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And it's the last panel of the week. No pressure. It's going to be very interesting, I can say. Before all of this, we don't have anything. We just have the closing ceremony and a big party and a big surprise for you.

So the word of this panel, sumitate, sumitate, means resources, wealth, money. And this is what we are trying to find to build more resilience. This panel is going to talk a little bit of that challenge.

And with that, I would like to introduce all the panel. So we have more time to talk. Zoe, please bring your panel. Zoe Trujanes is going to help us with the moderation of this panel. On applause, please.

No, thank you, Joaquin. Thanks, everyone, for being here. I know it's been quite a week so far, so we appreciate you coming to our session, which is, and we tried to entice you with our title, and it seems to have worked, Risky Business, Attracting Private Finance for Adaptation.

So as Joaquin said, mobilizing money for adaptation. How do we do that? So we're all aware that finance flows for adaptation are badly lagging, especially those versus for mitigation in terms of climate.

So of nearly $1 .3 trillion in climate finance flows as of 2022, resources for adaptation investments represented less than 10% of the total, very small. At the same time, the availability of public finance, so from the government, the public sectors, we'll hear from Carolina in the terms of Columbia, is increasingly limited as governments deal with immediate needs, such as basic public services and economic growth.

So really, in order to step up on adaptation finance, it means governments will have to bring in the private sector. In addition, for example, insurance can play a key role in

adaptation strategies. It can help absorb residual financial risks and incentivize physical resilience measures.

So while many well -tested models for private sector investment focusing on climate mitigation exist, attracting private finance for adaptation has some hurdles, it's harder, and we know this, and this is also why we're here to have this discussion.

So first, unlike carbon credits, there's not really a market for adaptation credits, and we don't know if that concept would work. So it's something to look into. Another issue is cash flow, right? So to engage with the private sector, you need to have profitable business models.

So while mechanisms exist for the government to capture some benefits around adaptation, it's really hard for the private sector to use those data for lending decisions. So due to these and other hurdles, about three quarters of urban adaptation finance, so in cities that really need also to scale up investment, for example, in infrastructure and resilience, came from the public sector, so not so much from the private sector.

So clearly there is quite a bit of potential to unlock this. So to find out, that's why we have our distinguished panel here today with us, so let me briefly introduce them. So first we have Ms. Carolina Heraldo Diaz, from who's the Director of Environment and Sustainable Development of the National Planning Department from Colombia, Hula.

And then we have Ms. Jane Jamieson, who's Program Manager for Global Programs and Infrastructure Finance, my colleague from the World Bank. Then we have Ms. Astrid Mannroth, head of the G20 Global Infrastructure Facility, also World Bank.

And then we have Mr. Wilfried Goh, who's Head of Public Sector Solutions Asia Excluding China. So let's do, just to get sort of a warm up, we're gonna do a lightning round. So I'm gonna ask the panel, kind of a speed round, so one minute per person.

And I'm gonna ask all panelists. So actually in this way, I'll start Wilfried with you and we'll kind of work our way. Because everybody has a different perspective, you're all coming from different angles of this issue.

So I'm gonna ask each of you, what are the main challenges in mobilizing private finance for adaptation from your perspective, from the reinsurance industry?

Thanks, Zoe. So hi, everyone. Good afternoon. My name is Wilfred. And in my role at Swiss Re, my team of client relationship managers and I build and maintain relationships with an array of public sector entities in an effort to support them in their risk management strategies.

And in doing so, we are able to help to close the protection gap of communities, businesses, and individuals. Just quickly, on Swiss Re, well, Swiss Re is one of the world's largest reinsurer. And thanks to our clients for their trust and support, we've been on this planet for 160 years.

Unfortunately, when we look at the entire universe of insurable risk, 75% of it is still uninsured. And it is our vision that we can help to make the world more resilient through our innovation and our expertise.

Now, going back to the challenge that was, or the question that was asked regarding challenge, many things come to my mind. But I'll just share one. And that is actually the disadvantages government intervention.

What do I mean by that? Well, of course, we know that the roles of governments are to provide and protect their citizens in areas that their citizens are not able to do as an individual. Examples would be like providing military defense or access to electricity and water.

However, when it comes to insurance and climate mitigation, in the recent years, what we have heard are noises around governments trying to put a cap on rising premium costs, as well as mandating certain covers to be in place.

Now, of course, there's good intentions behind that. So the governments are trying to ensure that insurance continues to be affordable and available. Unfortunately, what this does is counterproductive because it prevents the insurance industry from actually charging risk -adequate premiums.

And a result of that could ultimately cause the economic viability of insurers in a particular market. So I would rather encourage governments to actually put more of their efforts into reducing risk, reducing and mitigating risk so that insurance can continue to remain affordable and available to the citizens.

Thank you and good afternoon and thanks very much for inviting the global infrastructure facility to this important debate. So the GIF, as we call it, is a project preparation platform that advises governments in emerging markets and developing economies in the preparation of sustainable and resilient infrastructure projects for private investment.

So including for mainstreaming adaptation and resilience considerations. So in terms of what stands in the way of increasing adaptation finance, particularly for infrastructure, couple of thoughts. One point is that the business case for adaptation and infrastructure projects is not always well understood.

