors

- Expected IRR of 11-17% > historical returns of catastrophe bonds (c.8.2%) and MSCI Emerging Markets Index (c.10.3%)
- Portfolio diversification benefits
- Strong social and environmental impact



ommunities

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- Greater resilience to typhoons, climate extremes
- Higher survival chances in disaster event; reduced risk of injury
- Much reduced risk of homeless and swifter resumption of livelihood when food storage and seeds are protected from storm damage
- Potential improved access to financing / insurance

nts

overnme

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- \$560 million in avoided damages and indirect cost per million homes reinforced
- Risk-sharing with private sector
- Reduced socio-economic costs of homelessness and unemployment
- Reduced slum growth caused by climate refugees



rganizations

Multilatera

- Risk of financing such projects shared with private sector
- Fulfilment of institutional climate change adaptation, disaster risk reduction and human development
- Reduced need to mobilize resources for major emergency relief efforts - "shrinks the needs"
- Creates new potential mechanism for supporting bottom-of-pyramid, systemic needs in climate adaptation



Key issues have been identified and mitigated

Commercial	 Positive feedback from local co-operatives Communities in SEA highly familiar with aftereffects of weather-induced catastrophes 	50% of demand + 2.5x average default rate yielded positive IRR
Credit	 Group/community based lending (social pressure) Similar methodologies have yielded good results Amortizing loan structure 	Model robust at 10% default rate (2.5x of average) and provision for disasters
Development Impact Bond/ Grants	 GEF has advised that for large-scale projects, proposals could be routed to its Main Trust Fund, with emphasis on financial viability and social impact 	Benefits > cost, climate resilience is a focus area in recent years
Operational	 Governance framework to minimize mismanagement of funds has been developed Co-operatives have indicated willingness to work within the proposed framework 	See Governance / Risk Management Structure slide for details



Key Assumptions and Illustration of Base Case







ASEAN Storm Resilience Fund is scalable in four phases





Execution Road Map





Our Team

Finance & Investment





Sustainability & Government





ASEAN Specialised Meteorological Centre



NTU PROTECTIVE TECHNOLOGY RESEARCH CENTRE

Engineering & Program Management







Advisors to the Proposal

Advisor: Dr. Ang Ser-Keng, Academic Director of MBA Program



ASEAN Specialised Meteorological Centre Regional Weather and Climate Division



FARMCOOP

Foundation for Agrarian Reform Cooperatives in Mindanao Inc.

Ms Kahlil Apuzen-Ito, M.Sc. Research and Development Department



Ms Moe Thuzar

Fellow, Lead Researcher (Socio-Cultural Affairs), ASEAN Studies Centre & Coordinator, Myanmar Studies Programme



Dr Gustavo Fonseca Director of Programmes and team



Mr Ng Saye Phin President



Dr Jack Hong Co-Founder, Corporate Finance Expert





Appendix: Fund Details

Fund Size	US\$11.8 million
Investment Criteria	 Reinforcement projects must focus on homes and farmsteads for weather resilience Loans and grants will be given to applicants only in groups through a farming co-operative Co-operatives must engage an accredited contractor
Target Returns	11-17% (gross of fees)
Fees	2% management fee on committed capital, 20% performance fee on returns > 15%
Partners	Association of SE Asian Nations (ASEAN), Engineers Without Borders, World Meteorological Organization, UN Global Environment Facility
Geography	Southeast Asia, focus on the Philippines in early phases
Target Investors	Family Offices, Private Banks, Impact-Oriented Investors
Asset class	Private Equity + Development Impact Bond (DIB) serving as return enhancer
DIB Details	 Size and Tenor: US\$11.8 million, 4 year Estimated Return: Up to US\$160 per home reinforced, scaled by % of social impact target achieved
Tenor	6 years (callable commitments to year 4)
Metrics for impact	Number of reinforced homes - target of 48,000



Appendix: Governance / Risk Management Structure





Appendix: Base Cash Flow Breakdown

Year	1	2	3	4	5	6	Comments
Investor Capital Inflow / Outflow	(7,243,399)	(2,184,543)	-	720,000	6,523,399	2,184,543	Assuming 9,600 homes per year (80% of target)
Interest Earned	606,409	1,294,649	1,414,191	1,414,191	807,782	119,543	15% ¹ interest charged on MFI loans (50% of market rate for MFI)
Total Cashflow (excl Provisions and DIB)	(6,636,990)	(889,894)	1,414,191	2,134,191	7,331,181	2,304,086	
Less: Loan Loss Provision	242,564	517,860	565,677	565,677	323,113	47,817	6% loan loss, 1.5x average ²
Less: Operating Expense	242,564	517,860	565,677	565,677	323,113	47,817	40% ³
Less: Disaster Provisions	79,576	79,576	79,576	79,576	79,576	72,945	See Disaster Provision Methodology
From MFI Loans	(7,201,694)	(2,005,189)	203,262	923,262	6,605,379	2,135,507	
From DIB	-	1,231,913	1,231,913	1,231,913	1,231,913	-	See Development Impact Bond Mechanics
Total Cash Flow to Investor	(7,201,694)	(773,277)	1,435,175	2,155,175	7,837,292	2,135,507	

