

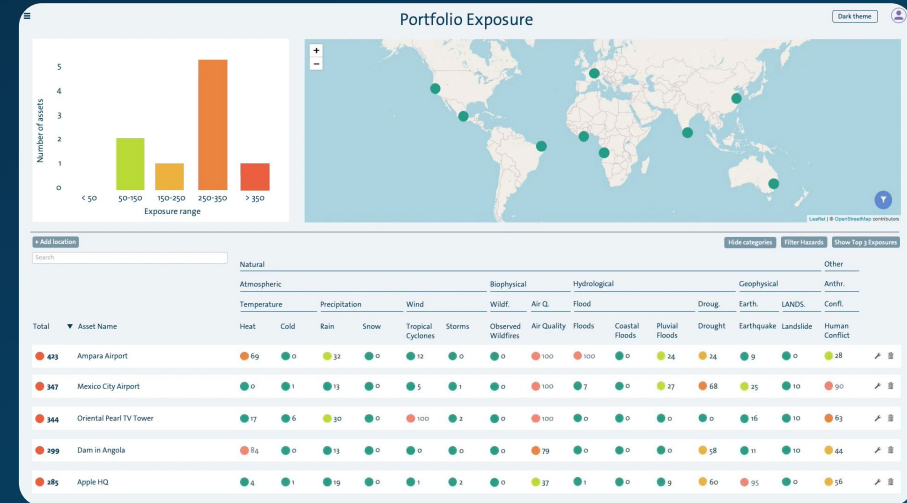


Royal
HaskoningDHV
Digital

Climate Hazard Platform

The Multi-Hazard Intel Platform

See *more*. Act *faster*. Be *resilient*.



Daniel Martens

Climate Resilience Consultant, APAC

Daniel.Martens@rhdhv.com



**Royal
HaskoningDHV**
Enhancing Society Together

For 140 years we design

and assess

and keep customers in business
by making them more resilient.

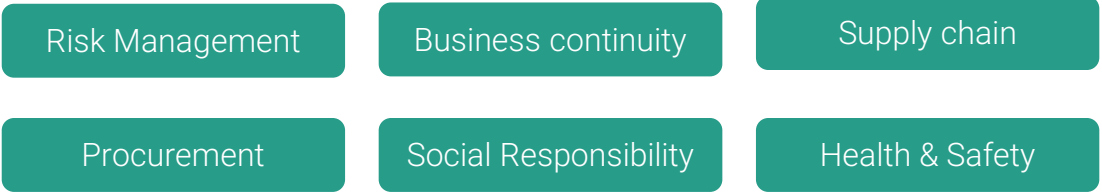
- logistics, production and supply chain processes
- physical infrastructure and installations
- their impact on the environment
- their exposure and vulnerability to climate change, increasingly severe weather and various (natural) hazards



More often hazards **disrupt business**

Processes are **vulnerable to ever smaller disturbances**

The complex global interconnected economies are **exposed to cascading effects**



Lost revenues
Increased costs
Reputation damage
Missed opportunities

- More frequent more severe weather events
- Ecological collapse
- Viruses and diseases

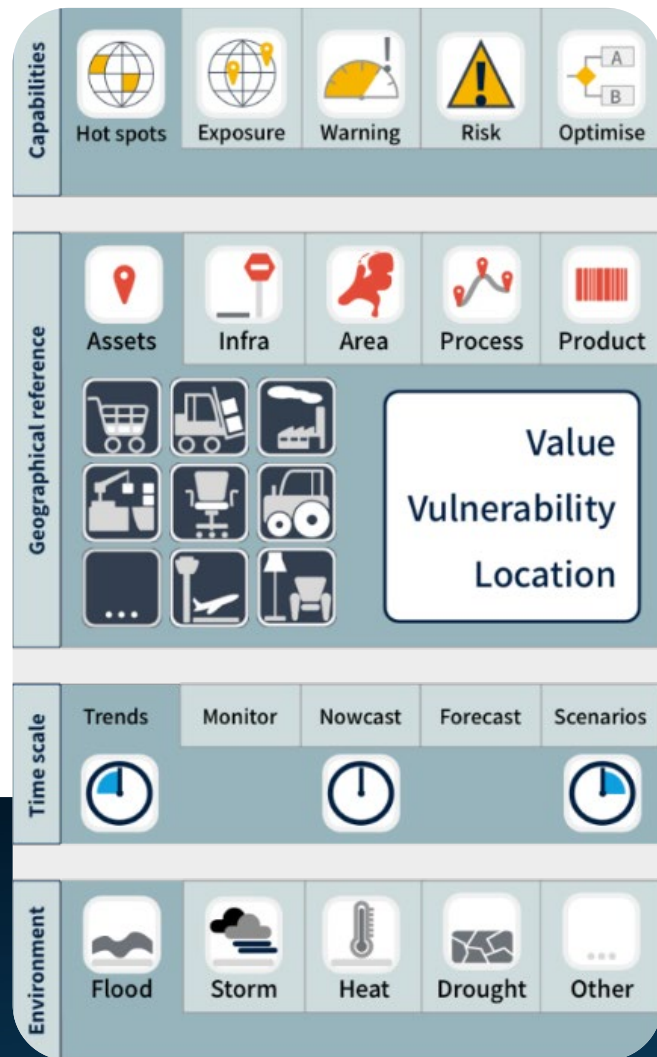
ENVIRONMENTAL

- Over optimized processes
- Just in time delivery
- Shifting supply chains

ECONOMICAL

GEOPOLITICAL

- Trade wars
- Depleting resources
- Social unrest



We've created a hazard agnostic platform.