So often, you know, developers think about this as an additional upfront cost that increases capex and opex. Very often, actually, as a step zero, they are not always even aware of the climate hazards and risks that may impact the project.

And instead of looking at this as a wise investment, because, you know, PPP typically has a life cycle of 20, 30 years, and by investing in adaptation upfront, you actually avoid that your asset is becoming stranded later or maybe severely impacted, so you're actually saving a lot of money throughout the life cycle of the project.

So that's one aspect to consider. And the other part, of course, is that adaptation is relatively complex and also associated with a number of risks. So the risk profile of these transactions is not always well understood either.

And it comes in a couple of dimensions. One is, of course, that projects, infrastructure projects with the primary adaptation objectives such as wastewater treatment, for example, often suffer bankability issues such as limited credit worthiness of some of the off -takers, for example, or other risk factors.

And the other one is also that those projects do not always have the incentives in order to mainstream adaptation. So beyond the studies, also then, as the governments move to procurement of these PPPs, you need to integrate some resilience requirements in the RFPs and ultimately in the concession contract in order to protect the assets against future climate hazards.

And that's actually where the GIF comes in, but I will reserve details for the next question.

Mm -hmm.

Thanks. So, I think Zoe, you're right. I think there's certainly a lot of challenges, as we know, actually, only around 2% of adaptation finance comes from the private sector, so there's a lot we need to do if we're really going to mobilize more private finance in this space.

But if I may, I'll take your challenge and turn it into an opportunity, as most of us here, we have to be optimists in this role. So, I sit in the Infrastructure Finance Group of the World Bank, where we partner with the Government of Japan on advancing the G20 quality infrastructure investment principles, so the QII principles.

And at the heart of those is resilience, but also mobilizing private capital and improving economic efficiency, which can seem like a contradiction in terms, but I think we really see how they are very closely integrated.

So, we provide technical assistance and work with governments on this real nexus of the challenge between bringing together resilience and private sector finance. And where I think I see the challenges, a bit building on what Astrid was saying, is really the mismatch of perceptions between private sector interests on one hand, where we're thinking about profitability and bankability of projects and returns on investment,

and climate resilient interests around adaptation finance being for a public good and not necessarily having an inherent revenue stream to finance that infrastructure investment. So, it's a tricky issue, but I would really argue that infrastructure, and particularly infrastructure delivered through private PPPs, or public -private partnerships, are actually quite well suited to incorporate climate risk,

because as Astrid mentioned, these are long -term projects for 20, 30 years that really factor in lifecycle costing, which I think is where you will really see that the dollar that you invest in adaptation today really has an impact down the line in the $4 that we understand will be returned, because you're very likely to see that climate impact realising in that moment within that lifecycle of the project.

So, I see challenges. I mean, the challenge is it's really difficult to bring these two pieces together, but I see clearly the business model and opportunities there. And that's what we're working on.

Thank you.

Thank you so much for the invitation and, you know, let me start by saying that I think that we have made progress because, you know, ten years ago we barely had in this conversation and financial institutions did not have financial portfolios or even ways to evaluate adaptation of resilience projects, so different from what happens at a global context in Latin American countries there is like a better balance between adaptation and mitigation project investment but,

for example, in Colombia we only invest 0 .2 our annual GDP in climate change and 75% of the resources come from public sector, so from our perspective we need partnerships, synergies, collaborations between all decision -makers but in particular I

think that we need, you know, public sector, productive sector and also the institutional system or the financial institutions and in that sense I think that our main challenges are from financial innovation,

accelerating implementation and also, you know, we need to be more effective identifying market opportunities.

No, great. Thank you. So it sounds, I mean, it's interesting to hear all the different perspectives. And I think, you know, all of us here on this, but at least four of us here on this stage are very interested in art.

We want to support governments, right, in terms of the public investment to be able to leverage more private investment in terms of adaptation finance. So Carolina, we're going to now do another round of questions going in this direction, starting with Carolina, to have more of the government perspective before we hear from Swissri and our World Bank colleagues.

So Carolina, as you sit at the National Planning Department in Colombia, you experience clearly the challenges, as you mentioned, firsthand. No? So do you think, two questions, do you think existing country settings are favorable to mobilize finance for adaptation, or do you need to do some reforms to enable this to happen more smoothly, and what would be necessary for public policy to facilitate access and utilization?

Okay, let's start that, I think that we can unlock the financial landscapes for resilience if we work at least on four dimension, policy and governance, knowledge dimension, founding dimension, and transparency mechanisms.

So let's start with the first one, policy and governance dimension. It's crucial to refine the scopes and responsibility of each actor at a project level. We need to understand the demand sites, who is the developers, public, private, including small and medium sized enterprises, anchor companies, the sub -national levels, but we also need to understand the supply sites, founders, if they are publics,

if they are commercial banks, if we are talking with developing banks, multilateral organization of philanthropy or investment funds, but we also need to understand that there are other actors like incubators, accelerators, implementers, and obviously the beneficiaries, because this will make climate resilience and adaptation project much attractive when it's clear who does what in each part of that.

Regarding the knowledge dimension, we need to balance rigor in project designs, without making pre -investment stage two complex, because always complexity can discourage private sector investments. Also, establishing a common language is crucial for mobilizing Robo's project portfolio.

