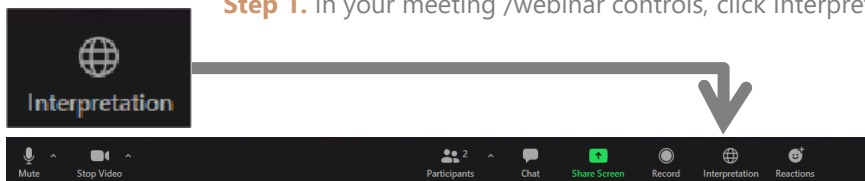


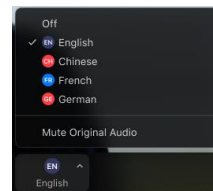
Simultaneous Interpretations

how to listen to the meeting in English or Russian

Step 1. In your meeting /webinar controls, click Interpretation



Step 2. Click the "Russian" or "English" depending on what you would like to hear.

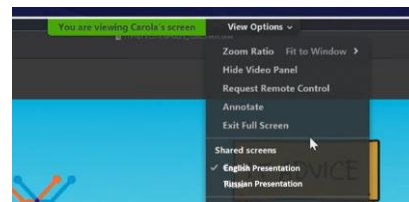


Additional Step - (Optional) To hear the interpreted language only, click **Mute Original Audio**.

Multiple Screen Sharing

how to view presentation slides in English or Russian

Step 1. On your screen, you will see on the top right part a "View Options" tab. Click the tab and choose one PPT presentation you would like to view (either English or Russian).





Disaster Risk Finance Analytics Tools

Virtual Training for Central Asia



Kazakhstan



Tajikistan



Uzbekistan



Kyrgyz Republic



Turkmenistan

02 Nov 2021 | 4pm-6pm GMT+6

DEVELOPED BY
**Disaster Risk Financing
& Insurance Program**



SUPPORTED BY
WORLD BANK GROUP

WITH SUPPORT FROM



GFDRR
Global Facility for Disaster Reduction and Recovery

Agenda

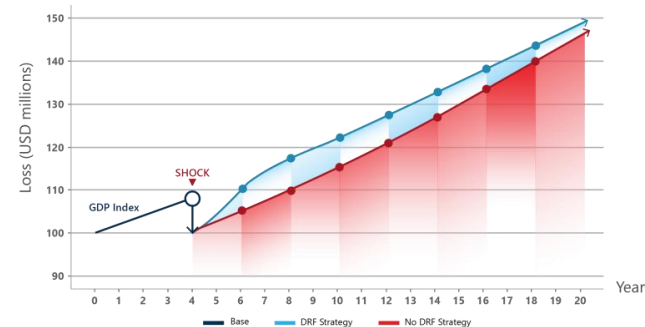
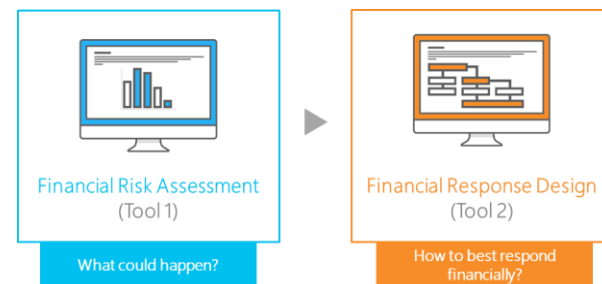
Time (GMT+6)	Activity	Lead/Speakers
16:00–16:15	Welcome and opening remarks	<ul style="list-style-type: none"> • WBG/Marco Mantovanelli (Country Manager for Uzbekistan) • WBG/Olivier Mahul (Practice Manager, Crisis & Disaster Risk Finance) • WBG/Christoph Pusch (Practice Manager, GPURL ECA)
16:15 – 16:25	Overview of the DRF Core Generic Tools	<ul style="list-style-type: none"> • WBG/Antoine Bavandi (Senior DRF Specialist, CDRF) • WBG/Stephan Zimmermann (DRM Specialist, GFDRR)
16:25 – 17:25	Presentation of the tools : Financial Risk Assessment Tool (25') Financial Response Design Tool (25') Key Take-Aways (10')	<ul style="list-style-type: none"> • WBG/Evie Calcutt (DRF Specialist, CDRF) • WBG/Lisa Yu (DRF Specialist, CDRF)
17:25 – 17:50	Questions & Answers	<ul style="list-style-type: none"> • All participants
17:50 – 18:00	Conclusion and Next steps	<ul style="list-style-type: none"> • WBG

1. DRF Principles & Introduction to Analytics Tools



Background

- The EU DRF Analytics Programme (2016-2021) has been supporting public good and country-specific activities to increase the financial resilience of countries against climate shocks and natural hazards.
- A core deliverable of this programme are the DRF Analytics generic Financial Risk Assessment (FRA) and Financial Response Design (FRD) tools. These are publicly available tools educating decision-makers on the financial risk management of disasters and specifically to:
 - ✓ Understand their financial exposure to natural hazards
 - ✓ Employ efficient financial/actuarial analysis in the development of disaster risk financing strategies
 - ✓ Benchmark various risk financing instruments, and challenge role and efficiency of insurance
 - ✓ Improve capacity to meet financial needs immediately following natural disasters
 - ✓ Develop the ability to monitor and evaluate DRF strategies



What is Disaster Risk Finance about?

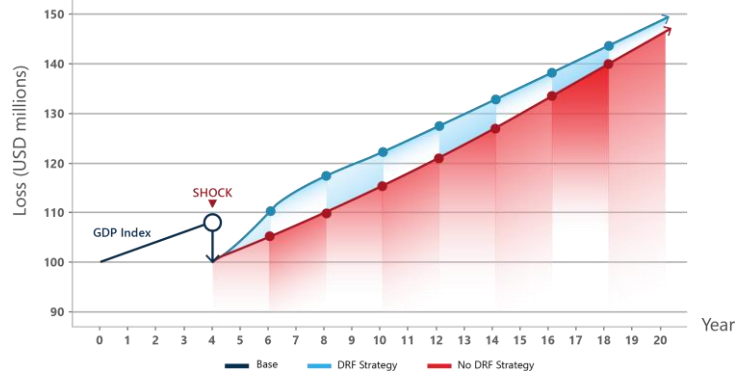


1. Protecting livelihoods and development



2. Increasing the Financial **Resilience** of governments, businesses, households, farmers, and the most vulnerable against crises and climatic disasters by implementing sustainable and cost-effective financial protection policies and instruments.

Impact of Climatic Disasters on GDP path



Four Core Principles of DRF

01. Timeliness of Funding.

Not all money is needed at the same time.