Based on available data:

- 20 year historic,
- (near) real-time,
- forecasted (days to decades)

We are able to **make transparent for any location** on earth and a growing number of events:

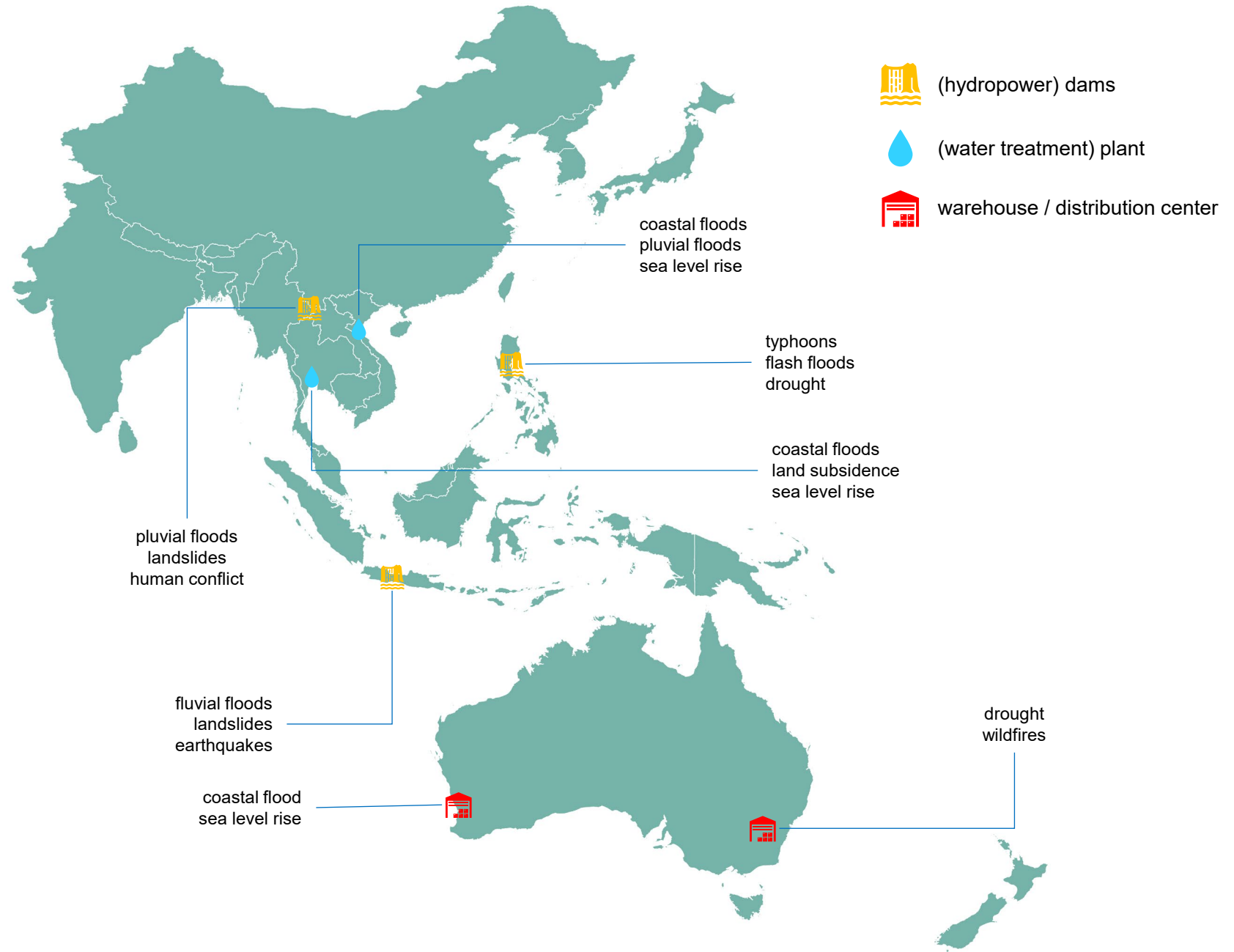
- what **happened in the past**,
- what **is happening now**,
- what **might happen in the future**

And with our 140 year engineering expertise **we understand the vulnerability of physical assets and business processes** to these hazards.

Climate Hazard Platform

Exposure and risk assessment at any location worldwide

- Historic, real-time and future risk
- Portfolio analysis at any location on earth
- Climate change & hazard exposure insight
- Opportunity spotting for climate adaptation measures
- (re)location services
- Climate change ready building designs
- Competitor and supplier analysis