And I know it sounds like so simple, but stakeholders need to understand each other to facilitate investment. So this is why the first mile support approach is so important to do that technical support, financial guidance, and legal expertise, in particular for adaptation and climate resilience project.

Regarding the funding dimension, it's important to map out in each country the type of economic and financial instrument and mechanisms for this kind of project, and we need to understand the scope, the usefulness of each type of instrument, the instrument based on the project or initiative stage, if it's early stage or mature stage, we need to know the potential amount of capital to mobilize the ticket of the project,

and the types of investor, and also we need to understand the types of intervention to meet finance, because we need other index, like the potential of job creation, or if the project is attractive for private investor.

And here, we found two sensitive discussion with the financial system, in particular because we need to balance, to find a balance between the impacts and the profitability of the project. And you should be bolder in working with projects outside energy or transportation, where we focus on maximizing expected profitability with minimal risk.

And regarding the project timelines, we need to explore investment vehicles, like blended finance, which can absorb initial losses and as an anchor for private capital. And it could be like a better support, high risk projects with positive impacts.

For the last dimension about transparency, you know, clear metrics are essential. So in terms of goals and indicators, and also we need to extensively use MRB system, monitoring, reporting, and verification system for climate finance, but also integrating this with the country's public investing system.

It would be ideal for this process.

No, thank you. That was quite comprehensive, lots of challenges there. But especially, I like your point on understanding the actors and the need for speed, right? And making sure that the climate adaptation, the element is integrated and understanding who can do what in terms of the different partnerships and the blended finance.

Jane, so early planning is fundamental for adaptation. Could you provide examples of how technical assistance and I think Carolina also talked quite a bit about the need for technical assistance, has effectively supported EMDEs and incorporating resilience considerations at the outset in terms of early planning stages.

Yeah, thanks, Zoe. And really building on Carolina's points around having the right policies in place, having the regulations in place, getting projects structured, and transparency of processes and pricing is really critical.

So in our group, we have the Public Private Infrastructure Advisories Facility, or PF, which works with country governments on creating that enabling environment for private participation in infrastructure.

So really working in that upstream space. And you wouldn't necessarily think this is an entry point for climate and adaptation. And certainly it's been a work in progress that we have been systematically integrating climate into our decision making and policy setting in that space.

So I think maybe seven or eight years ago, maybe 30% of our portfolio had a climate element. And usually it was around mitigation and renewable energy and promoting private markets for that. But actually now more and more, I think we're at almost 100% of our projects now have some level of climate co -benefit.

And around 40%, 45% has adaptation really integrated into it. So it's been a work in progress, but there's something we've really tried to do. So this might mean helping governments think about their PPP regulations and integrate climate considerations into that.

An example is we've worked in Indonesia with the Indonesian Infrastructure Financing Facility to help establish their screening criteria for investments. And we've helped them develop a screening tool that really looks at climate adaptation and biodiversity and how they choose their investments to have the maximum impact in that space.

Some other examples is when we work with sectors. So how do we open up infrastructure sectors like energy, transport, telecommunications for the private sector participation? We've really thought through how to integrate climate hazards into that assessment of the market so you can really ensure reliable services because it's about delivering good services and sustainable services.

So we've really critically helped that. So for example, in the telecom sector in Angola, we helped with rolling out a program of rural telecommunications and thinking how you integrate climate into that very vulnerable country and making sure you improve the business model for that.

Secondly, the other piece we've been doing is developing what we call the Climate Toolkit for PPPs, which we developed with the Global Infrastructure Facility and also the IFC, the Private Sector Arm of the World Bank.

So this is a toolkit for country governments to really think through climate throughout the whole lifecycle of projects, so from early identification right through to transaction structuring appraisal, right through to, as Astrid said, degrading the right contracts in place and getting the right incentives in your contract to include climate.

So an example of that, we've worked in Mozambique. We've used the Climate Toolkit for a bus rapid transit PPP where we looked, we took, we did a number of, I'm looking at Guillermo in the front row who actually was the TTL on this, so I better get this right.

They looked at a number of climate scenarios and saw how that impacted people's behavior. And then that would ultimately impact the financial viability of that project, so that really helped think through the whole life of the particular project.

So that's just one example of how we're doing that and you'll plug this at the end. And we're doing a workshop on Friday, so if you'd like to learn more about that.

Great, thanks, Jane. I'm going to move on to Astrid. So Astrid, the GIF as a G20 initiative, you have extensive private sector network comprised of institutional investors, commercial banks, and project developers.

So what feedback do you hear from them? So what are the key enablers needed to scale up private investment for resilient infrastructure, again, in emerging markets and developing economies?