02. Disaster Risk Layering.

No one financial instrument can address all risks.



03. Flow of funding.

How money reaches beneficiaries is as important as where it comes from.



04. Data and Analytics.

To make sound financial decisions you need to have the right information.



Introduction to DRF Tools



Financial Risk Assessment
(Tool 1)

What could happen?



Financial Response Design
(Tool 2)

How to best respond
financially?



Introduction to DRF Tools



Financial Risk Assessment (Tool 1)

1. Use historical event data to estimate the potential financial needs.
2. Quantify the resulting funding gap based on the assumed available funding.
3. Understand the uncertainty and variability of the historical event data itself.



Financial Response Design (Tool 2)

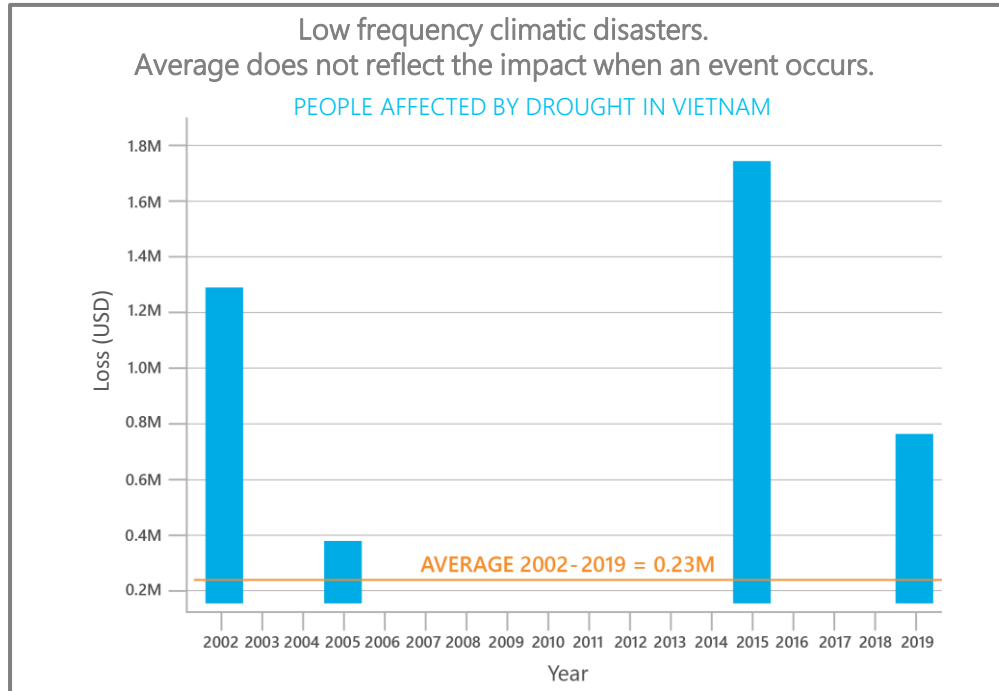
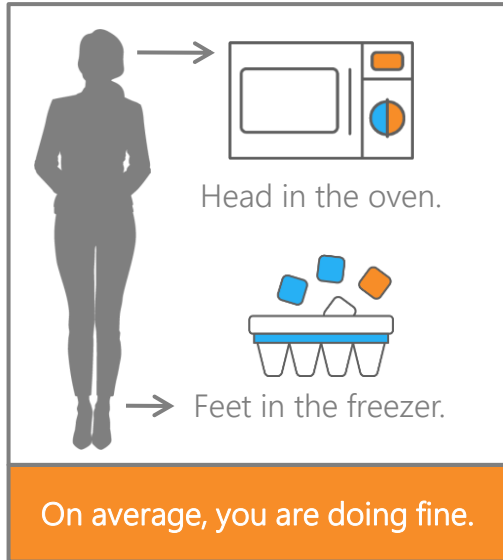
1. Compare the funding gap under various DRF strategies.
2. Optimize the use of funds by designing a layered DRF strategy with the most cost-effective instruments.
3. Evaluate the impact of assumptions on the cost-effectiveness of various DRF strategies.

2. Financial Risk Assessment Tool



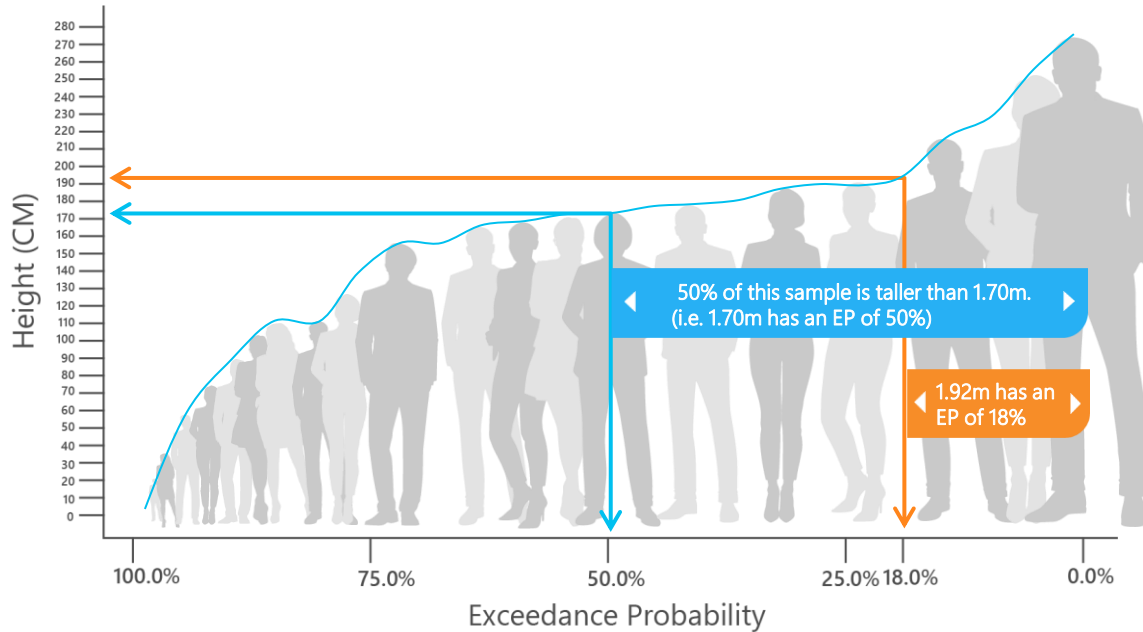
Risk Metrics Review: Average

Beware of the flaws



Risk Metrics Review: Exceedance Probability Curve

Exceedance Probability (EP) versus associated Value of the Variable of Interest



Remark: Notice that the EP Curve represents only the data in the **sample**.

