Climate Risk Analysis & Flood Forecast

Company Deck

Gaia Vision

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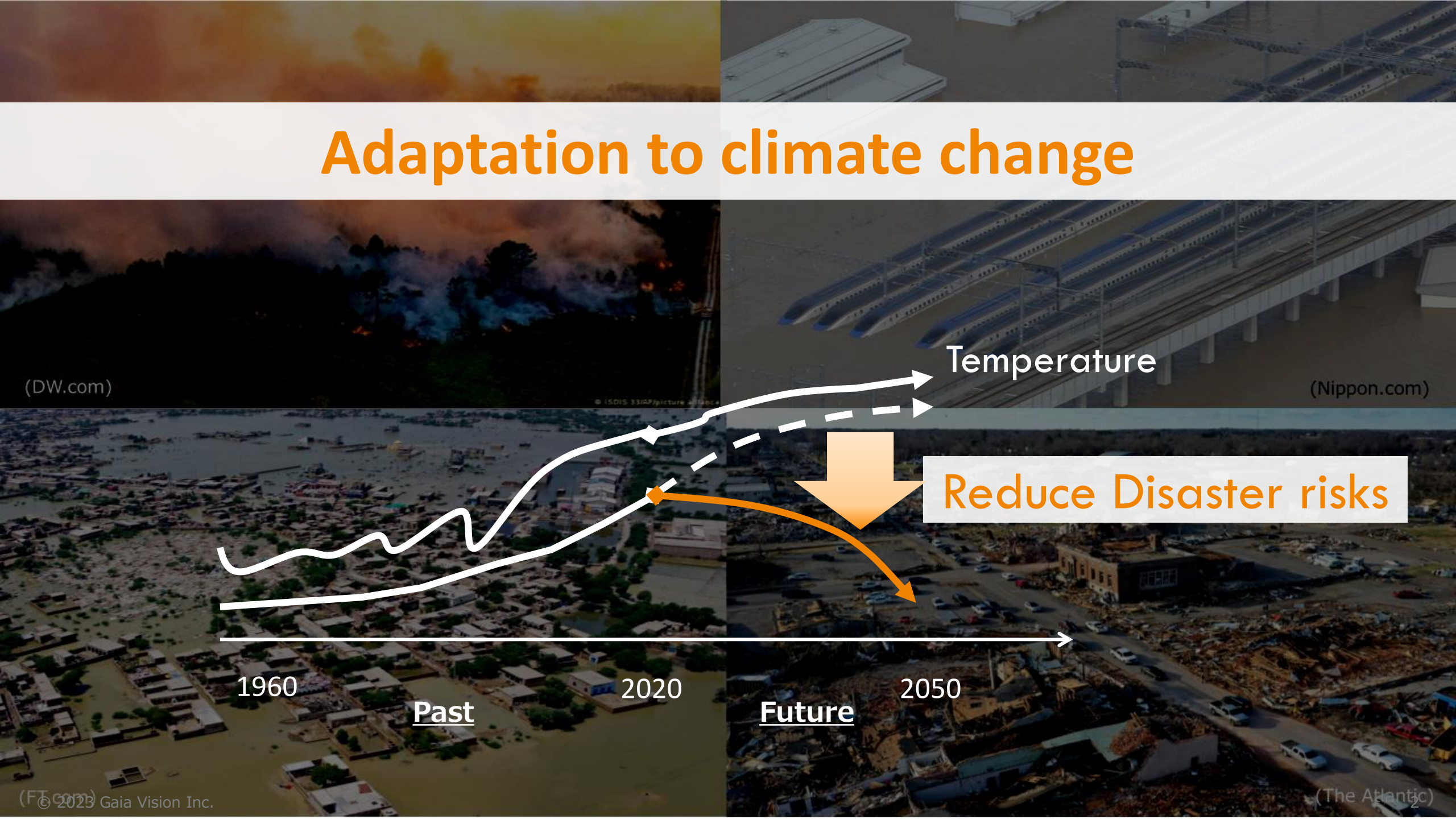
Adaptation to climate change



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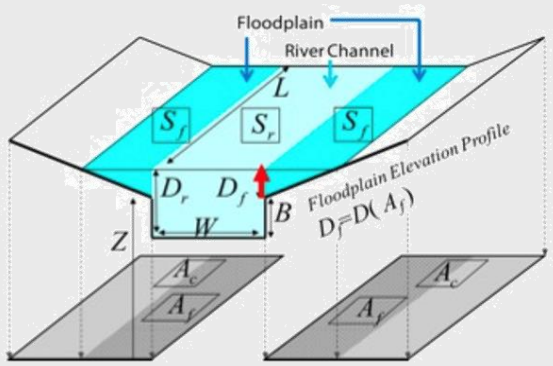
Core technology

Global River Hydrodynamics Model from the University of Tokyo



Climate Data Analysis Technology

GIS Development Technology

1 Risk Assessment

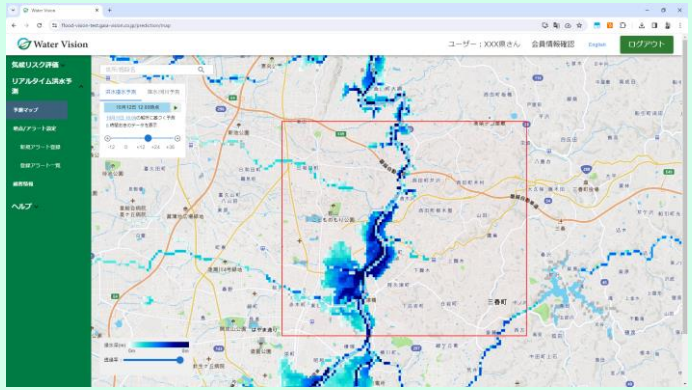
Climate Risk Analysis

Climate Vision

2 Risk Monitoring & Prediction

High-resolution flood forecast

Water Vision



3 Risk Mitigation

Flood Control Effectiveness Evaluation

4 Others

- River Flow Simulation
- Water Stress Management
- Climate change-related R&D support
- Climate change-related strategic planning support

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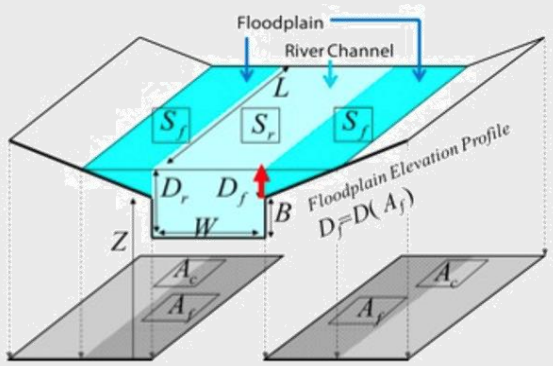
Core technology