Yeah, thanks very much. So as a global public private collaboration platform the give actually entertains the standing dialogue with the private sector And we we do that through our private sector advisory council Which has as you mentioned commercial banks institutional investors developers with about 18 trillion in assets under management And we use them in two ways one is really to consult with them about the kind of projects and structures they that they need to be Coming to the table as investors,

but also then to bring projects We help governments prepare to private sector investors as well in the in the other direction And in our regular dialogue, you know, it's actually quite interesting. For example in Japan in February We consulted with a number of the major Japanese investors like Marabenui sumo Tomo It was your soldiers asking them what is really keeping you from investing more in infrastructure including in resilient infrastructure and emerging markets and It's very interesting because they never say it's

the high development cost But they always say please provide the governments with advisors to really help them in structuring and negotiating these complex projects So confirming that we are active in in the right space And so we really think that the risking starts at the project Preparation stage after as Jane mentioned,

of course the enabling regulatory and legal framework is in place and that means Baking in all the considerations including climate adaptation resilience considerations into the project preparation studies Yeah, so doing the the risk assessments up front Then including design specifications in technical environmental social studies But also factoring in the the costs into the financial analysis and of course the benefits the future benefits And this is something that the GIF can can help support for governments If it's not yet included in the scope of project preparation activities We offer that and then secondly as a as a knowledge platform We also provide tools and as Jane already mentioned,

we have the climate toolkit that we develop together That also helps governments, you know build their capacity how to mainstream this in in PPP structuring And maybe just to give you one quick example Where we have done this in in an adaptation relevant sector in South Africa the eta guini municipality Which is the the Durban municipality is looking to make their a city or or?

Yeah, the region the most livable city by 2030 at the same time It's also quite a flood - plone area and and also experiencing a lot of drought So the wastewater treatment plants really were coming under strain And so the government approached the IFC and ourselves to help them put a PPP program in praise For the development of new wastewater treatment plans, which is in the process of being designed And of course,

you know there we bring all the tools to bear Wastewater treatment itself is already something that is helping adaptation and has adaptation co -benefits But it has to be done. Of course also in a resilient manner.

So all of this is being factored into the studies which are ongoing and You know, hopefully we're close by the end of this year and really contributing quite a bit to the water security of the city

Thanks, Astrid. So Wilfred, as we heard from Astrid, bankability is achieved when the risk -adjusted return on investment is suitable for private financiers. But for that, of course, we need to identify and mitigate risks to the insurance industry plays a crucial role in this space.

So it would be great if you could give a little bit of insight into how Swiss Re is helping mitigate climate risk.

Yeah, thanks for the question. So at Swiss Re, we have a framework in place that consists of three components. The first component is understanding your risk. Second is reducing your risk. And third is transferring your residual risk.

Allow me to expand on this. So firstly, understanding your risk. In this area, we have built an online platform that allows our clients to have a digital twin. And through that, they're able to have a deeper understanding and appreciation of how their fiscal assets could be impacted by both current day natural hazards, as well as future climate scenarios.

We also have a financial model within this online tool that allows our clients to understand what the financial impact could be. An example of this is the Australian Queensland government, who had recently procured this tool from us.

And this allows their local councils to have a deeper appreciation of what could be the peak risk and thereby be able to prioritize their risk assessments. So secondly, reducing your risk. So once you've identified and selected which are the peak risks to address, we have in -house risk engineers who are able to perform either desktop analysis or on -site assessments.

And through their assessments, they are able to provide advisory services to help our clients reduce their risk. Examples of this could be looking into the integrity of a levy that is protecting a critical site.

Thirdly, that's the risk transfer component. And here, I would say that what the industry does is that we support by taking off or de -risking certain elements of a financial

transaction and in so doing help to be an enabler when it comes to climate mitigation or adaptation.

Let me give you an example. So a few years ago, we provided a novel parametric of quick solution to Nepal because they were trying to construct a hydropower in the country. What was the challenge? The challenge was that even though a consortium of DFIs were available and willing to disburse the loans, they had a condition that an earthquake insurance had to be in place.

Now, back in 2015, if you remember, there was a massive earthquake in Nepal. And as a result of that, the traditional capacity dried up. And so what was the solution? Well, together with IFC and AON, Swistry was able to provide a novel of quick parametric solution that was able to respond based on the intensity of shake.

And it also had a mechanism that would adjust its limits based on an annual calibration of the project as the project value increased over time. What was the outcome? The outcome was that once this hydropower plan is in place, potentially it would reduce the amount of greenhouse gas emissions by 26 ,000 tons per year.

And should there be an earthquake that happens during the construction period, the payouts could actually be used quite flexibly. So either in reconstructing the hydropower plan, or it could be used to service the loan.

I'd just like to share with just one other example. And that's a risk adaptation example I'd like to share. So most recently, Swiss Re was able to provide an innovative solution to protect the daily income of the self -employed women in India, 50 ,000 of them.

What was the challenge? The challenge is that the self -employed women, when the temperature rises on very, very hot days, have to make a decision. They have to decide between, do I forego going to work and therefore lose my daily income?

Or do I risk it and suffer the consequences that would threaten my health, such as heat exhaustion? What was the solution? Well, together with our partners, CRA, SEBA, as

well as local insurer in India, ICICI Lombard, we were able to provide a novel heat, extreme heat parametric product that would respond whenever the temperatures hit a certain level, the payouts will be given and they'll be distributed to the members of SEBA.

What was the outcome? Well, I'm glad to share with you that just last month, the product worked and there was a payout. And as a result of which, 90% of these 50 ,000 women based in Gujarat and Rajasthan were able to be protected for their daily income.

Thanks.