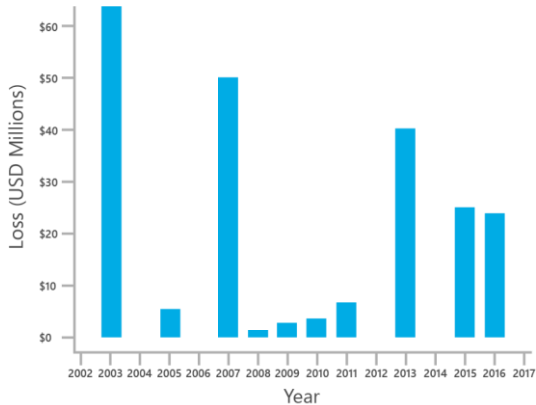
Remark: The **Return Period (RP)** is calculated as the inverse of the Exceedance Probability (EP). E.g. 100 years RP is the same as 1% EP, 20 years RP means 5% EP, and so on.



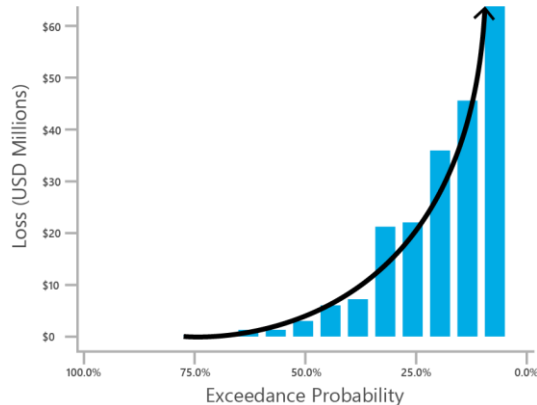
Financial Risk Assessment Tool

From Data to Risk Metrics and Funding Gaps

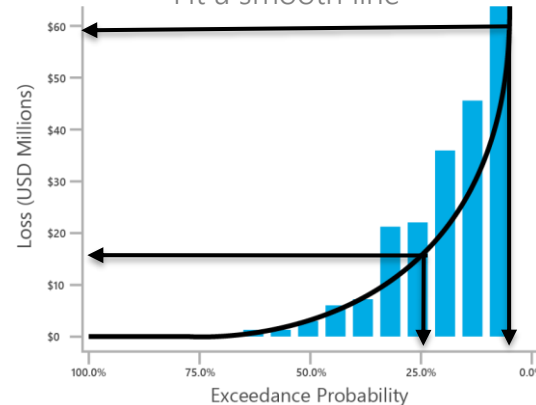
Step 01: Input Historical loss data



Step 02: Reorder from low to high



Step 03: Distribution fitting. Fit a smooth line



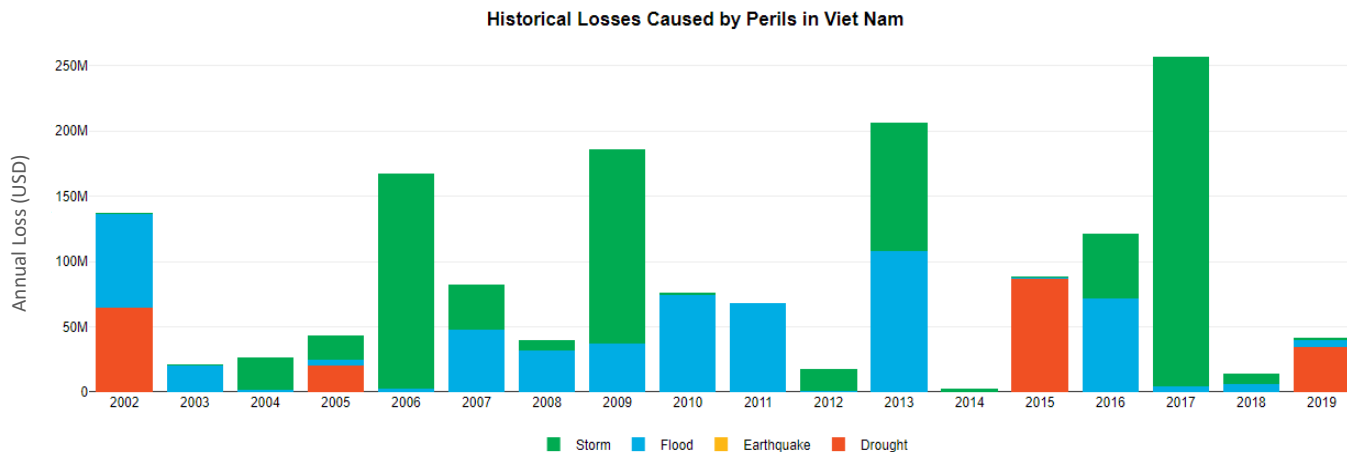
Risk Metrics from fitted distribution (smoothed line)

Funding Gap by comparing the metrics with available funds



Example of application: Vietnam

Vietnam is one of the most hazard-prone countries in the South East Asia region, with **droughts**, **storms**, and **floods** causing substantial economic and human losses.





What do past events in Vietnam tell us about the future?



DRF for floods in Vietnam

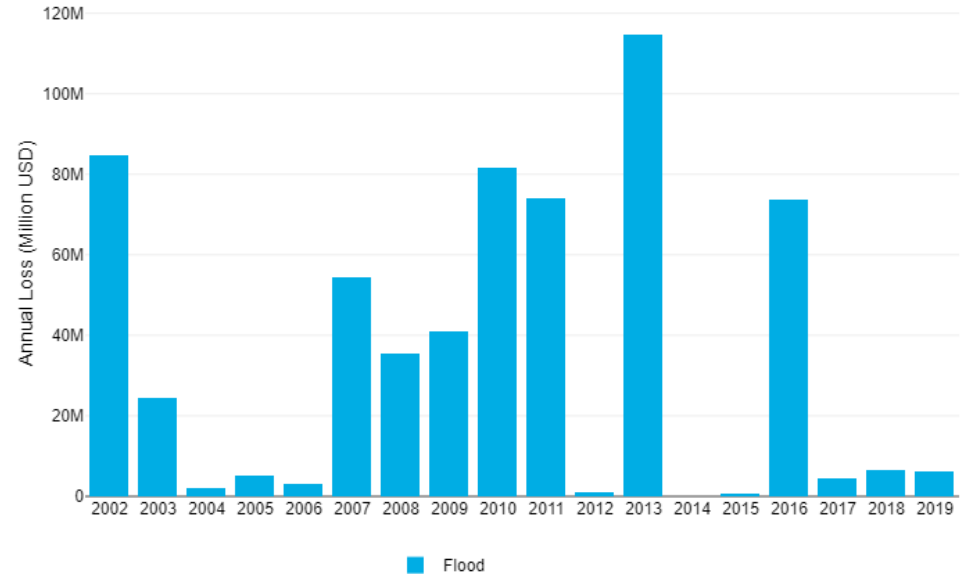
As part of the DRF planning, the Ministry of Finance (MoF) wants to estimate **potential losses** in the future and related **funding gaps** caused by floods

Assumptions

1. Number of persons historically affected are adjusted by Population growth.
2. Assistance costs = USD 50 per person affected

Remark: historical losses are the main INPUT.
Be aware that **Garbage In/Garbage Out**.