Global River Hydrodynamics Model from the University of Tokyo



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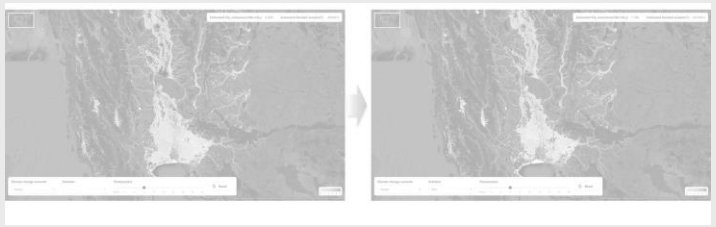

4 Others

- River Flow Simulation
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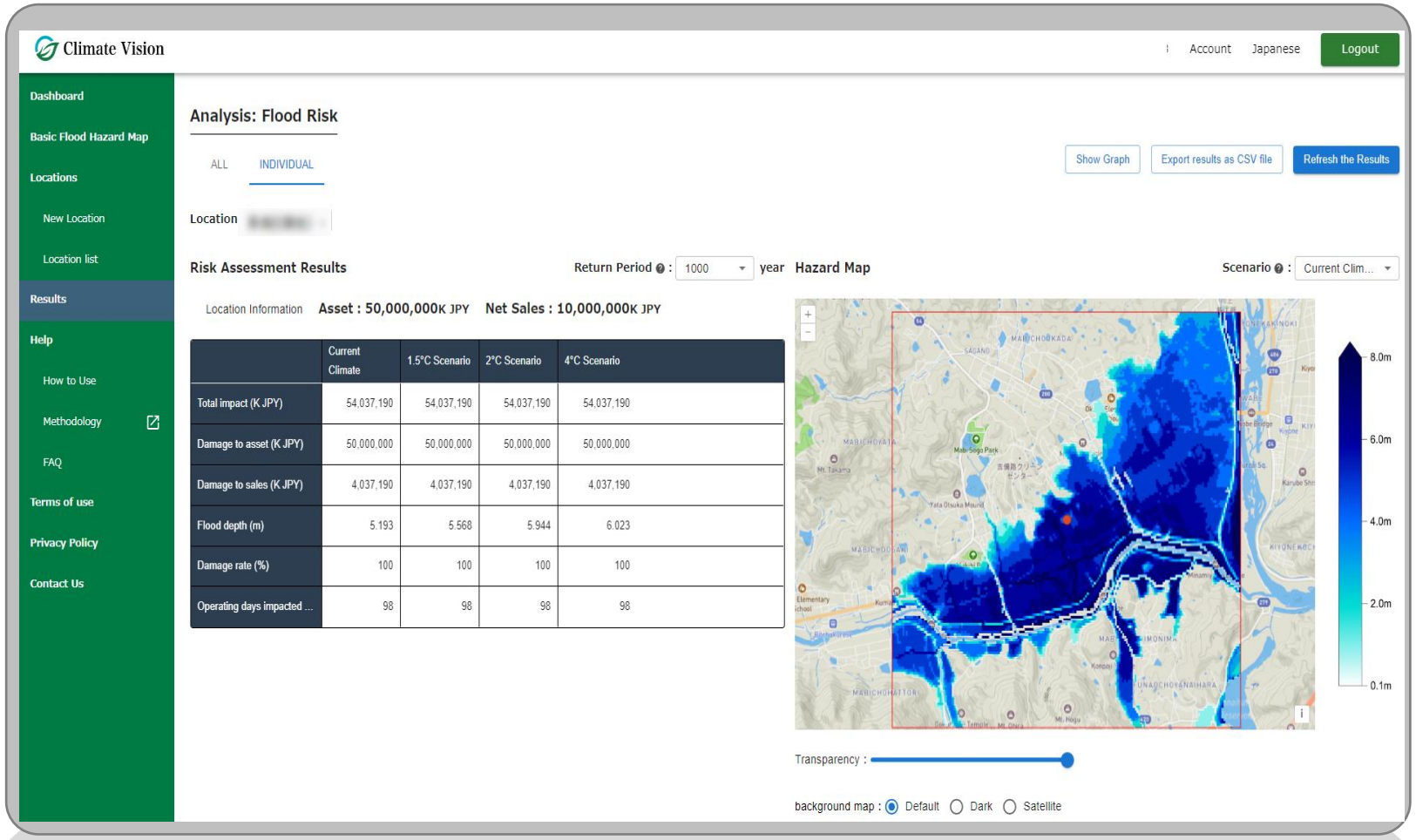
Climate Vision

Climate Change / Flood Risk Analysis Platform



Target users

Local Governments/
Private (Manufacturer/etc.)

Used by 60~ companies

Location data

Quantitative results & flooding risk maps

Global | **High resolution**

Climate change | **Financial impact**

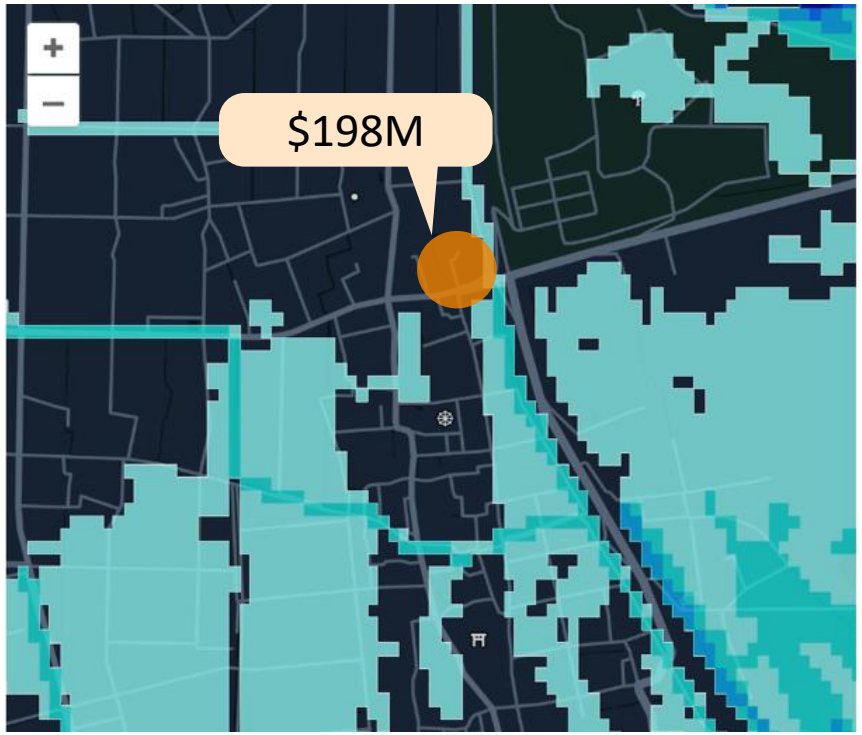
Enables risk analysis under future climate conditions