Oh, thanks. And that's a really interesting, also showing the importance of inclusion in not only bringing in elements to make sure that the most vulnerable groups are protected as well. So we're not only always talking about, of course, infrastructure, but how it benefits broader society and all of its different parts.

So we were going to do another round of questions, but I don't want to stand in the way, of course, of the closing ceremony, let alone the sake cocktail later. I do want to offer any of our panelists, if you have any last one minute or so comments, please come in.

And if not, we can wrap up, but I want to give you the opportunity. So if anyone has any... Yeah, Jane, go ahead.

Yeah, so one, just really quickly, be interested to hear from the audience afterwards, so happy to talk to people. I think we've mentioned here a few tools that we have to help integrate adaptation into our infrastructure investments, like roads and water and transportation energy.

But I think where we really see the gap in business models is around how we get the private sector to invest in infrastructure for adaptation, like coastal protection, flood management. And we've launched a program called the Adaptation Finance and Biodiversity Program, where we're trying to look for business models around that.

And we've launched this with the Cities Resilience Program of GFDRR. So just to say, we're really trying to identify those models. We see some appearing in more developed economies and upper middle income countries.

But we really need to get those solutions to emerging markets and to go to scale. So that's one of the challenges that we really see and we want to keep working on. So with the room full of people who are very knowledgeable around adaptation, I'd love to hear any ideas people have.

So you can catch me afterwards, thanks.

All right. Anyway, go ahead, Astrid.

Yeah, really just an offer to the room just to reiterate that the global infrastructure facility is available for governments to help you in transactional advisory and it's often kind of an overlooked space, I call it the missing middle because there's a lot of good work going on on the upstream enabling environment and also quite a bit of attention on downstream finance but you actually need to translate one into the other and that's exactly where project preparation comes in.

So, if you have any need of support for your infrastructure projects, how to mainstream adaptation and resilience, please come and find us after the session.

I would just encourage governments to definitely consider utilizing insurance as part of your financial toolkit. It's certainly a good complement in helping you achieve your goals when it comes to climate mitigation or climate adaptation.

Thanks.

actually show a big challenge regarding the financial resilience project. In most occasions, we are not oriented investment effectively. So it's important to clarify the role of the public and the private sector.

And for that, it's important to determine where public investment should be minimal and where it should help reduce transaction costs and receive well -risked. Because, you know, in deep, this is like a detention between who financed what kind of projects.

Great, no, so I would, let's give a round of applause to our panel, it was a great discussion, thank you. I won't try to even attempt, yes, there you go, from the front row, lots of applause. So I won't even try to fully summarize this, but what I found really interesting is the importance of the partnerships, the technical assistance to also work not only with governments, but also bring in the views of the private sector because I feel sometimes we talk to one,

but we may not fully understand the other side, right? And so, of course, the World Bank can support Swiss Re, of course, in terms of risk transfer and other partners, but I think it's bringing everyone around the table and understanding the importance of integrating resilience into these investments and providing support as well to governments, as Carolina was also saying, and I think Astrid as well for the transactions and making sure the contracts.

So it's all kind of aligned and moving in the same direction. And last, also, as both Jane and Astrid mentioned, if you're interested to learn more, since, of course, this was a very brief conversation, there is the session Friday morning on accounting for climate risks and identifying opportunities in infrastructure PPPs, so please do join us.

And thanks again, so thanks for a great session.

It's my first time and it's been an amazing experience. I get to meet a lot of people from different backgrounds, but with the same motive of making the world a better place and also to support those in needs.

For me, it's quite special. You come here to get inspired, you come here...

to really get to know the people that work in a really important issues.

The sessions are very dynamic and inclusive and we get to learn as well and we also get to meet other people from all over the world with the same mission and passion that we have.

Japan is like a benchmark for everything that is earthquake design and everything that is earthquake based. It's the best place to be as an earthquake engineer.

The winner is... Love County in Southern Kenya.

This award is dedicated to all the marginalized communities, all the marginalized leaders in this world. We're going to do a better and a greater job in as far as our land, culture, Kenya, Africa is concerned.

Today I have learned inclusion of the disabled persons, how we can integrate some elements in our project.

And understanding how we can bridge gaps with humanitarian applications to science in such an exciting and interesting place and learning about both the history and the future of Hemeiji, I think it's been a really tremendous way to experience the trip here.

Thank you. Hope to see you all again soon.

How awesome was these days, huh? Big applause to you. Big applause for the session leads, for the plenaries. Thank you, everybody. Now we will start our closing ceremony, which also is another highlight of understanding risk.

We are in the middle very much on the whole week. Tomorrow and Friday, we have workshops and meetings that are longer than an hour that goes deep into the technical aspects of what we do. But I would like to see in the audience who has been in an airplane.

I think most of you know. Oh, trains, yeah, trains, good, good. About helicopters, yeah. How many of you have been in a submarine? Well, our next speaker, he works in a submarine. So I'm very excited and I'm very jealous.

We will have our next keynote speaker, someone who's working in something that many of us don't see, but sometimes we leave, we enjoy. Understanding the risk is very important, but when you don't see it, it's even most important.

We think that we have an understanding of all the different hazards that we have been facing in recent years. But how about thinking about thousands of years? What happened that time? We don't know much.