Historical Losses Caused by Perils in Viet Nam

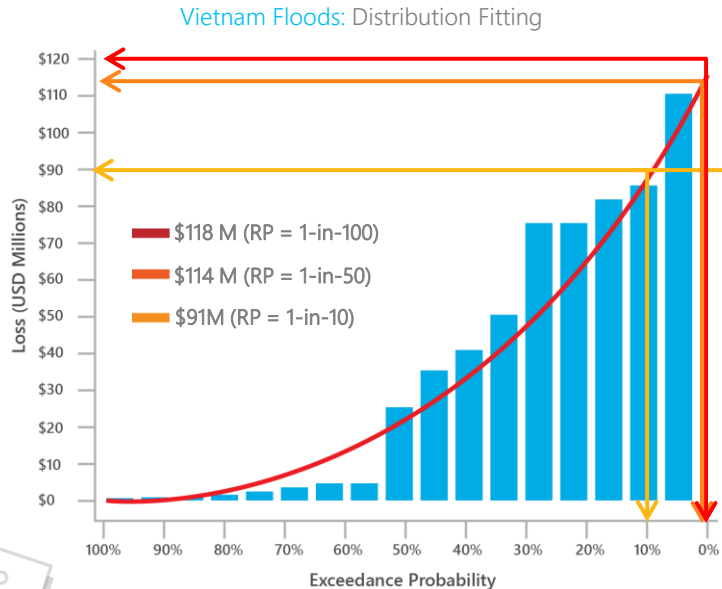


DRF for floods in Vietnam

As part of the DRF planning, the MoF wants to estimate **potential losses (1)** in the future and related **funding gaps (2)** caused by floods

1. How likely are worst case scenarios?

2. How likely will budget be exceeded?



- How big could the funding gap be in worst case scenarios?

A Budget of USD 91m has 10% chance of exhaustion (1-in-10 years)

There is 2% chance (1-in-50) of a funding gap higher than USD 23m

There is 1% chance (1-in-100) of a funding gap higher than USD 27m

DRF for floods in Vietnam

Solution Using Risk Assessment Tool: Data Selection

① DATA SELECTION
② DATA MANIPULATION

③ SIMULATIONS
④ OUTPUTS

Data Selection

Please make selections to specify the data you wish to analyse. The data selected can be viewed using the graphic at the bottom of the page or edited by switching to the table and double clicking the relevant cells.

If you wish to have extra flexibility in specifying the data source and/or statistics produced, please select Advanced mode below.

Select User Mode
 Basic Advanced

Select Input Data
 Country Archetype

Select Country
 Viet Nam

Select Data Source
 DesInventar EM_DAT OCHA

The best data source for the chosen parameters is: EM_DAT

Select Input Data

Country Archetype Manual Input

Choose CSV file

No file selected

Select Data Type

Total damage People Affected

Input Cost Per Person (USD)

50

Remark: Loss Data Inputted. Different kinds of (user-supplied) data could be used, such as *Emergency relief expenditures, Cost per person, Agricultural losses, replacement cost of infrastructure, Reconstruction of public assets*, etc.

Historical Losses Frequency

Plot Table

Year	Drought, USD	Earthquake, USD	Flood, USD	Storm, USD
2002	65,000,000	0	71,590,800	90,000
2003	0	0	20,841,150	250,900
2004	0	0	1,750,900	25,045,250
2005	20,500,000	0	4,619,650	18,383,000
2006	0	0	2,606,000	164,864,500
2007	0	0	48,108,600	34,271,500

DRF for floods in Vietnam 🇻🇳

Solution Using Risk Assessment Tool: Data Manipulation

1 DATA SELECTION
2 DATA MANIPULATION

3 SIMULATIONS
4 OUTPUTS

Scaling

Scaling can remove trends caused by known indexes such as population, to help make losses more comparable between years. Basic mode always scales by population but advanced mode allows for more options.

For each given year, a scaling factor is calculated by dividing the scaling data for the most recent year by the given year. Each peril year is then multiplied by the scaling factor for that year to give a corrected loss in terms of the most recent scaling year.

Scale Data By

Scale Data By	Population Factor
Population	
Inflation	
GDP	
No Scaling	
Manual Input	
2002	81,534,407
2003	82,301,656
2004	83,062,821
2005	83,832,661
2006	84,617,540
2007	85,419,591
2008	86,243,413

You are using raw scaling data.

Final Data

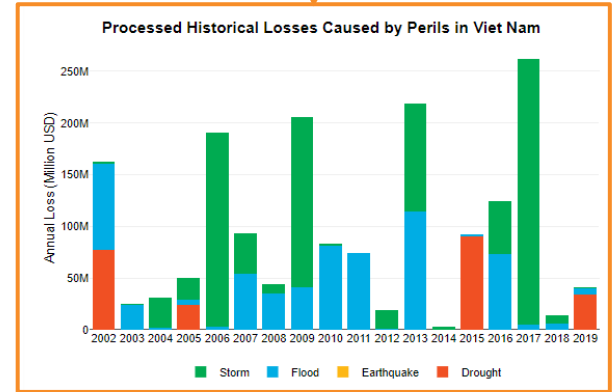
The peril data displayed below has been multiplied by the chosen scaling factors and detrended (if selected).

This data is what the tool will use to fit the parametric distributions to each peril and produce the outputs.

Plot
Table

Copy
CSV

Year	Drought, USD	Earthquake, USD	Flood, USD	Storm, USD
2002	76,900,503	0	84,697,977	106,478
2003	0	0	24,426,984	294,069
2004	0	0	2,033,347	29,085,426
2005	23,588,338	0	5,315,603	21,152,411
2006	0	0	2,970,762	187,941,848
2007	0	0	54,327,781	38,701,907



Remark: These data are the main input for DRF analysis. Be aware that **Garbage In/Garbage Out**.