Financial Impact

Flooding depth (m)

0 2 4 6 8

Current climate



Future climate (+4°C scenario)

Future scenario

+1.5°C +2 °C +4 °C

Financial impact

Asset damage Business suspension

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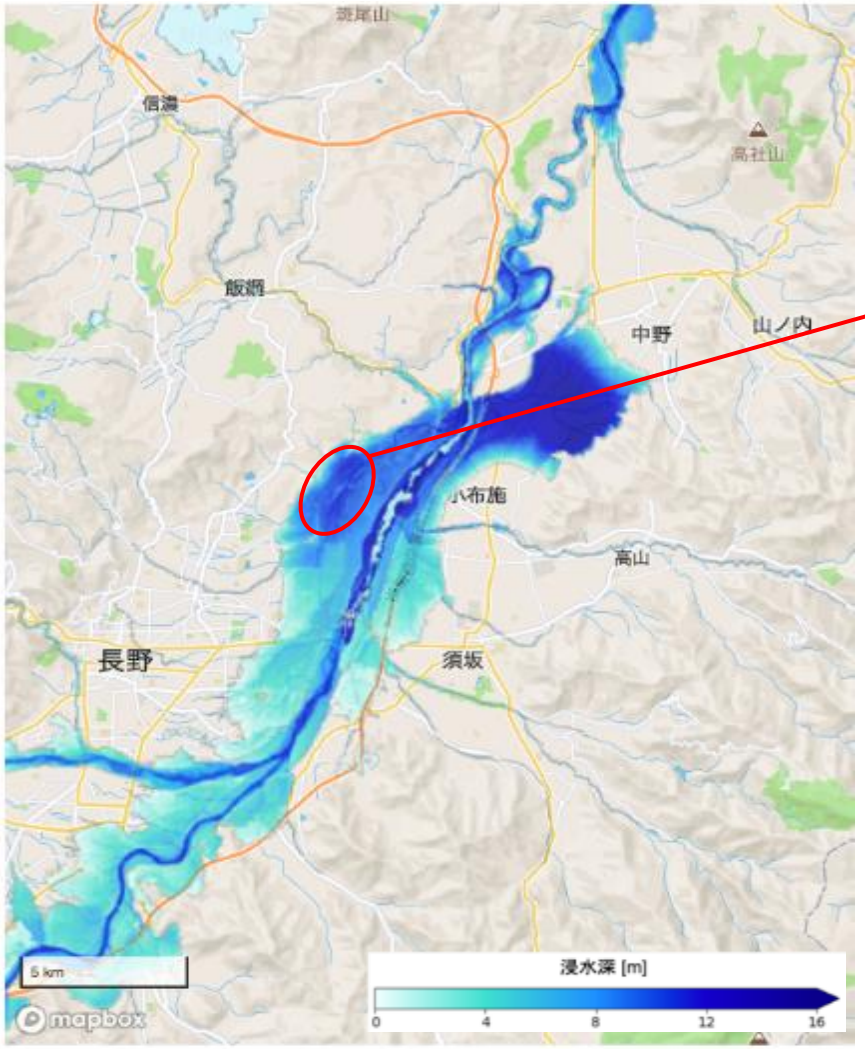
Advanced global and high-resolution simulation technology

(Existing overseas data ineffectual for its low resolution)

Gaia Vision Simulation output



Flooding by Typhoon Hagibis (Oct. 2019)

Existing data

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Used for Disclosure reports

NEC

Issued TNFD report based on risk analysis by Climate Vision

NEC TNFD Report 2023

July, 2023

Risk management
—Water related risk mgmt. in Pathum Thani, Thailand—

In cooperation with Gaia Vision, a startup from the Univ. of Tokyo, our high-resolution flood simulations for 1.5°C and 4°C scenarios showed that the flood depth in this area is 0.6m under current conditions, 0.7m under the 1.5°C scenario, and 0.8m under the 4°C scenario in a 1/100 probability event. Although the flooding depth will increase as the temperature rises, we were able to confirm that current countermeasures will be sufficient to cover such increase.

11

https://jpn.nec.com/sustainability/ja/eco/pdf/NEC-tnfd-2023-j.pdf

MLIT
Ministry of Land, Infrastructure, Transport and Tourism

Listed in the national guideline!

✓ **Research is underway to utilize flood models to construct future flood hazard maps, and several products are already available at the global level.**

⋮

Column 3-12：Services for Climate Risk Analysis

図 3-14　気候関連リスク評価に関するサービスのイメージ図

Gaia Vision: To be released (As of 2023/3/1)

41

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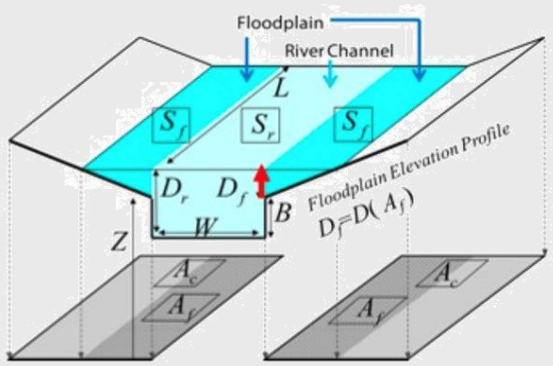
Core technology

Global River Hydrodynamics Model from the University of Tokyo



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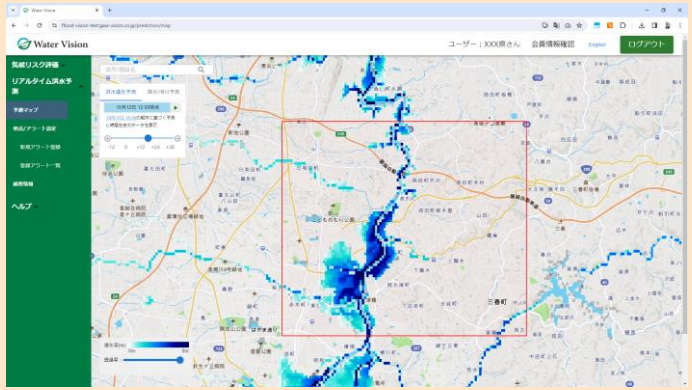
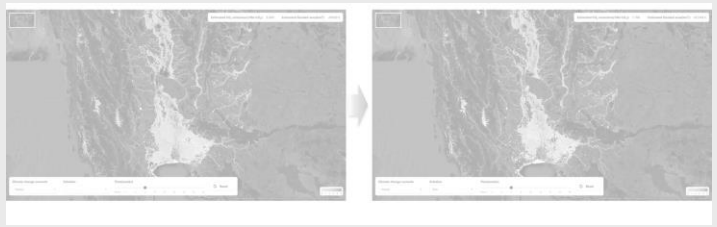


3 Risk Mitigation

Flood Control Effectiveness Evaluation



4 Others

- River Flow Simulation
- Water Stress Management
- Climate change-related R&D support
- Climate change-related strategic planning support