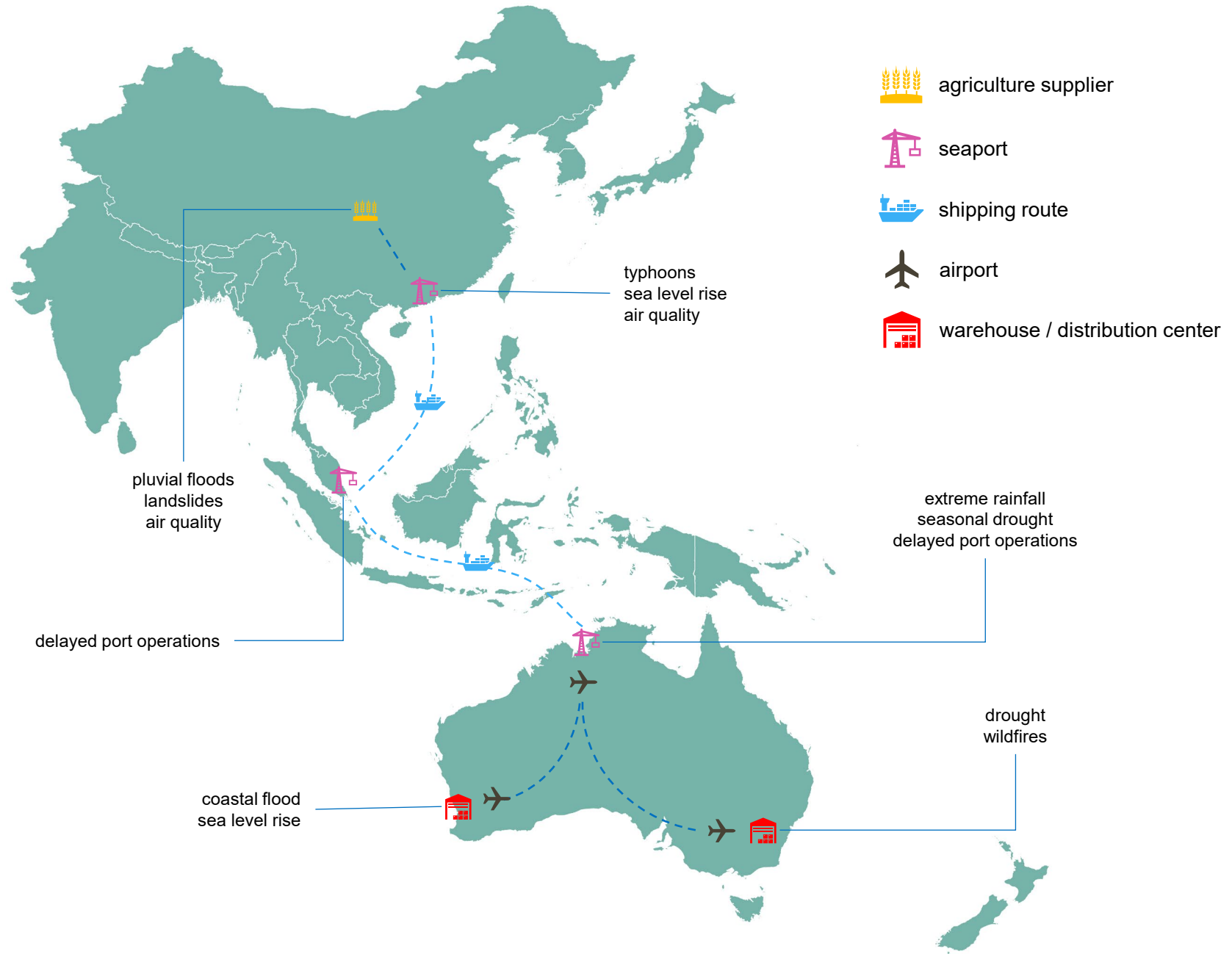
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Monitoring & alerting services