DRF for floods in Vietnam

Solution Using Risk Assessment Tool: Simulation

DATA SELECTION

DATA MANIPULATION

SIMULATIONS

OUTPUTS

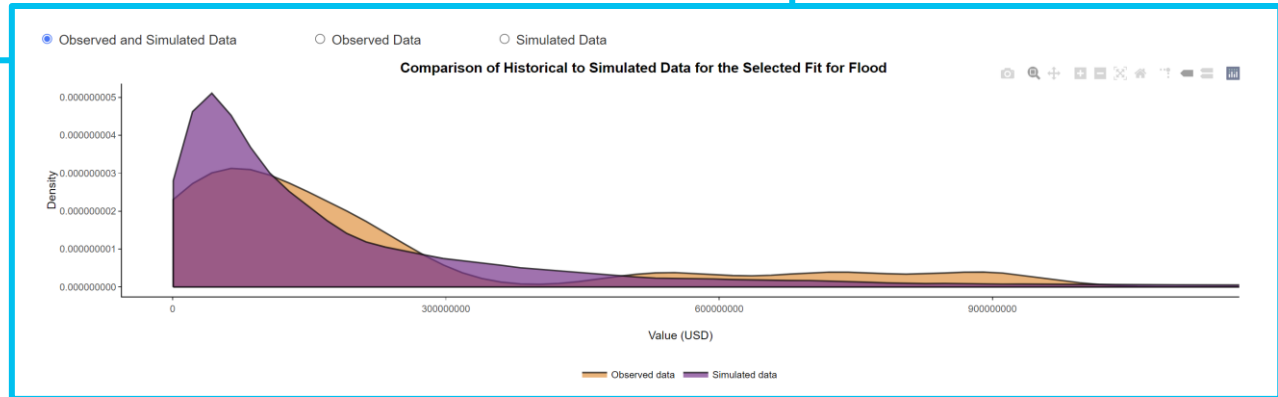
Simulations

The Tool runs 15,000 simulations for each parametric distribution that has been successfully fitted to a given peril. If multiple distributions are fit for a peril, the one with the highest (Criterion) weight is selected.

In advanced mode the user can change the selected distribution for a given peril.

Choose Distribution for Flood

Log normal



DRF for floods in Vietnam

Solution Using Risk Assessment Tool: Outputs

DATA SELECTION

SIMULATIONS

DATA MANIPULATION

OUTPUTS

Outputs

In this tab, the user can view the simulated losses across the selected perils calculated from the distributions selected on the previous page. Selecting combinations of perils will combine each peril's simulations to produce a new 15,000 simulations therefore the risk profile of two perils is not the sum of the losses at each return period.

95% confidence interval's can be toggled. These show the range of possible values for each return period that 95% of losses will fall within.

Select Perils to View

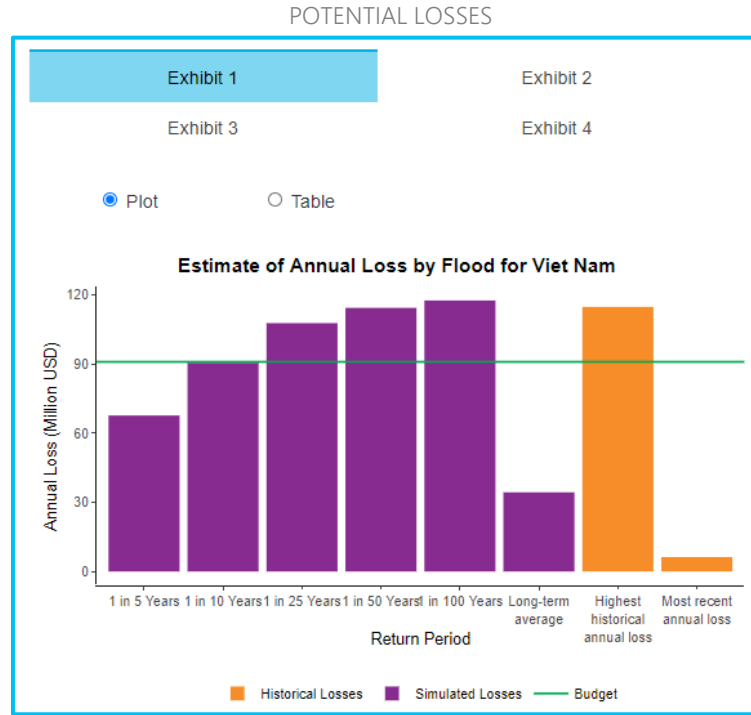
Drought Flood Storm

Toggle Confidence Intervals

On Off

Budget in Millions USD

91



DRF for floods in Vietnam

Solution Using Risk Assessment Tool: Outputs

DATA SELECTION

SIMULATIONS

DATA MANIPULATION

OUTPUTS

Outputs

In this tab, the user can view the simulated losses across the selected perils calculated from the distributions selected on the previous page. Selecting combinations of perils will combine each peril's simulations to produce a new 15,000 simulations therefore the risk profile of two perils is not the sum of the losses at each return period.

95% confidence interval's can be toggled. These show the range of possible values for each return period that 95% of losses will fall within.