1) Sgv.ph – Financial Power of the Poor

2) <u>CGAP</u>

3) Microfinance Gateway



Appendix: Disaster Provision Methodology

Weighted Ave Loss Based on Probability of Wipe Out Events						
hted Loss Per Month						
1,660.39						
1,577.37						
41.51						
0.69						
3,280 ²						

The Philippine Atmospheric, Geophysical and Astronomical Services Administration
 Assumed homes not reinforced will be wiped out if wind speeds hit above 60mph
 Doubled probability of wind speeds being above 200mph
 Assumed homes wiped out if wind speeds hit above 200mph



Appendix: Development Impact Bond Mechanics





Appendix: Sensitivity of IRR to Key Variables



Model highly sensitive to Loan Loss Rates and Market Interest Rate (used to compute DIB payments)

- Base case Loan Loss Rate was assumed to be 6%, 1.5x of average
- Market Interest Rate to be fixed at 30% at negotiation



Appendix: Sensitivity of IRR to Variables (Table)

% Change in Variable	Demand	Market Interest Rate	Loan Loss Rate	Interest Rate	Op.Exp to Rev	Delay in DIB PMT (Months)
Base Value	800	30%	6%	15%	40%	0 15.20%
		10.000/				3 14.71%
-5%	14.08%	10.32%	19.65%	16.05%	15.45%	6 14.27%
-4%	14.21%	11.19%	18.66%	15.78%	15.30%	9 13.86%
20/	14 220/	12.070/	17 (00/	15 520/	15 160/	12 13.49%
-3%	14.33%	12.07%	17.08%	15.52%	15.10%	15 13.14%
-2%	14.46%	12.94%	· 16.69%	15.25%	15.01%	18 12.82%
-1%	14.58%	13.83%	15.70%	14.98%	14.86%	21 12.53%
0%	1/1 71%	1/1 71%	1/ 71%	1/1 71%	1/ 71%	24 10.31%
070	14./1/0	14./1/0	14./1/0	14./1/0	14./1/0	27 10.12%
1%	14.84%	15.60%	13.72%	14.44%	14.56%	30 9.94%
2%	14.97%	16.49%	12.73%	14.17%	14.41%	33 9.77%
3%	15.10%	17.38%	11.74%	13.90%	14.27%	36 7.47%
4%	15.23%	18.27%	10.75%	13.63%	14.12%	
5%	15.36%	19.17%	`\ 9.76%	13.36%	13.97%	

Expected range of IRR quoted



Appendix: Scenario Analysis

		Demand of Homes					
Loan Loss (%)	500	600	700	800	900	1,000	
1%	14.86%	16.47%	18.06%	19.65%	21.23%	22.81%	
2%	13.87%	15.47%	17.07%	18.66%	20.25%	21.82%	
3%	12.88%	14.48%	16.08%	17.68%	19.26%	20.84%	
4%	11.88%	13.49%	15.09%	16.69%	18.28%	(19.86%)	
5%	10.89%	12.50%	14.10%	15.70%	17.29%	18.88%	
6%	9.89%	11.50%	13.11%	(14.71%)	16.31%	17.89%	
7%	8.90%	10.51%	12.12%	13.72%	15.32%	16.91%	
8%	7.90%	9.52%	11.13%	12.73%	14.33%	15.92%	
9%	6.90%	8.52%	10.14%	11.74%	13.34%	14.94%	
10%	(5.91%)	7.53%	9.14%	10.75%	12.36%	13.95%	
	*			*		*	
	Stressed			Base		Best	

Factored in 3 month delay for DIB payments to allow for tracking of metrics etc.