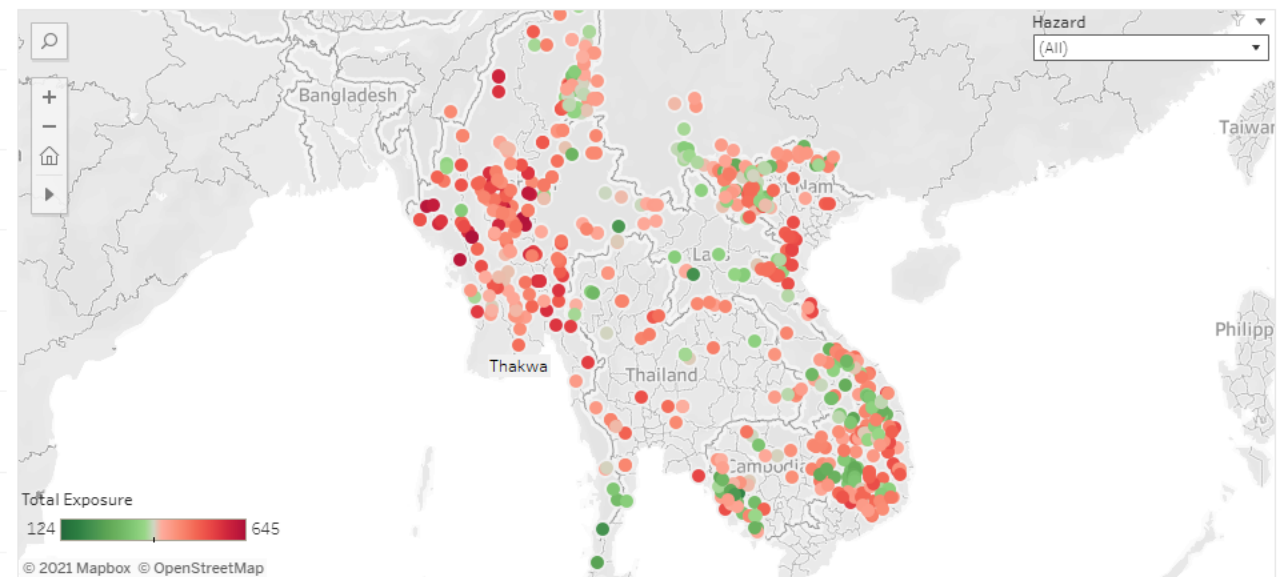
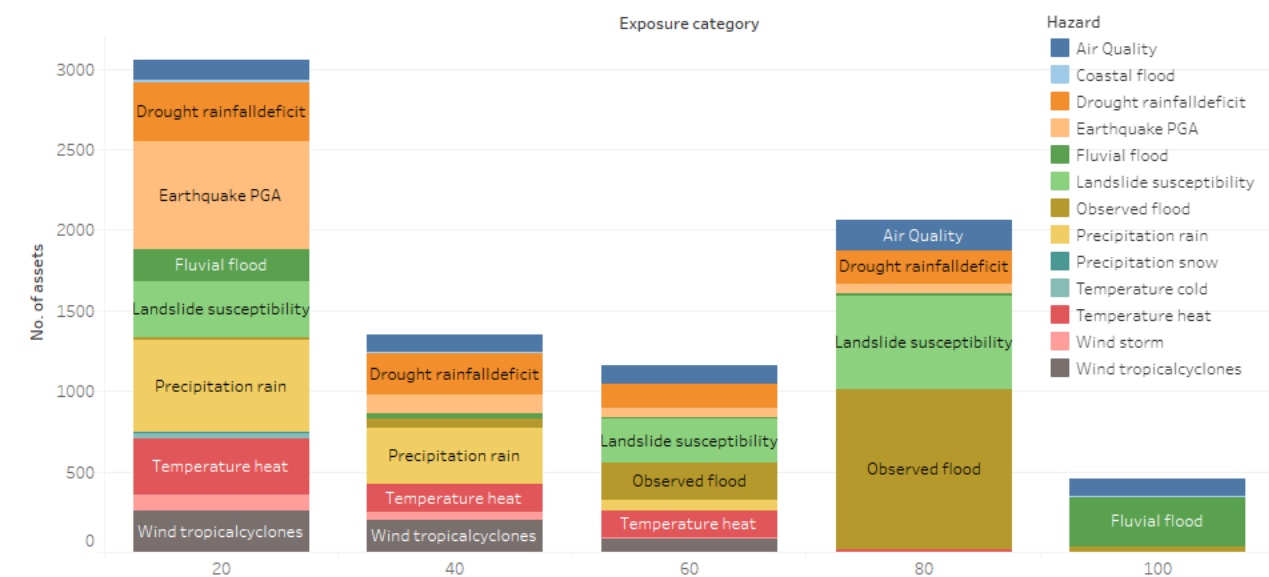
- Hazard impact on supply / value chains
- Employee / traveler safety
- Crop production / agro supplier performance
- Subsidence of objects e.g. dams
- Delayed port operations due to storm
- Solar storm alert