Select Perils to View

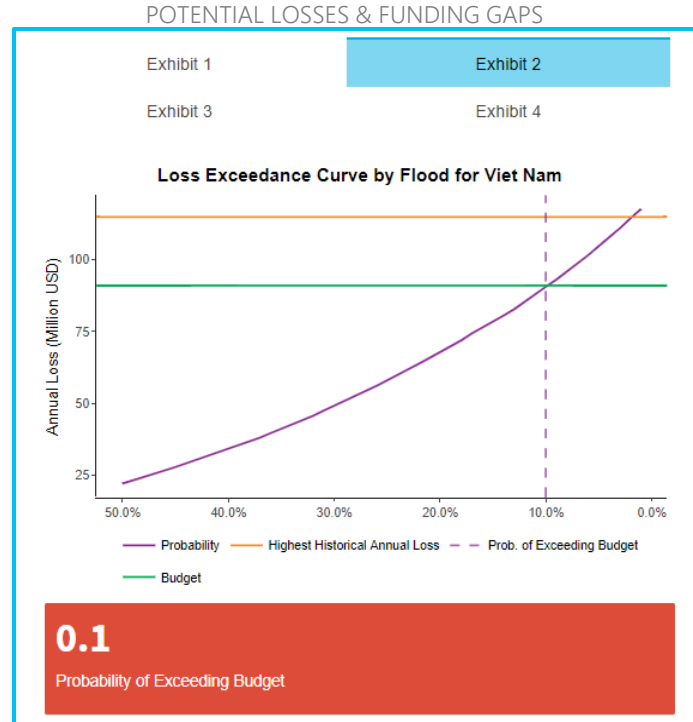
Drought Flood Storm

Toggle Confidence Intervals

On Off

Budget in Millions USD

91

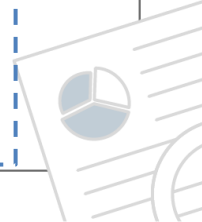
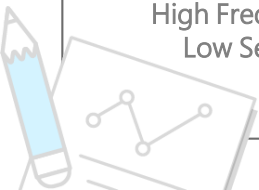
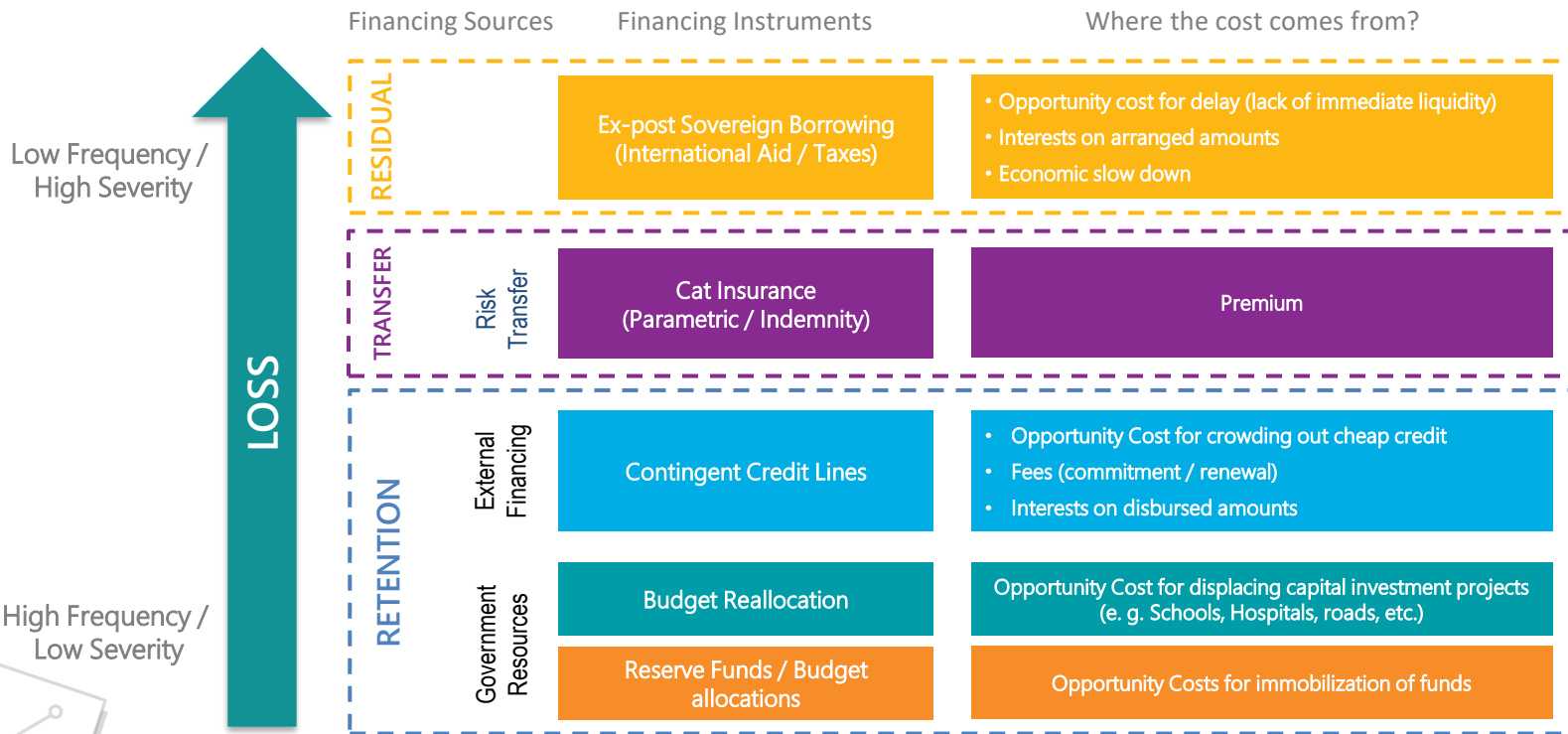


3. Financial Response Design Tool



Financial Response Design: Layered DRFI Strategy

Instruments and Costs



Link between DRF Tools



Financial Risk Assessment
(Tool 1)

What could happen?



Financial Response Design
(Tool 2)

How to best respond
financially?

Output from **Tool 1** is used as Input in **Tool 2**

Tool 1 outputs a Risk Profile (i.e. losses associated to Exceedance Probabilities)

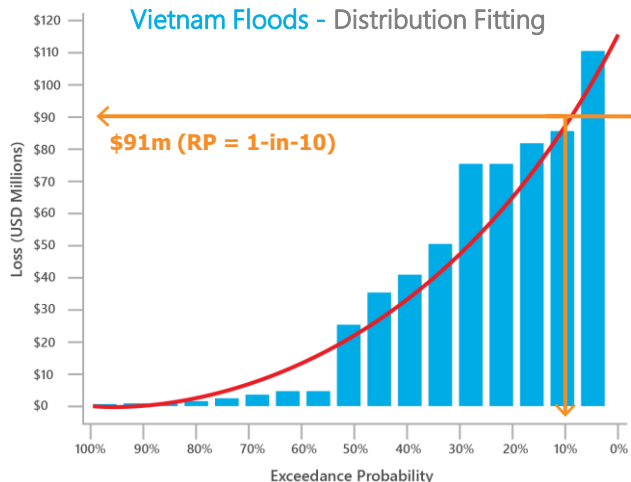
Tool 2 analyzes alternative DRF strategies for funding the losses from the risk profile outputted in Tool #1 in order to optimize the cost-effectiveness of funds.