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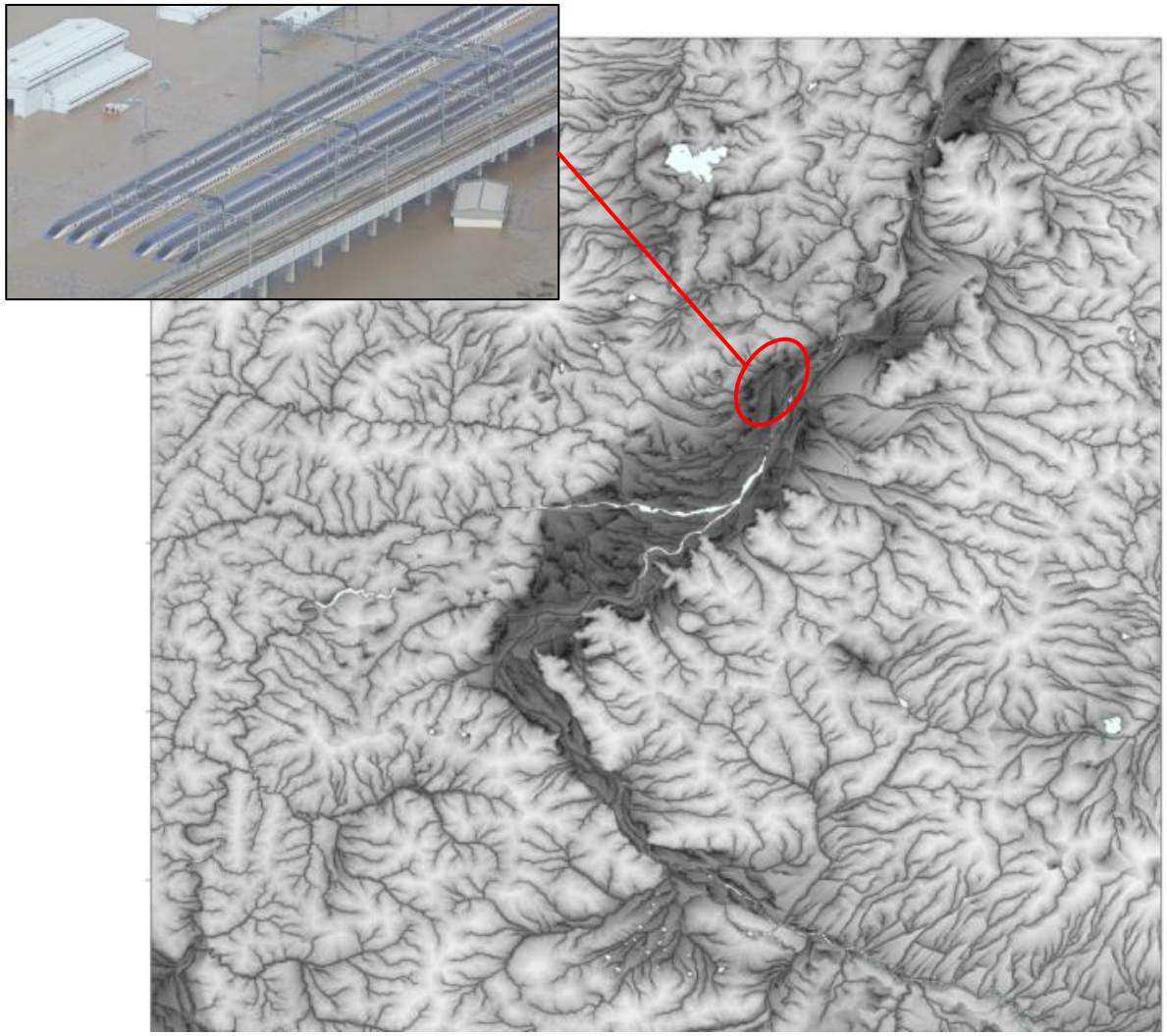
Predicts flood extent/depth
1.5 days ahead

High-Resolution Flood Forecast Solution

Water Vision



October 12, 9 a.m. | 9 p.m. | October 13, 9 a.m. | 9pm

The damage was **predicted in advance.**

Image Video of the Solution

© 2023 Gaia Vision Inc.

Public

<User>

- Government/Municipalities
- Div.: Crisis/River Management, etc.

