Smart Support Guidance for Donors and Policy Makers to Manage Sovereign Climate Risk in Vulnerable Developing Countries

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Vulnerable developing countries face the dilemma of protection and development

- Governments of developing countries prone to hazards have limited public investment capacity;
- Economic development without sufficient risk management makes the country more vulnerable;
- Climate change in middle-near future induce more stress of balancing development and protection

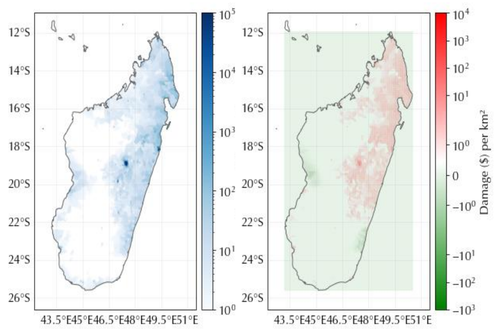

Fig 1. left: Annual average losses caused by tropical cyclones under the current climate; right: Difference of losses under the RCP 8.5 scenario than the current climate

- Taking **Madagascar** as a case study country, we calculated the risk of tropical cyclones in various scenarios;
- Losses caused by cyclones (wind, surge, and rain) makes up 0.5% of GDP
- In RCP 8.5 scenario, losses rise by 20%

Governments alone cannot address the fiscal challenges induced by climate hazards

- Risk reduction measures including costal protection and reinforcing public buildings can effectively reduce losses, but require large investments;
- Developing countries are entitled to access various financing resources to address losses after disasters;
- When running out financing resources, the government will incur a fiscal gap

	Reduction of losses caused by wind		Reduction of losses caused by surges	
	All assets	Public assets	All assets	Public assets
Coastal protection	-	-	24.1%	6.0%
Reinforcing public buildings	9.8%	59.7%	12.3%	60.0%

Fig 1. Effects of adaptation measures in reducing losses of different assets

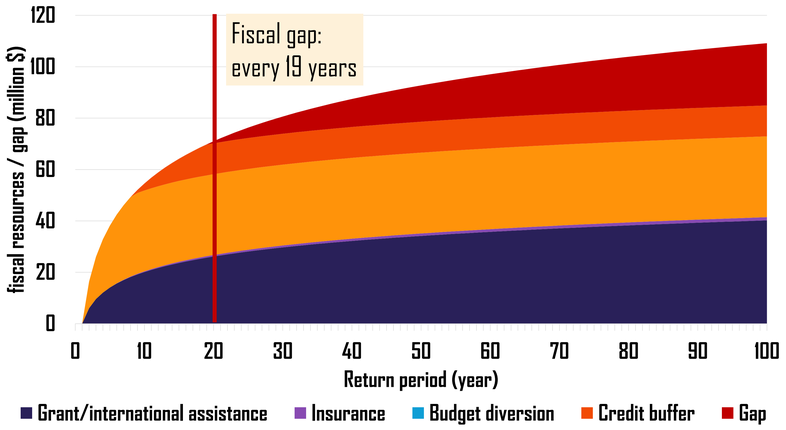

Fig 2. Financing resources available to the Madagascar government for disaster relief and reconstruction after storms of different return periods

Smart Support of global donors largely improve the economy and resilience

	No Adaptation; w/o subsidy	Adapt; w/o subsidy	25% subsidy for risk reduction	25% subsidy for insurance	12.5% subsidies each
Investment (% of GDP) in risk reduction	-	0.4	0.6	0.4	0.6
Reconstruction (% of damage)	-	50	50	50	50
Insurance (% of public assets)	-	33	33	100	100
Annual average GDP growth (%)	5.33	**5.52**	5.55	5.52	5.53
Growth volatility*	1.5	0.6	0.4	0.6	0.5
Probability of exceeding the fiscal threshold (%)	-	6.8	7.5	**0.8**	**1.0**
Total subsidies required annually (% of GDP)	-	0	0.15	0.11	0.16

Tab 2. Acceptable strategies of the Madagascar government and international donors,

- We studies the overall fiscal and economic impacts of different policy combinations;
- Three policies are considered: a. investment in risk reduction; b. reconstruction rate; c. insurance
- GDP growth rate, volatility of the growth rate, and the probability of debt/GDP ratio exceeding the threshold are examined.
- With the "optimal" strategy (column 2), the annual GDP growth rate is 0.2 percentage point higher compared to non-adaptation;
- Subsidies from global donors on insurance premium significantly incentivise the governments to increase coverage rate. This can stabilise the fiscal performance.