DRF for floods in Vietnam 🇻🇳

As part of the DRF planning, the MoF wants to estimate **potential losses (1)** and to **design a DRF strategy (2)**

1. How likely are worst case scenarios?

Financial Risk Assessment (Tool 1)



2. How to best respond financially?

Financial Response Design (Tool 2)

Optimize combination of instruments

Risk Retention

Risk Transfer

Line of Contingent Credit

Insurance

Budget Reallocation

Reserve Fund

Residual Risk on top of USD 91m

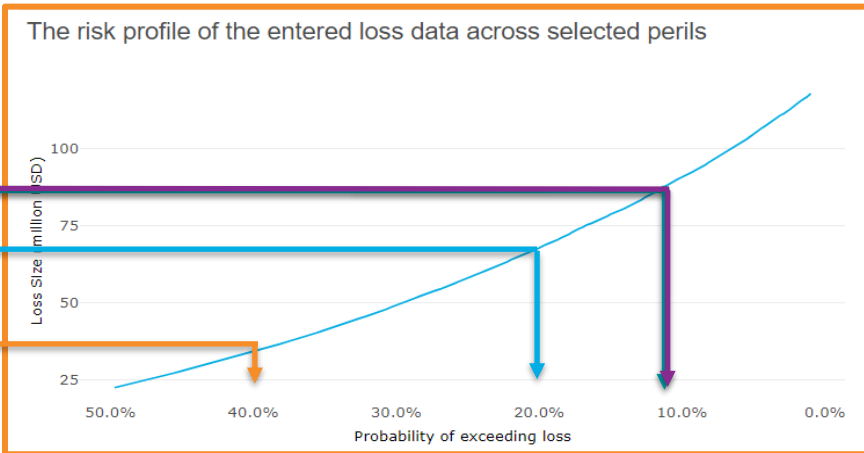
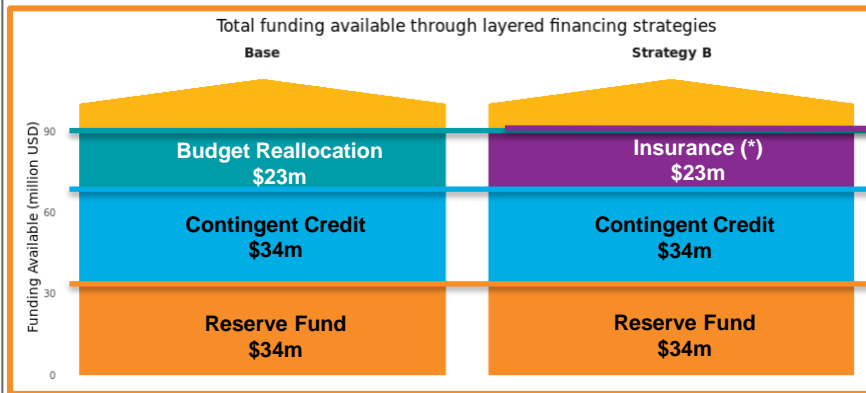
Ex-post Sovereign Borrowing (International Aid / Taxes)

Target DRF Protection \$ 91m



DRF for floods in Vietnam 🇻🇳

MoF wants to **design a DRF strategy** to allocate the DRF Protection of USD 91m among Risk Retention and Risk Transfer instruments



Remark: In this example the two strategies were design to have the same layering and same total budget, but decision makers can design strategies with different layering, instruments and amounts (e.g. different size and EP for Reserve Fund, exclude Contingent Credit, etc.).

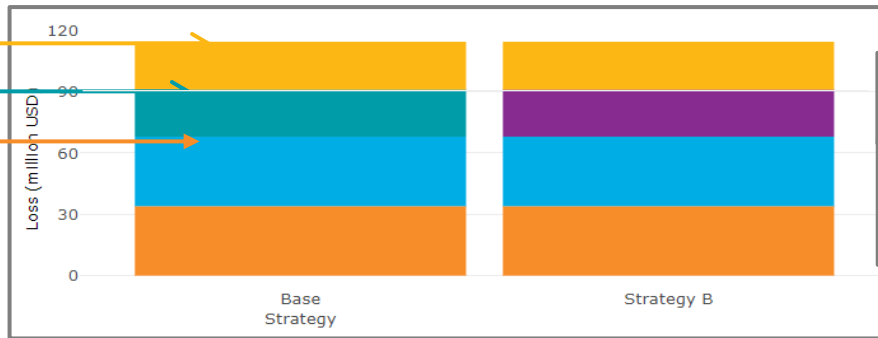
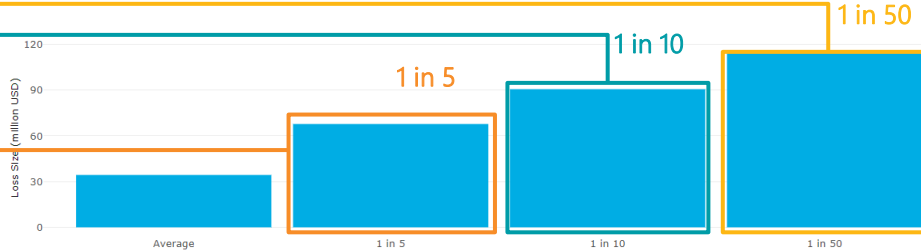


DRF for floods in Vietnam 🇻🇳

MoF wants to understand how losses of different severity are financed under each DRF strategy designed

The expected magnitude of loss at different return periods over the next year

● Plot ○ Table



The breakdown of instrument use to fund a user selected loss (return period) over the next year under each DRF strategy

- Reserve fund
- Line of contingent credit
- Emergency ex-post budget reallocation
- Insurance
- Ex-post sovereign borrowing

DRF for floods in Vietnam

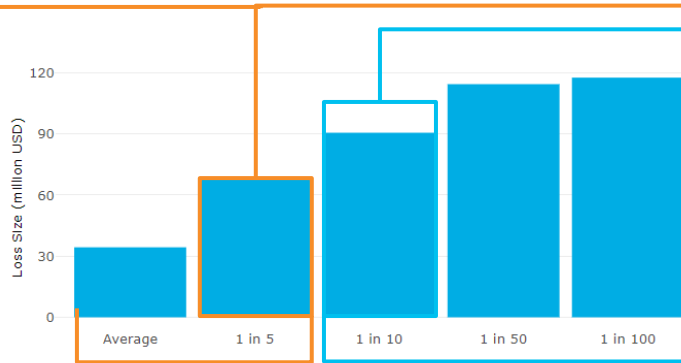
MoF wants to **optimize the use of funds** by designing instruments where most cost-effective.

Base Strategy results more cost-effective: the insurance included in Strategy B is not triggered and consequently the premium increases the Opportunity Cost.

Strategy B is more cost-effective: the insurance is triggered (and payouts much more than the premium spent) and consequently the Opportunity Cost is reduced.