<Scenes of Use>

- Appropriate Evacuation Order

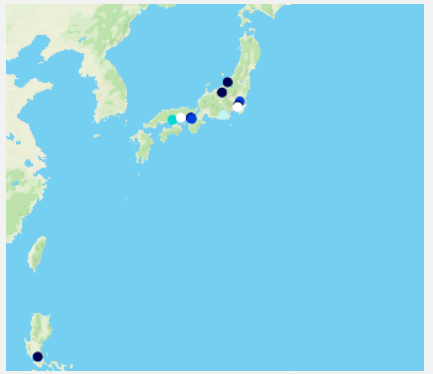
Private

<User>

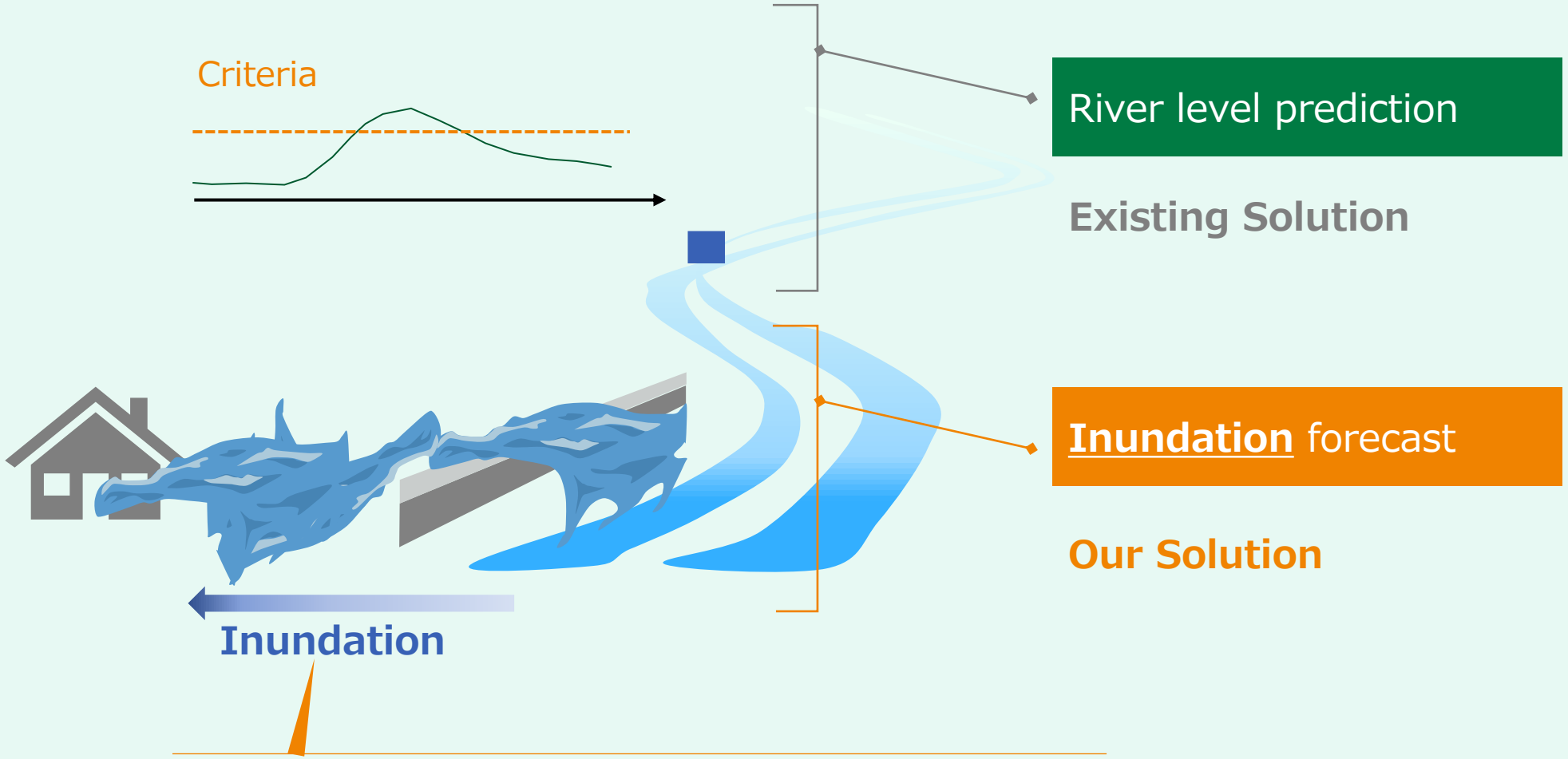
- Manufacturing, Infrastructure, Construction, etc.
- Div.: BCP, Risk management, etc.

<Scenes of Use>

- Identify locations affected by floods.
- Ensure employee safety, evacuate assets, etc.



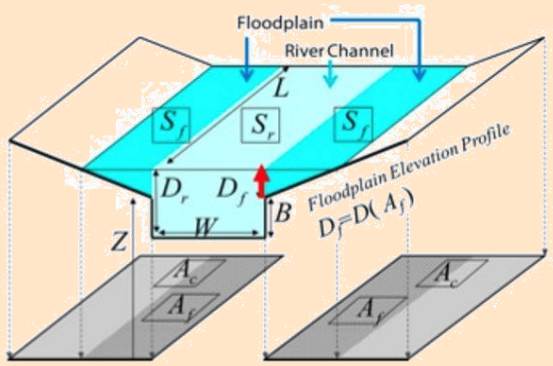
Flood *Inundation* Forecast



Predicts where and how much flooding will occur

Core technology

Global River Hydrodynamics Model from the University of Tokyo



Climate Data Analysis Technology

GIS Development Technology

1 Risk Assessment

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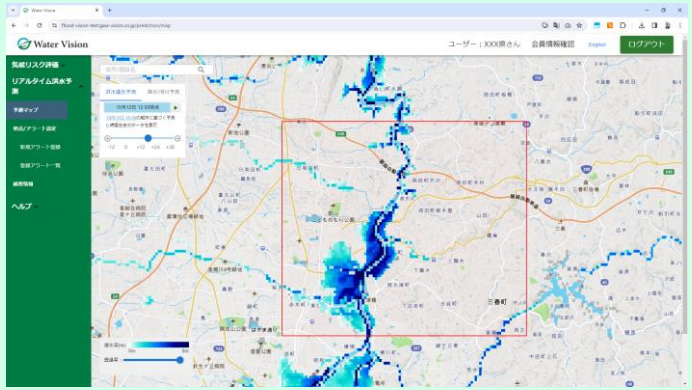
Climate Vision

2 Risk Monitoring & Prediction

High-resolution flood forecast

Water Vision



3 Risk Mitigation

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4 Others

- River Flow Simulation
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- Climate change-related strategic planning support

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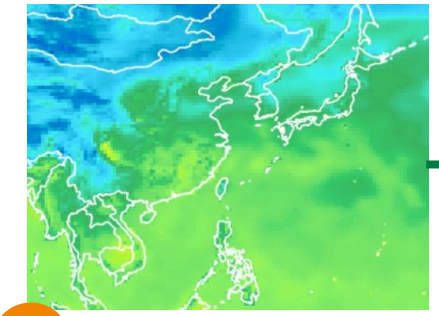
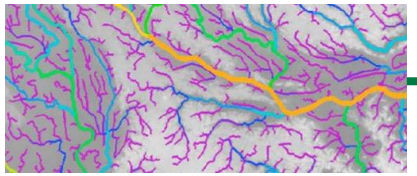
1. Possesses **global high-resolution topographic** data and **river flow direction data**
2. **Low computational cost**, being able to calculate for thousands of years without expensive computers >> Easy, real-time operation on a global basis

Rain/Discharge data



1 Geographic data (Global)

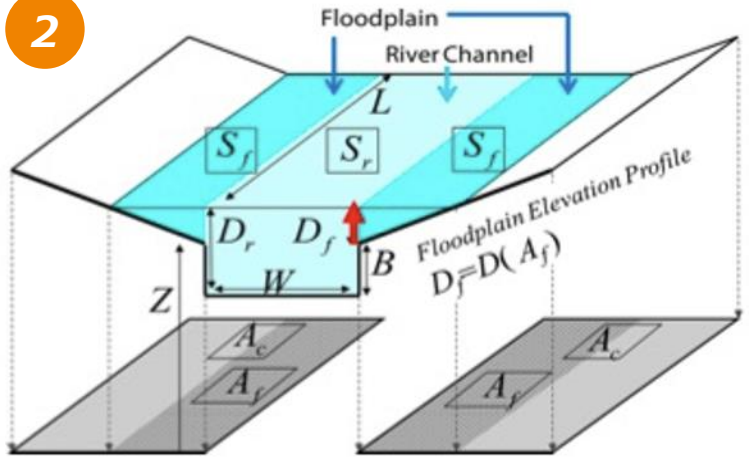
1 Flow direction data (Global)