Example – Dam Vulnerability

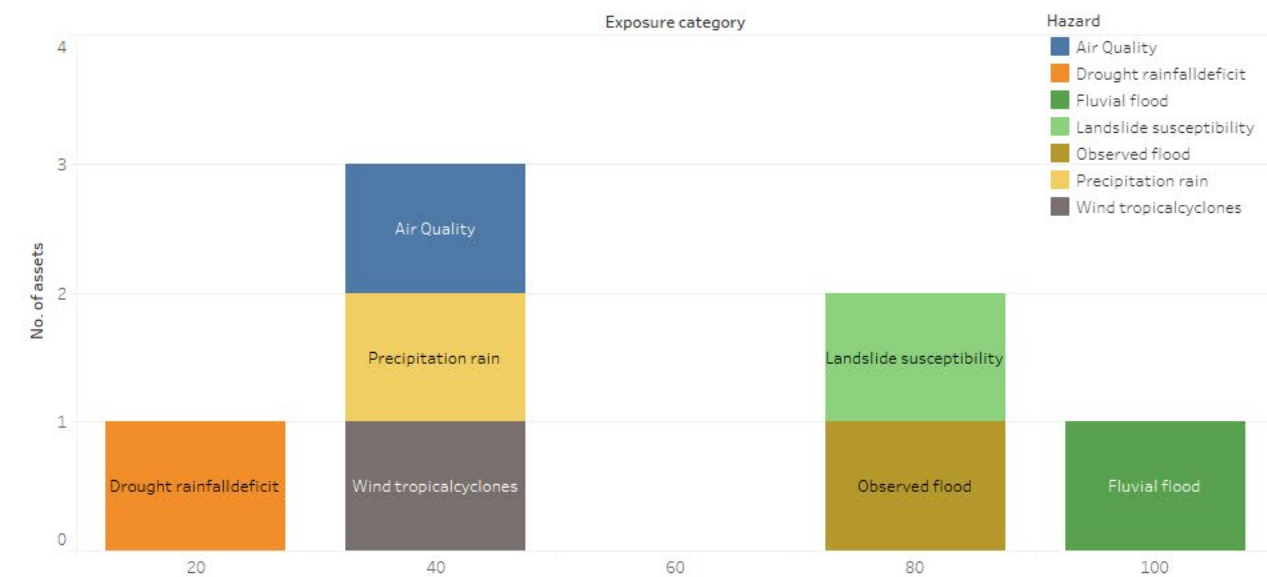
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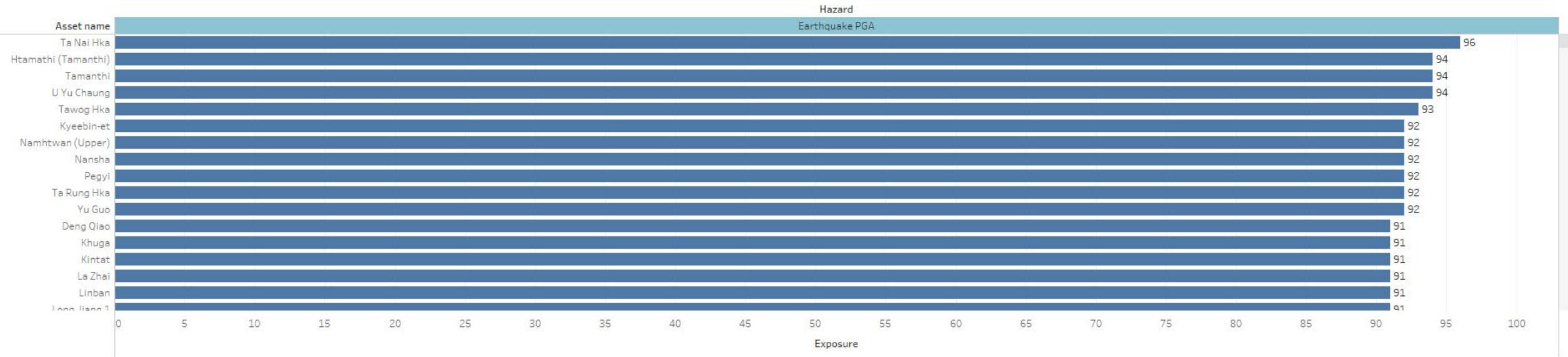
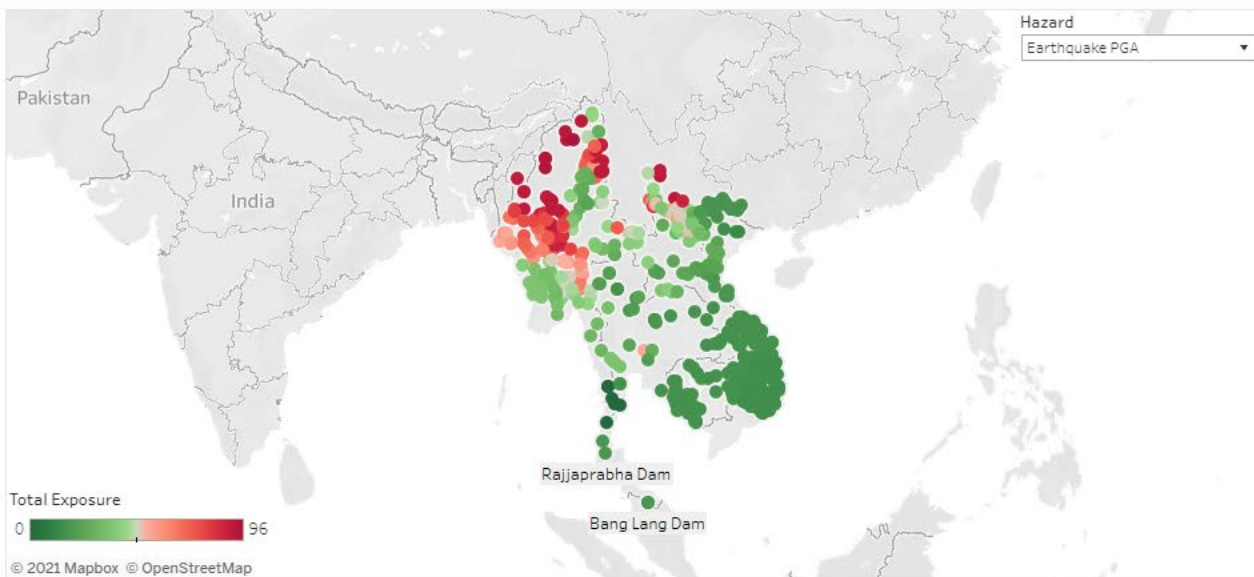
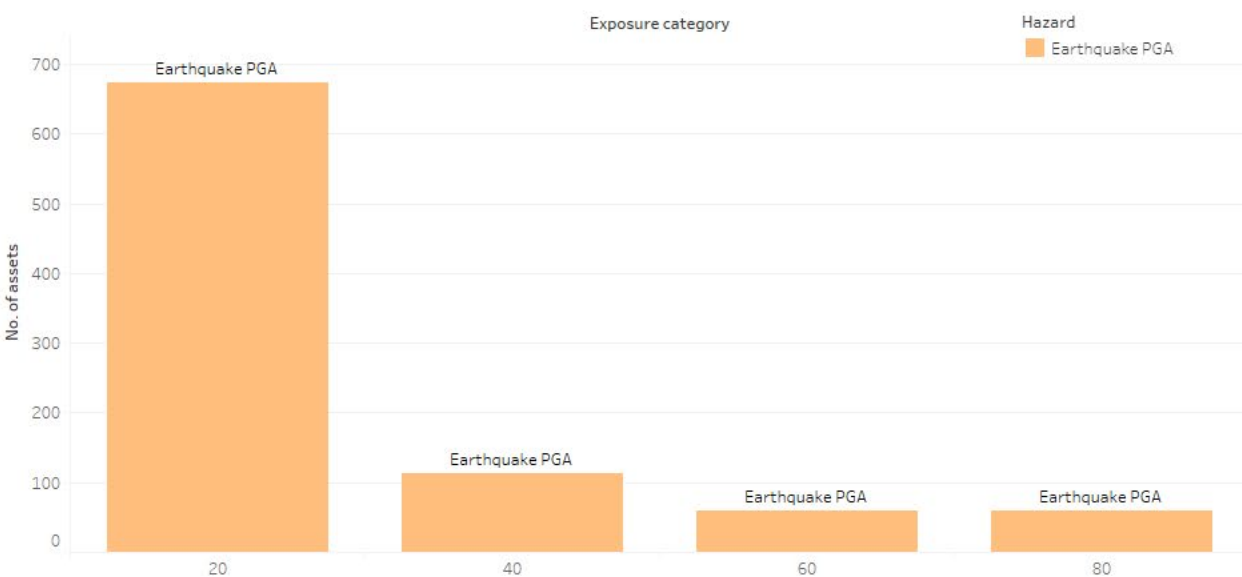
Asset name	Air Quality	Coastal flood	Drought rainfallde..	Earthquake PGA	Fluvial flood	Landslide suscepti..	Observed flood	Pluvial flood	Precipitation rain	Precipitation snow	Temperature cold	Temperature heat	Wildfires	Wind storm	Wind tropicalcylo..
A Lin B1	23	0	0	16	0	80	32	0	63	0	0	21	0	4	51
A Lin B2	67	0	9	16	100	80	0	0	63	0	0	46	0	2	51
A Luoi	23	0	0	16	0	80	70	0	63	0	0	21	0	4	50
A Roang	67	0	4	16	99	80	0	0	52	0	0	22	0	1	53
A Vuong	25	0	10	16	100	80	97	0	59	0	0	30	0	1	59
A Vuong 3	25	0	5	16	0	80	81	0	59	0	0	37	0	1	57
Ã,Ãa Nhim Hydro	40	0	29	15	100	80	99	0	47	0	0	11	0	1	62
An Diem	25	0	2	16	100	80	85	0	61	0	0	37	0	1	61
An Diem 2	25	0	8	16	100	80	87	0	66	0	0	45	0	1	61
An Khe - Kanak	50	0	35	15	100	80	87	0	46	0	0	24	0	3	75
An Khe - Kanak (ThÃiÃ»..	27	0	19	15	100	80	82	0	54	0	0	16	0	3	73
Annchaung	36	100	30	39	100	60	93	0	69	0	0	58	0	0	43
Australia_	2	0	0	21	0	30	88	0	22	0	5	0	0	53	1
Australia_ALDERMAN	0	0	93	26	0	30	0	0	12	0	1	25	0	4	0
Australia_ALPINS WR	2	1	58	21	21	60	95	0	28	0	0	26	0	1	59
Australia_AMHERST	0	0	79	23	0	10	80	0	15	0	1	11	0	15	0
Australia_ADADAT	0	0	76	22	0	60	68	0	16	0	2	9	0	12	0