The expected magnitude of loss at different return periods over the next year

Plot Table

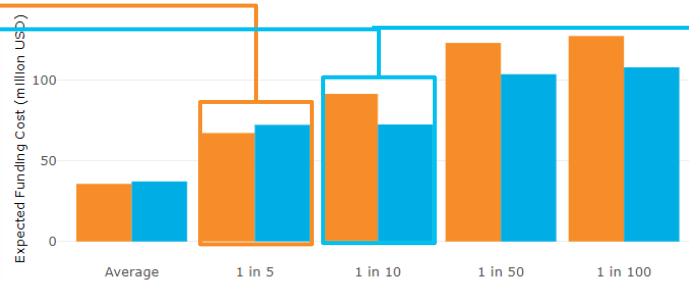


< Risk Retention is more cost-effective >

< Risk Transfer is more cost-effective >

The potential opportunity cost of funding losses for different magnitudes of loss over the next year under each DRF strategy

Plot Table

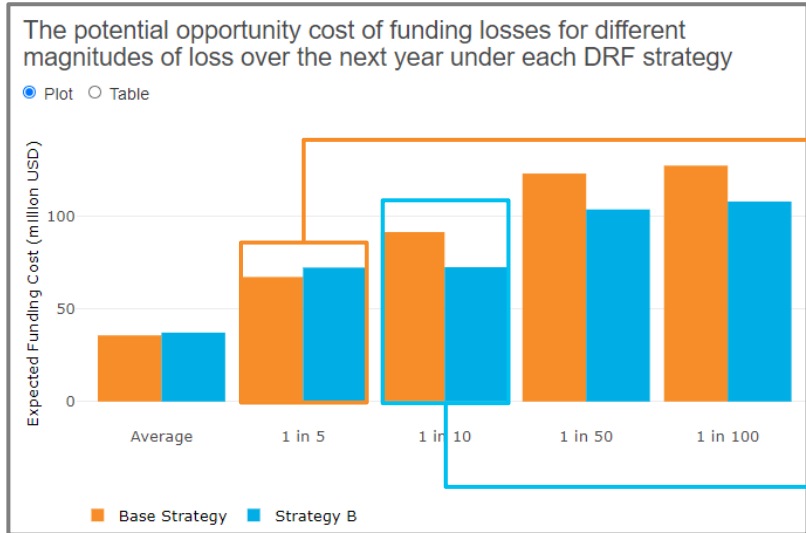


■ Base Strategy ■ Strategy B

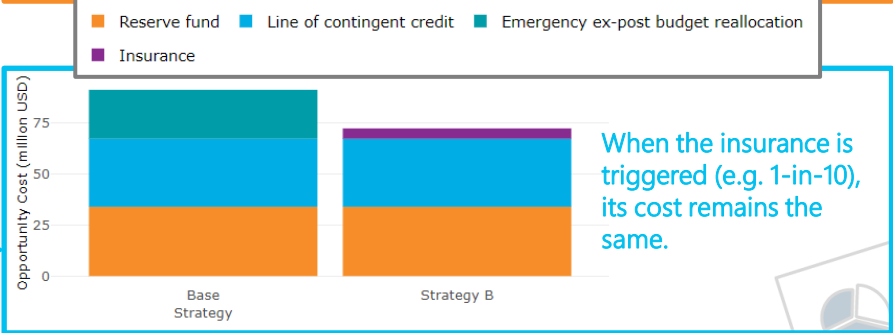
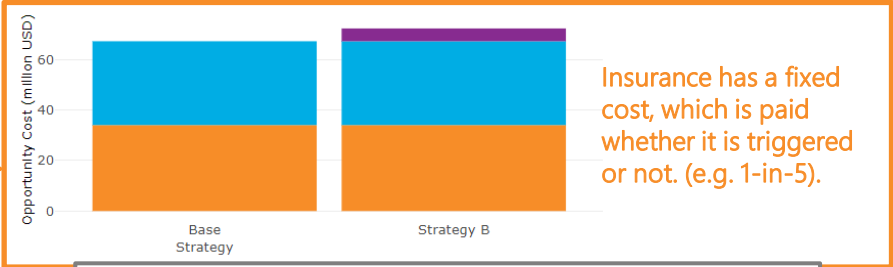


DRF for floods in Vietnam

MoF wants to **optimize the use of funds** by designing instruments where most cost-effective.



The potential opportunity cost of funding a user selected loss (return period) over the next year under each DRF strategy split by instrument type



Legend:
■ Reserve fund
■ Line of contingent credit
■ Emergency ex-post budget reallocation
■ Insurance

Tool demonstration

Note: User guides for tools



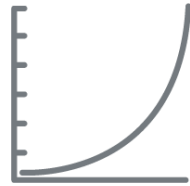
4. Key Messages



Key Messages



Financial Risk Assessment Tool



1. Probabilistic risk assessment helps governments to make informed decisions going beyond historical data.



2. Risk Metrics: being aware of average flaws and understanding *loss exceedance curves/tables*.

Remark: Remember Garbage In/Garbage Out.

Key Messages



Financial Response Design Tool

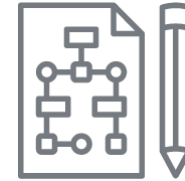


1. Risk Retention and Risk Transfer instruments carry opportunity costs.



2. The design of the financial response generates opportunity cost savings.

2B. In the case presented, designing instruments where most cost-effective produces saving of more than 20%.



3. *Risk Retention* instruments are more cost-effective for *high frequency/low severity* scenarios, while *Risk Transfer* is more appropriate for *low frequency/high severity* events.

5. Q&A Session

- Please share your questions in English via chat box.
- If possible, please indicate which presenter(s) to address your question(s).

Scan the QR code



Join the DRF Community

Self-Paced e-Learning: Fundamentals of DRF



(Russian)



(English)

Materials

- Tools are available online, password-protected, at <https://www.financialprotectionforum.org/online-learning-financial-risk-response-tools> with password: WBGApril2021!
- **Training slides:** will be shared over emails.
- **User guides:** detailed user guides have been developed for both tools; these can be downloaded directly from the tools.



Contacts

Event coordination/Training Execution and Logistics:

Antoine Bavandi abavandi@worldbank.org

Evie Calcutt ecalcutt@worldbank.org

Stephan Zimmermann szimmermann3@worldbank.org

Qhelile Ndlovu qndlovu@worldbank.org

Lisa Yu yyu8@worldbank.org

Kaavya Ashok Krishna kashokkrishna@worldbank.org

Peijing Li pli2@worldbank.org

Point Persons for World Bank in Central Asia, leads of SFRARR-Central Asia (Strengthening Financial Resilience and Accelerating Risk Reduction in Central Asia):

Chyi-Yun Huang chuang@worldbank.org

Madina Nizamitdin mnizamitdin@worldbank.org