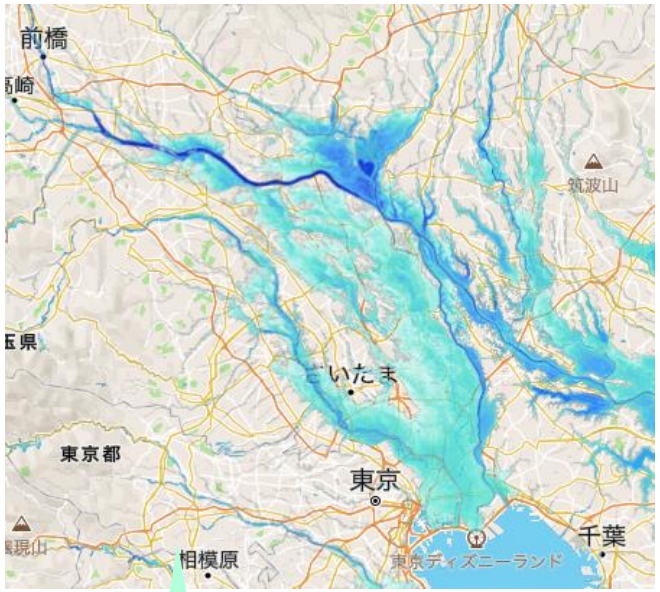
CaMa-Flood

Global River Hydrodynamics Model from the University of Tokyo

2



Gaia Vision Solution



Resolution

- **90m** (Japan: 30m)

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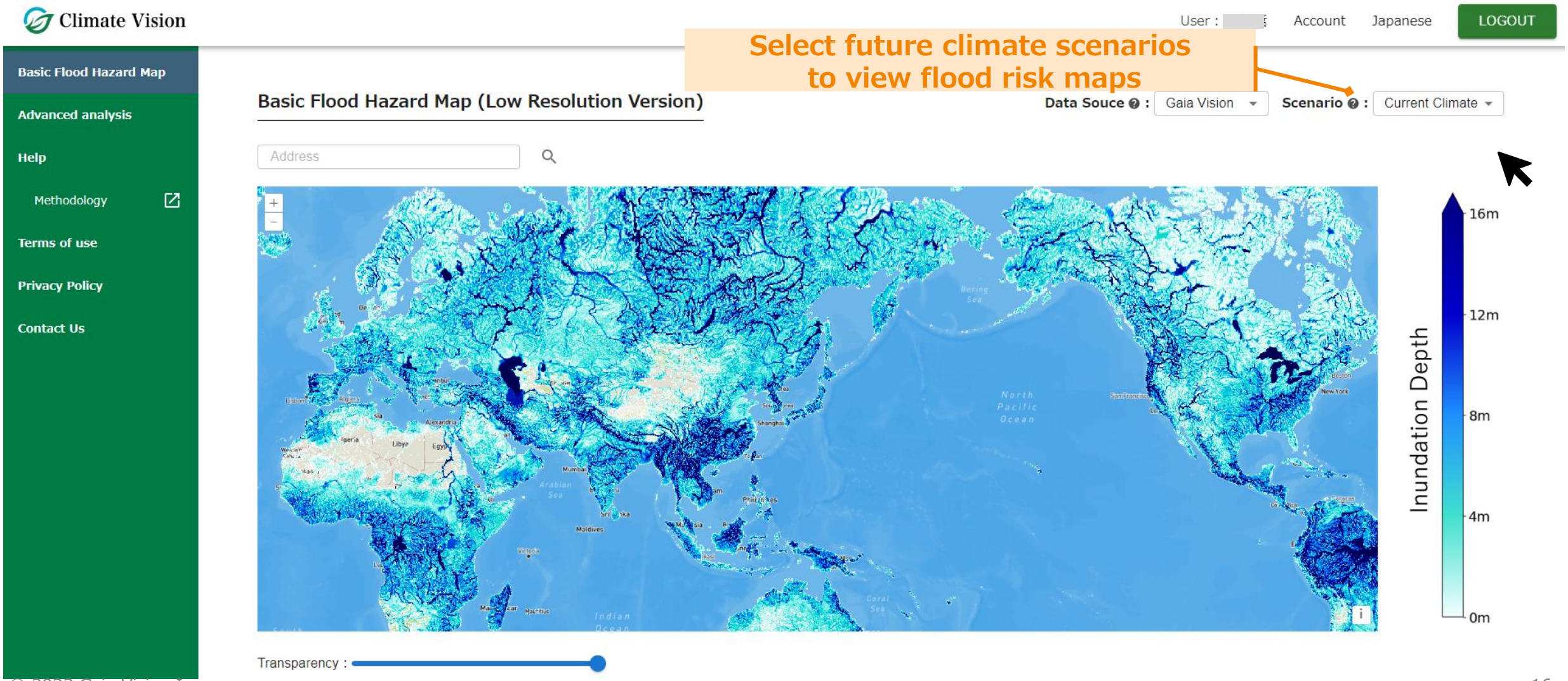
Climate Vision Lite

https://climate-vision-atlas.gaia-vision.co.jp/



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Appendix

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Companies' climate risk management has progressed by TCFD, etc.
Yet, 2 issues remain for natural disaster risk

Until now

International rules (TCFD TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES ISSB ...)

Demand

Autonomous climate change risk management and disclosure

Companies

Issues

	Measurement	Countermeasure
Physical risk (disasters)	1 **Difficult**	2 **Limited**
Transition risk (decarbonization)	**Possible** GHG emission calculation	**Possible** Renewable energy / energy saving etc.

1. Disaster risk is difficult for companies to analyze on its own as it requires simulation with uncertainty
2. Cross-sector measures (e.g., watershed flood control) are fundamentally necessary