Expected losses due to inability to pay when disaster strikes during / post reinforcement have been factored in



Appendix: Scenario Analysis Cash Flow

Base Cash Cash Flow	1	2	3	4	5	6
From MFI Loans	(7,201,694)	(2,005,189)	203,262	923,262	6,605,379	2,135,507
From DIB	-	1,231,913	1,231,913	1,231,913	1,231,913	-
Total Cash Flow Base Case	(7,201,694)	(773,277)	1,435,175	2,155,175	7,837,292	2,135,507
Stressed Case Cash Flow	1	2	3	4	5	6
From MFI Loans	(4,602,127)	(1,469,018)	(108,660)	341,340	3,993,732	1,314,768
From DIB	-	481,216	481,216	481,216	481,216	-
Total Cash Flow Worse Case	(4,602,127)	(987,802)	372,556	822,556	4,474,948	1,314,768
Best Case Cash Flow	1	2	3	4	5	6
From MFI Loans	(8,901,049)	(2,290,712)	489,776	1,389,776	8,391,355	2,689,307
From DIB	-	1,924,864	1,924,864	1,924,864	1,924,864	-
Total Cash Flow Best Case	(8,901,049)	(365,848)	2,414,640	3,314,640	10,316,218	2,689,307





Appendix: Loan Mechanism

- Farming cooperatives promote the scheme and educate their members on benefits
- Members sign up through their cooperatives in groups
- Members repay loans to cooperatives, which aggregates payments to Programme Office
- Cooperatives track ground-level progress
- Funds are disbursed to contractors directly from Programme Office on the basis of completion of milestones that are signed off by cooperatives and their members



Appendix: Contractor Accreditation / Inspection Mechanism

- Modular reinforcements will be designed in partnership with NGOs such as Engineers Without Borders
- Design specs will include materials, components and best practices that can withstand 200mph winds
- Contractors must demonstrate they can build to specifications in order to be accredited
- Basic checklists will be distributed to cooperatives and their members so they can assist in quality control
- Goal is to ensure good quality construction but without onerous bureaucracy, also creates ancillary benefits for local construction industry and employment
- Random checks may be organised by Programme Office and coops, there will also be reporting mechanism for individuals to report mishandling



Appendix: ASEAN has proven track record in regional development

- Framework has succeeded in encouraging economic reform and knowledge transfer and FDI in countries thought to be politically risky
- ASEAN facilitated disaster relief and investment in Myanmar post-Nargis
- ASEAN has existing programmes for climate resilience, agricultural development and related Sustainable Development Goals – Storm Resilience Fund is highly aligned with objectives
- Mechanisms exist for capability-building grants and multistate cooperation
- ASEAN Storm Resilience Fund will apply for capabilitybuilding grant under one of the programmes / pillars

ASEAN Sustainable Development Goals (2017)

"By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events

and other economic, social and environmental shocks and disasters"



Appendix: Nargis & Haiyan Impact



Loss and damage resulting from Cyclone Nargis based on the PONJA

Damage from the Cyclone was estimated at US\$ 4.1 billion.

800,000 houses were damaged or destroyed

Total economic losses amounted to approximately 2.7 per cent of Myanmar's projected GDP in 2008.

Affected households were extremely vulnerable—55 per cent reported having only enough food to feed themselves for one day or less. Reliance on the steady flow of relief supplies was widespread.

The scale of the impact was similar to that inflicted on Indonesia following the Indian Ocean Tsunami in 2004.

Over 90 per cent of needs were at the community level and could be addressed through communitybased approaches.

Reference: A Humanitarian Call: The ASEAN Response to Cyclone Nargis



Reference: Weathering the Perfect Storm: Lessons Learnt on the ASEAN's Response to the Aftermath of Typhoon Haiyan



Appendix: Estimated Damages and Relief Costs Avoided

- We consider Annual Average Loss Value from Cyclones and the Annual number of people exposed to cyclone damage
- Loss per person affected (for Philippines rollout) =

USD 51.20 in direct damage to infrastructure +

USD 64 in relief to sustain livelihoods and basic care

= USD 115.20

This would otherwise be borne by governments and donors

- With 1,000,000 households made resilient, 6,000,000 people will be shielded and those costs are foregone
- \$560 million in avoided damages and indirect cost per million homes reinforced
- Net enabling grants/DIB for ASEAN Storm Resilience Fund, net benefit = \$293 million per million homes reinforced

ASEAN Member State-	Annual Ave. Loss (Direct) Value from Cyclones [USD millions]	Annual number of people exposed to cyclone damage		
Philippines	2,039.00	39,825,145.70		
Indonesia	40.89	42,559.30		
Viet Nam	22.60	3,549,019.50		
Brunei Darussalam	11.10	-		
Thailand	7.30	40,489.68		
Malaysia	6.40	-		
Myanmar	3.00	1,101,540.03		
Lao PDR	1.00	35,283.52		
Cambodia	0.40	803.76		

Reference: Global Assessment Report on Disaster Risk Reduction – GAR 2013 Probability Modelling of Natural Risks at the Global Level: Global Risk Model



Appendix: Proposed Technical Solution