Example – Dam Vulnerability

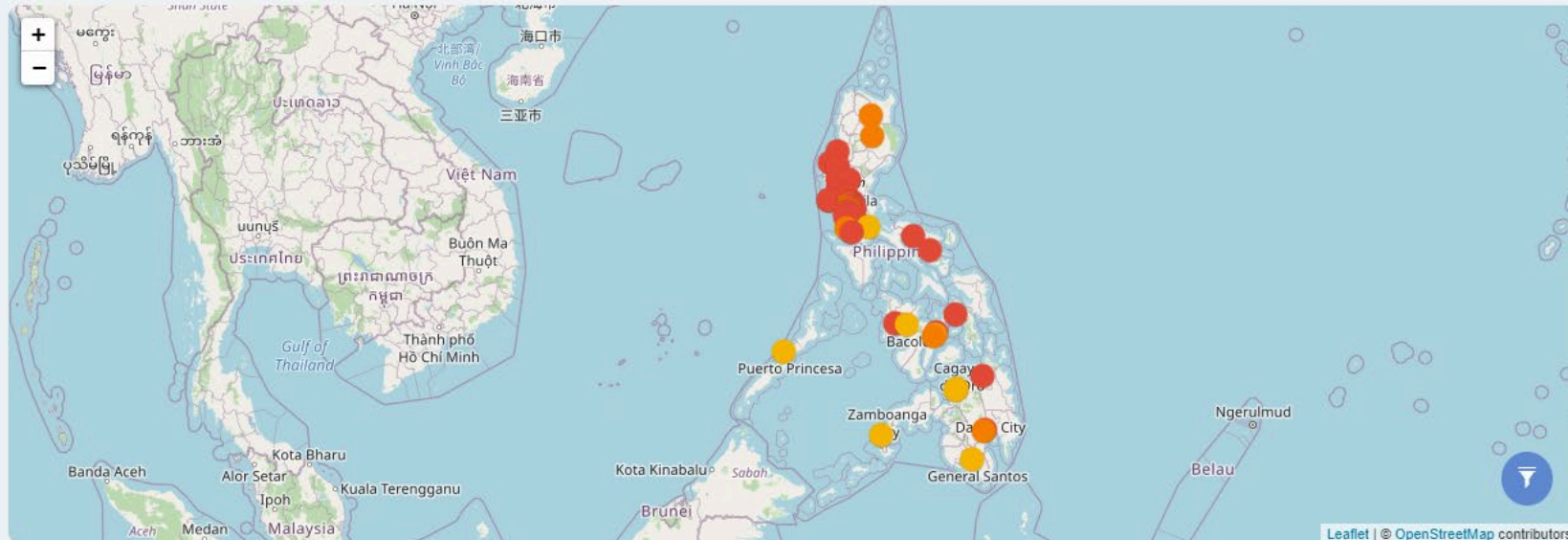
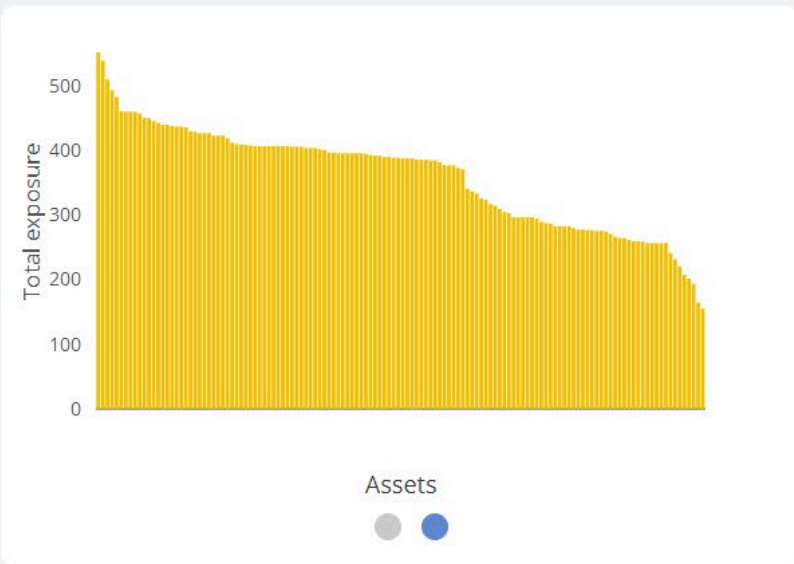