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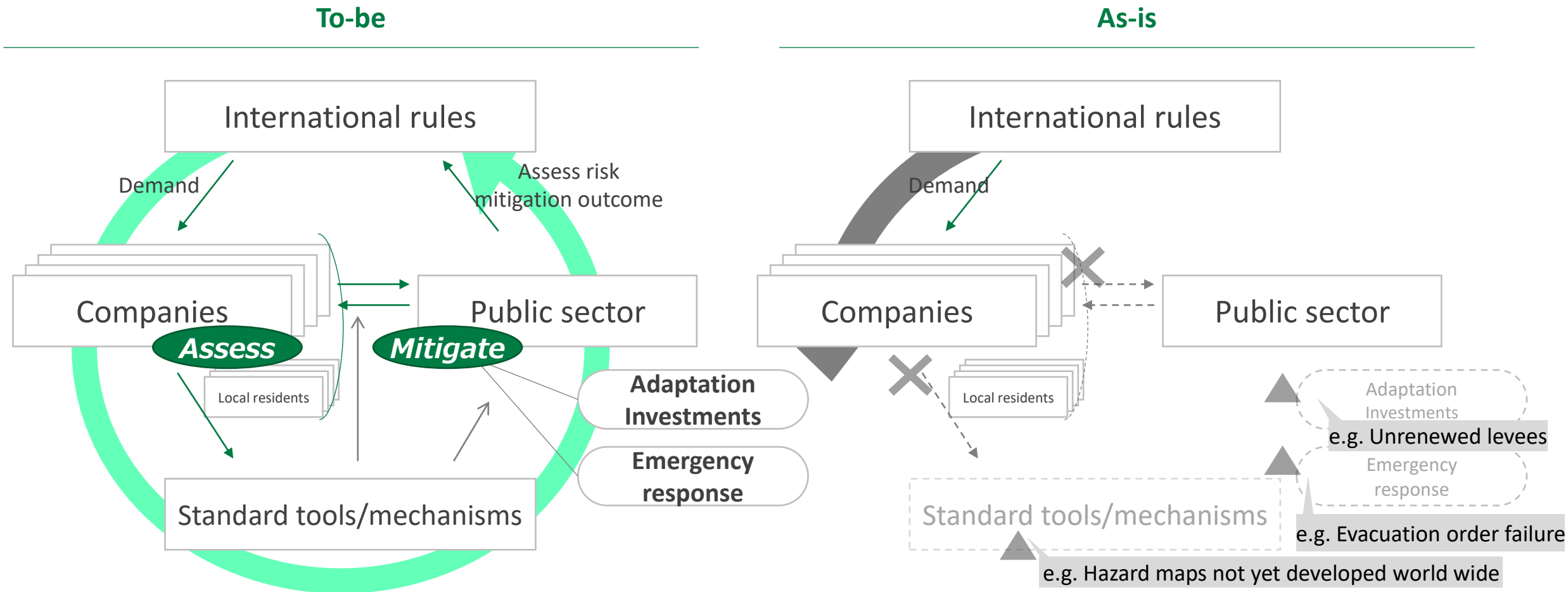
Companies' risk assessments should be aggregated for designing public countermeasures. Yet, such risk assessment is not possible, disabling the process towards risk mitigation.



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We have 50 companies as free users and 18 companies as paid users.

Product / Services	#of users	Industry and Cases
Climate Vision Lite	**50**	• Manufacturing • Logistics • Construction • Infrastructure, etc.
Climate Vision	**10**	• Manufacturing（NEC/Sakatainx/etc. ） • Logistics, etc. : Risk assessment and Information disclosure
Realtime Flood forecast, Risk control acceleration and others	**8**	• IT Company: Disaster Prevention simulation • Infra : Realtime river level estimation • Local governments : DX advisory for river management

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Our customers appreciate our global, future, and high-resolution simulation.

"

1 **We want to analyze the data centrally on a global basis.**

(National hazard maps can be used to a certain extent for major domestic rivers but...)

2 **We want to analyze future climate scenarios**

(Existing data is only for current climate, thus future analysis was challenging…)

3 **We want to conduct high-resolution analysis**

(Existing data was unsatisfactory as it did not fit with our intuitions in the field)

"

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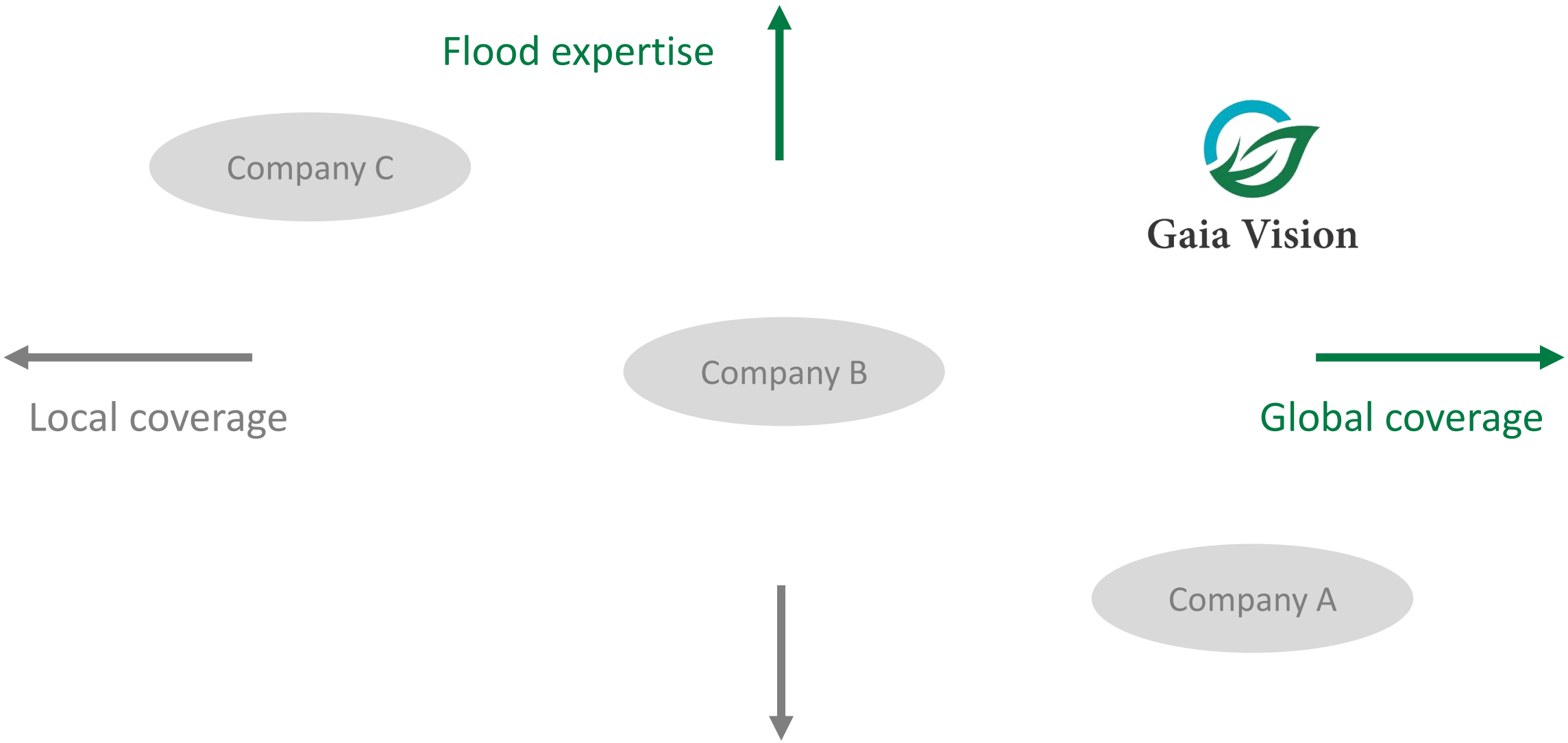
Global coverage and flood expertise are our strengths.