I want to introduce Ken Tani. He is a senior curator of the National Museum of Science, Natural and Science of Japan. Please, let's give him applause. Tani, thank you. Thank you very much. Thank you.

Thank you for the invitation. I think everyone's waiting for a cold drink, so I'll try to make it short. I work as a marine geologist at the National Museum of Nature and Science in Tokyo. This is a photo that I took from a volcanic island called Izuoshima, which is located just south of Tokyo.

This island itself has erupted in 1986, and all of the islanders who were living at that time had to evacuate from the island until the eruption ceased. And this chain of islands that you see in the back are also inactive volcanoes, which has a past record of eruptions.

But today, I would like to introduce you our ongoing study on what lies underneath the waves, which is a submarine volcano in the seafloor. So Japan is an island of volcanoes, as you know, with more than 100 active volcanoes shaping the dynamic scenery, but also caused significant hazards in the past.

I think these photos would represent what you would imagine when you hear about volcanoes, so mountains on land. However, such volcanoes on land are only a minor part of volcanism currently happening in this planet.

Actually, more than 80 percent of the global current volcanism occurs in the submarine environment, mostly in the seafloor. Mid -oceanic ridges in red lines, where oceanic plates are formed, are the chains of very active submarine volcanoes erupting somewhere even at this moment.

Subduction zones in blue lines, where the oceanic plates subducts beneath the deeper ice. That's where most of the earthquake occurs, but at the same time, they generate magma and form very active volcanoes.

Since Pacific plate is surrounded by the subduction zone volcanoes, it is called a Pacific Ring of Fire. So most of the global magnetism is happening where we cannot see, which is under the sea. However, the submarine volcano studies are not well, let's say, conducted yet.

Compared to the volcanoes on land, eruption styles and mechanisms become very complex with the presence of water. Water pressure, which corresponds to the depths where the eruption occurs, is also an important factor controlling the style of the eruption.

It is very difficult and expensive to conduct seafloor survey, which hinders our studies on the submarine volcanoes. Also, we lack monitoring system like seismometer arrays, as we have for the online volcanoes.

And for us geologists, it is very important for us to observe the phenomenon to understand the processes. But submarine eruption mostly occurs most underwater, so we don't even know when and where these eruptions are happening.

But recently, there are several eruptions that are well -documented by satellite and aerial observation. One case was in the deep ocean, a 2012 eruption of Hawaii volcano offshore of New Zealand. This volcano lies deep ocean at 700 -meter depths because salmon plume and pumice raft to sea surface.

This was a surprise even to us volcanologists and geologists because we did not expect that eruption at such depths can cause effect to our sea surface. By the way, the pumice is a very highly porous eruptive material that will float in water.

In the shallow ocean environment, Fukutoku Kanama volcano in Japan erupted in August 2021. This eruption formed 12 -kilometer high plume and formed a pumice raft on sea surface. In open ocean environment, a very explosive eruption occurred in January 2022 in one of the Tongan island.

I think you all remember this eruption. This eruption is said to be the largest natural explosion in the century, causing 57 kilometer high prune and cause tsunami damage around the Pacific coast. So we are now gaining more knowledge about submarine eruption and associated hazards.

One more important thing to add regarding the difficulties on studying submarine volcano is the lack of detailed seafloor maps. Due to the water covering the seafloor, we cannot use, for example, light or later to obtain precise maps.

So we need to use seaport sonar to make a map, and this takes time and effort. So as a result, only 25% of the seafloor has been mapped so far. This is in contrast to like Mars or Moon, which are already 100% mapped by spacecraft.

So in terms of the topography, it's a bit ironic, but we know much less about our ocean than other planets. So for us, even the distribution of submarine volcano are still largely unknown. We don't really know where it is.

So as a marine geologist studying submarine volcanoes, what we do first is actually like 18th or 19th century. We make map first. So we use a research vessel to make a support multi -beam echo sounding to make a detailed map.

We're now being able to obtain very precise map of the seafloor using a submarine robot called AUV. After the maps are made and we know where the volcanoes are, we conduct seafloor observation and sampling using a different kind of robot called AUV.

Or we go to the seafloor ourselves using the submersible. As Hawkins has introduced, I have been down to the deep seafloor 11 times using these submersibles. So I'd like to introduce to you our finding of hidden shallow sea volcano near Tokyo, Tokyo Bay from one of these surveys.

It is called Omurodashi. It might probably feel a bit odd, but this is kind of a big sea mount located less than 100 kilometer south of Tokyo Bay. So it's very close to the metropolitan Tokyo. This is a 3D map of Omurodashi.

You can see it has a very vast flat top summit at 120 meter depths. Indicating the wave planation or wave erosion during the last glacial period and the activity of the eruption has not occurred since then.

So this sea mount has been considered inactive. However, on the summit, there's a small hole in the summit called Omuroho, which has been known to the local fishermen for quite a long time for a good catch.

The discovery of this volcano being active was just a coincidence. In 2007, we conducted a test of analytical equipment called geosarmometer probe in the Omuroho. Geosarmometer is used to analyze the temperature gradient beneath the seafloor.

Surprisingly, we obtained an enormously high geosarmometer gradient of maximum 30 degrees Celsius per meter. So this suggests that the temperature will exceed above 100 degrees in several meters below the seafloor.