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Chibwe	4	0	26	72	100	80	90	0	30	0	4	1	0	0	0
Chibwe Nge	94	0	26	90	0	80	72	0	45	0	26	1	0	0	0
Chiem Hoa	100	0	0	17	100	80	92	0	48	0	0	40	0	0	31
Chieng Cong 1	98	0	10	36	0	80	16	0	56	0	0	28	0	0	24
Chieng Cong 2	98	0	10	34	0	80	37	0	56	0	1	28	0	0	24
Chieng Ngam Thuong	94	0	8	50	100	80	63	0	43	0	0	38	0	0	20
Chipwi	4	0	26	72	100	80	90	0	30	0	4	1	0	0	0
Chipwi Nge	94	0	26	90	0	80	72	0	45	0	26	1	0	0	0
Chulabhorn	100	0	15	18	0	60	99	0	56	0	0	17	0	0	0
Chulabhorn Dam	100	0	15	18	0	60	90	0	56	0	0	17	0	0	0
Chulabhorn Downstrea..	100	0	15	18	0	60	98	0	56	0	0	17	0	0	0
Coc Ly	79	0	12	49	100	80	87	0	32	0	0	37	0	0	4
Coc San	90	0	12	30	0	80	44	0	48	0	1	44	0	0	13
Cua Dat	100	0	5	26	100	80	59	0	35	0	0	42	0	1	47
Da Dang 2	40	0	23	15	100	80	87	0	45	0	0	8	0	1	59
Da Dang - Da Chrome	40	0	18	15	0	80	62	0	48	0	0	6	0	1	60
Da Kai	40	0	16	15	0	80	60	0	63	0	0	2	0	1	64

Example – Dam Vulnerability



Example – Property Portfolio Exposure



[+ Add location](#)

[Show Header](#)
[Filter Hazards](#)
[Show Top 3 Exposures](#)

Total	Asset Name	Heat	Cold	Rain	Snow	Tropical Cyclones	Storms	WildFires	Airquality	Floods	Coastal floods	Pluvial floods	Drought	Earthquakes	Landslide	
551	[Redacted]	74	0	51	0	100	1	0	100	100	0	36	19	70	0	[Edit] [Delete]
538	[Redacted]	74	0	51	0	100	1	0	100	100	0	24	19	69	0	[Edit] [Delete]
509	[Redacted]	63	0	53	0	100	1	0	92	100	0	12	14	74	0	[Edit] [Delete]
492	[Redacted]	63	0	53	0	100	1	0	92	90	0	5	14	74	0	[Edit] [Delete]
482	[Redacted]	71	0	46	0	100	2	0	100	8	0	48	37	70	0	[Edit] [Delete]
460	[Redacted]	63	0	52	0	100	1	0	81	0	0	56	23	84	0	[Edit] [Delete] [Help]

Example – Property Portfolio Exposure

Climate Asset exposure report

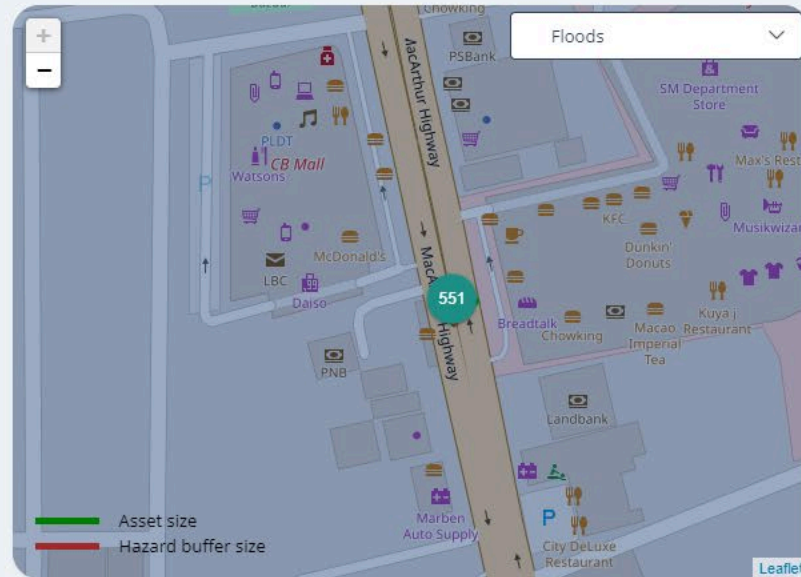


Address Sm Urdaneta, Urdaneta, Pangasinan, Philippines
Longitude 120.571644
Latitude 15.970874