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Free ver. for screening risk presence <> Paid ver. for detailed analysis

	Free version	Paid version
	Identifies the presence and general extent of flood risk, which informs the necessity of a paid analysis	**Useful for quantitative analysis and countermeasure planning for disclosure reports**
Area coverage	**Anywhere globally**	
Development method	✓ Uses CaMa-Flood & high-resolution geographic/river data (original license by Gaia Vision) by the Univ. of Tokyo ✓ Uses the future climate ensemble data (d4pdf/etc.)	
Resolution/ output	✓ **Medium (500m), limited zoom level** ✓ **Color bar**	✓ **High (Domestic 30m / Overseas 90m)** ✓ **Numerical values (flooding depth / financial impact)**
Functions	✓ Flooding depth under current climate (1-in-100-year) ✓ Inundation depth under future climate (4 °C scenario / equivalent to ~2080)	✓ Flooding depth under current climate by probability (1-in- 10/100/1000 year) ✓ Inundation depth under future climate by scenario (1.5/2/4 °C scenario) ✓ Financial Impact Assessment ✓ Consulting / Reporting (Standard Plan ~)

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Managements

Yuki KITA

CEO, Founder *# R&D*

- Ph.D in Environmental Studies
- **Climate change & flood risk researcher** in the Univ. of Tokyo
- Insurance industry experience

Satoru DEMOTO

Co-founder *# BizDev*

- M.S. degree in **Climate Change**
- Former youngest certified weather forecaster
- Strategic consulting & startup BizDev

Advisors

Dai YAMAZAKI

Technical Advisor

Associate professor at the Institute of Industrial Science, the Univ. of Tokyo

Jun KAMO

Advisor

- CDO Club Japan Founder and CEO

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Useful for private, financial, and public sectors

Private Companies

- Manufacturing
- Infrastructure
- Heavy industry …

Financial

- Bank
- Investment fund

Public

- Government
- Municipality

Risk management & Disclosure

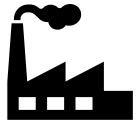
Disclosure reporting

TCFD TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES

CDP DISCLOSURE INSIGHT ACTION

IFRS®

Risk analysis



Real-time prediction & Risk control acceleration

Pre-response/BCP for foreseeable disasters

Climate change impact assessment for flood control projects

Initial DD support

Disclosures & Risk management

Scenario analysis / Stress tests
(For multiple portfolio locations)

Portfolio	Revenue	Assets	Physical risk	・・・
X	xx	xx	1043	xx
Y	xx	xx	2056	xx
Z	xx	xx	5072	xx
A	xx	xx	560	xx
…	xx	xx	xx	xx

Future hazard mapping & Countermeasures

Hazard map development considering climate change

Effective evacuation order decision making

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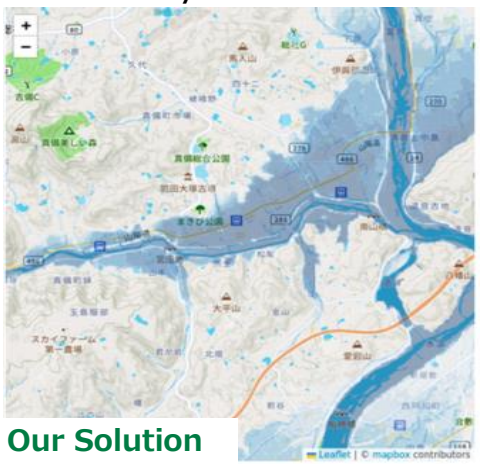
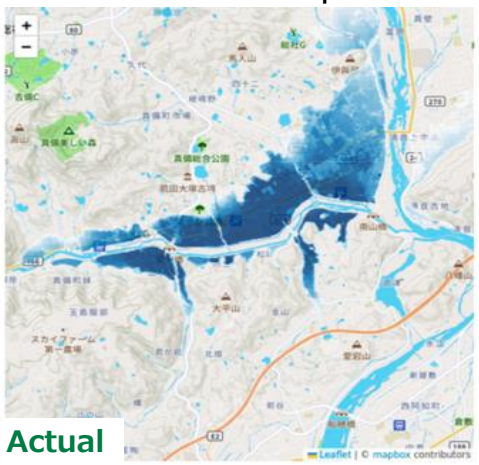
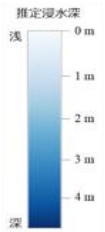
Our solution displays similarities to actual flooded areas

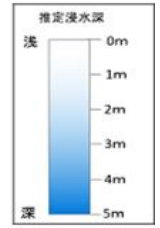
July 2018: Torrential rain in western Japan



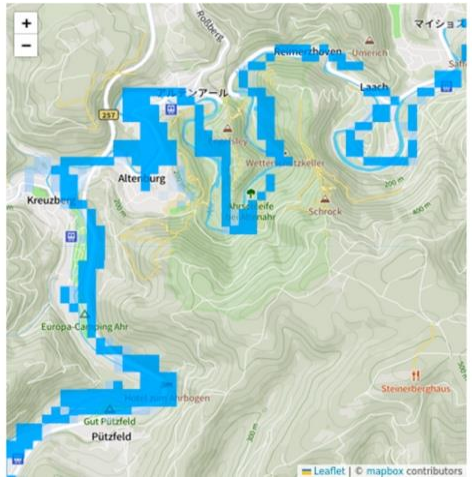




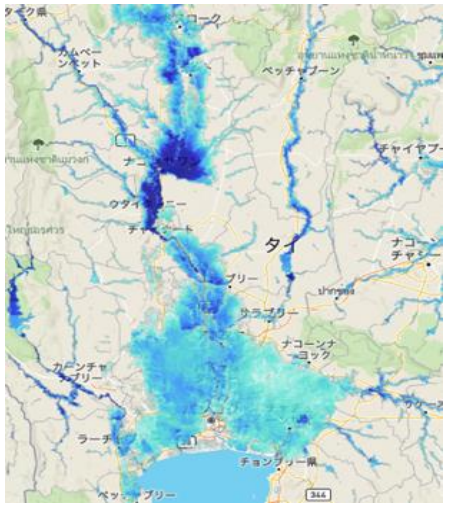
October 2019: Typhoon in East Japan

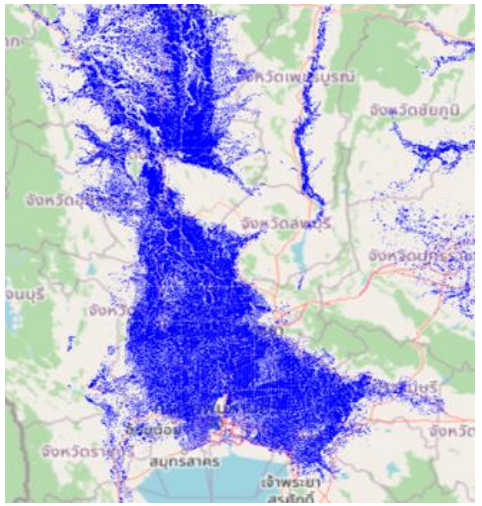


July 2021: Flooding in Germany and Belgium



October 2011: Thailand Floods





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To be the world's #1 ClimateTech company.

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https://www.gaia-vision.co.jp/

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Gaia Vision

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