So it's very, very hot. Of course, we fast thought this instrument was broken, but after we cross -checked them at shore, we found that these values are correct. And these such high geosarmometer gradients suggest presence of hot heat source in very shallow level.

In this situation, most likely to be a magma. However, it took us a while to conduct this site again to check our findings. In 2012, we discovered, at the base of the Omoro Hall, very active in high -temperature hydrothermal activities in the Omoro Hall.

You can see in the video a simmering of very hot fluid coming from the seafloor. Analyze temperature was almost exceeding nearly 200 degrees Celsius. You see the ROV manipulator, a robot arm, trying to sample the hydrothermal deposit deposited from these hydrothermal fluid, which is called a chimney.

The white one is quite rare. So this is a direct indication that Omorodashi is an active volcano. I think all of you know that the hot spring is highly favored in Japan as a tourist destination. And this is actually the discovery of the nearest underwater hot spring to Tokyo.

But unfortunately, we cannot visit here so easily. So this is kind of a symbol of the Japanese hot springs. We also found evidence of actual eruption at the seafloor. Seafloor around the Omoro Hall were covered with pumice and lavas, which is the eruptive material from the volcano.

When we collect samples from the seafloor on our right photo, surface looks a bit ugly. But when you cut them in half, you see that they are composed of very fresh volcanic rock. In this case, the rock is called rhyolite.

Based on this evidence, we concluded that this Omoro Hall, a small crater on the summit, was actually a volcanic crater formed by explosive eruption. We don't really know how many times eruption occurs.

We put S on it. So now we know that Omorodashi is an active volcano and have caused explosive eruption in the past. We started to look for record hazards caused by disruption to the surrounding islands.

So we studied volcanic ash succession in Izu Oshima and Toshima, both inhabited islands. We surprisingly found small white pumice crusts in the ash layer, as indicated in these blue arrows. From various analysis, we found that these are volcanic ash derived from Omorodashi eruption.

By dating these ash layers, we were able to pin down the timing of the eruption, which occurred 13 ,500 years ago. This is quite recent for us geologists. But more importantly, it is now evident that Omorodashi eruption has caused hazards to surrounding island in the past.

So in more general aspect, it is very important to understand potential risk of shallow sea submarine eruptions. We have several examples of types of hazards that we can occur from these eruptions. One is maritime hazards by explosive eruptions.

On the left photo is a Miujin Sho volcano eruption located further south of Omorodashi, which erupted in 1952. This was also a very shallow sea eruption. A Japan Coast Guard vessel called Daigo Kiyomaru was sent to monitor the eruption, but never returned.

They later found a wood barrel from this ship, with pumice crusts pierced in the wood. So unfortunately, it is considered that this vessel has encountered unexpected explosive eruption and sunk. More recently, we encountered another type of hazard to coastal area by pumice rafts.

As I said, pumice floats in water. During the Kotoko Kanaba eruption in 2021, a large amount of pumice were ejected from the eruption and formed a massive raft covering

the sea surface. You can see in the video, this is taken from a Japanese meteorological agency research vessel.

So what looks like a land is actually a pumice raft covering the sea surface. They drifted more than 1 ,000 kilometer west to Okinawa Island and caused various damage to the island. For example, a blockage of ports and damage to the engine, the ship engines, because the pumice is sucked into the ship engine and that causes the overheat.

And also there was a major damage to fish farming. We had had a historical record of similar hazards in the past, but we are forced to realize how modern infrastructures are weak to such events. The highly explosive eruption in Funga Tonga in 2022 in Tonga made us realize more catastrophic consequence of explosive submarine eruptions.

Our left figure shows numerical simulation of how the tsunami propagated around the Pacific from disruption. 20 -meter high tsunami was reported in proximal Tongan Islands, and even in Japan, 1 .5 -meter tsunami was reported.

We also recognize a new type of tsunami called Meteo Tsunami, formed by atmospheric pressure waves. Also, we experienced another type of hazard from this submarine eruption, and this was a damage to the submarine telecommunication cable by sea floor sediment flows triggered by disruption.

As a result, the Tongan Islands lost international communication soon after the eruption due to this damage. So, all these potential risks are present at various levels in Omorodashi and any other shallow -sea volcanoes worldwide.

But unfortunately, they are not well -recognized public yet. But at the same time, I should point out that submarine volcanoes risk to human society, but it's important for biodiversity preservation.

With the collaboration with marine biologists, we have discovered rare hydrothermal vent species in Omorodashi. The right photo panel, you will see a new type of tube worms and very primitive type of fish.

Sorry, I'm a geologist. And several new species have been found and described. Hydrothermal vent in general, a crucial energy source for marine animals and have been considered to be a potential site where our life originated.

So it's very important to study and preserve these sites. So to wrap up, submarine volcanoes are a leading actor of the global organism, but not well studied yet. And potential disaster risks associated with the submarine eruptions are underestimated or unfortunately, at least not well recognized public yet.

Recent cases revealed vulnerability of modern infrastructure to such submarine eruptions. We're trying to further understand the risk from the submarine volcanoes. And what we're doing is going deep.

So this is a photo that I took from the submersible last year, just before we started our dive to unstudied submarine volcanoes in Okinawa. It's an exciting walk, but sometimes it's very challenging.