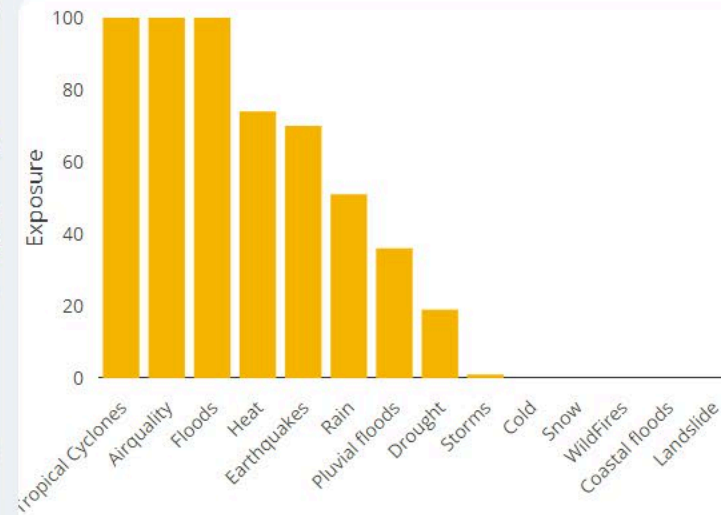
Total Exposure

551

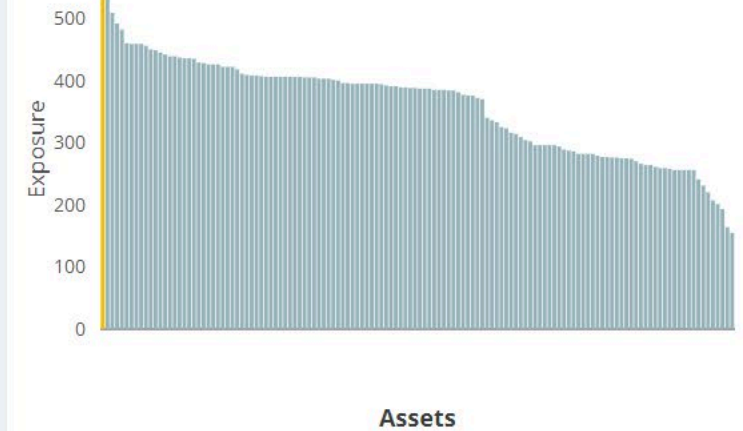
Asset location



Exposure index per hazard



Relative asset exposure



Key differentiators

Existing **approaches** are:

- **Domain specific** (supply chains, compliance, finance, scientific)
- **Expensive**
- Require costly consultants
- **Difficult to use by non-experts**
- Hard to scale
- Focused on disasters
- Lack engineering grade understanding of hazards and vulnerability



Our solution:

- **Multi-purpose, cross-functional use**
- Comfortable pricing structure
- Out-of-the-box use
- High usability with expert depth when needed
- Extremely scalable in cost efficient ways
- Focused on disruptions and **making businesses resilient and improve performance**

Why our Climate Hazard Platform?



Hazard Exposure

On a global scale



Risk Assessment

You, your suppliers & buyers



Monitoring & Alerting

Even cascading effects



Simulations & Planning

Be ready for the unforeseen

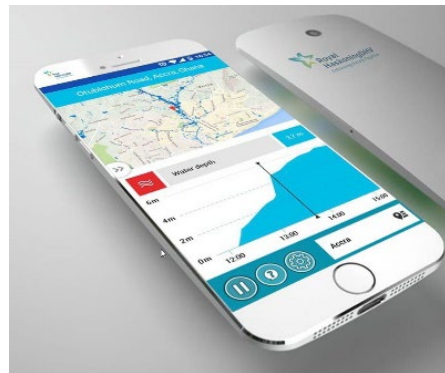
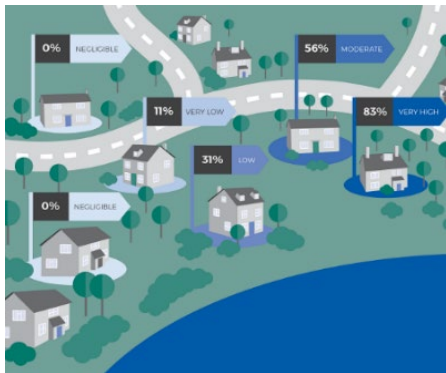
Looking for:

- Additional test-bed opportunities in operational environments
- Partners with complementary technology or data
- Licensing agreements and co-investment

See **more**. Act **faster**. Be **resilient**.

Resilience Portfolio

Tools & data products



Decision-as-a-Service



Connect with us





Thank you!

For more information, visit our website:
www.royalhaskoningdhv.com



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 Daniel.Martens@rhdhv.com
 www.linkedin.com/in/martensdaniel