It's a great pleasure for me to share my experiences to all of you this afternoon. And thank you for listening.

Thank you, thank you Mr. Danny, what a pleasure, thank you very much, man I just learned that we don't know anything 13 ,000 years is nothing well thank you very much everybody we are almost ready for sake almost as we learned, as we learned, dento, dento, kaku shin, and the most important for all of us, kyojin se, very good, I will not ask you the other nine words that we learned, it's okay, it's okay,

we had amazing sessions today, we had great innovation, a lot of tradition on what we've seen with the kimonos, it was so funny looking at your pictures, I have them wearing the samurai's and the geisha's was beautiful, some of you were shaking in the earthquake models, that was very nice, we had a lot of very diverse topics, we talk about high -tech, we talk about low -tech, we talk about insurance,

we talk about communities, we talk about issues from national governments, but also we talk about issues for local government, but at the end of the day all these different topics have something that all of them need in order to be risk -informed, it's really understanding risk, really understanding all the aspects of data exposure, vulnerabilities, how we make calculations of this risk in order to really make informed decisions with the best information we have,

we just saw the 13 -year -old, not that all, that we don't know a lot of it, but we have to take the risk and we have to make informed decisions with what we have, I also really loved the conversations that we had in the corridors and also especially at the coffee place we had there, it was on purpose, long lines, a lot of time to have chats, we had very good chats over there, so it wasn't just random,

it was on purpose, maybe let me see where we are with this, okay, I also want to thank all the UR community that made this possible, our sponsors, our partners, many thanks to the panelists that participated on this and I got some, it is random, but I got some words that I wanted to share that got stick to me during the conversation and the panelists, Shigeru Ban mentioned about Kami, the word of cardboard,

but also depending on how you make the intonation, it's God and I think the message there is how we use the information we have to really communicate and maybe convince the right thing to do in certain areas, that architecture and the use of those materials was very innovative.

As I said, the opening ceremony was innovative without being technology. It has innovation, doesn't mean necessarily technology. But technology also is very important. We had a beautiful conversation panelist talking about AI.

One thing that I learned from it, it was that AI is a human tool, so let's use it and not abuse it. The other aspect I wanted to highlight was something that was very interesting to me. I mean, what we do is something ordinary, and how can we make something ordinary?

So in times of disasters, it become extraordinary. And lastly, it was something from our African friends. It's how can we spot the light on the local communities? Disasters start a local community and end a local community.

So basically, all what we do has to have an action, and the action is at local community. And the last thing I was talking with Tsung -Won, also in the corridors, is how funny is this event that we can talk with each other, and somehow we have a connection.

It's like a napkin. There is a way that you can fold it that you will connect two dots. And we were finding very interesting connections among each other, which I hope we can take advantage of and make more and more connections.

Some statistics, because they are important and we love statistics at the bank, we had more than 1 ,500 attendees. By far, the biggest understanding risk we ever had. So a plus for you. So you should have at least 1 ,000 more followers in your X accounts or LinkedIn or whatever you have.

135 countries participated. That also is a break, very, very important. We have participation from civil society, international organizations, private sector, universities, public sector. This is big, so as you can see, we can fold this napkin and make the connections that we need.

We are going to have more than 100 technical sessions and focus days. Focus days, as I said, are going to be happening tomorrow and Friday, which are more dedicated to training, more deep technical aspects.

And of course, coffee. We guess how much coffee we have had these days. 5 ,000. Number, no? 10 ,000. Well, I guess not enough. That's my answer. Very good, and we also have a participant that was our youngest participant who was 10 -year -old.

Not necessarily from the school and the people who painted and participated in the opening ceremony. We had a 10 -year -old participating in understanding risk. That was amazing. And guess the oldest.

It wasn't old enough. We can always participate in understanding risk. You want free sake? Take your phones out and help us fill this survey. We need your help on providing a little bit of context and what happened here in Himeji for the Himeji city.

This is going to help them and see where are you coming from, how did you enjoy it, and how you enjoy this amazing city here in Himeji in Japan. One of the things I wanted to ask you also is, what are you going to miss the most from Japan, from Himeji?

Food? The toilets? I mean, the toilets are amazing, no? But I guess the connection, the connections and making friends, I think that that's very important. Among the beer, beeru, remember beeru? Very important word.

So I think that that's something that I want to remember from here, and it's another and the last word of the day. Which is furu sato, furu sato. Which means your home, your place where you feel really at home.

So each of us has their own furu sato. You're going back home, being your house when you were born or where you're working, where your family is. So we are all living around the planet. And I hope everything that you have learned today, all the connections that you have done, all the experiences that you have experienced today, you share it and you take action.

Because without action, this is nothing, no? And maybe in two more years, in the next understanding risk, we can all come together in our own furu sato, the understanding risk 26. I hope to see you there.

So this is a moment that I want to take to thank everybody that has been producing this event for you. You know, you have seen this beauty here. I'm just the pretty face, but behind all of this, there's a huge effort, a lot of hours, days, months of preparing this.

We have a great production team that is in the back. High production. Thank you very much. But there are people and I want to ask them to come because you have to see that. Mika -san, Dixie, Keiko, Mika, come on, please.

Come on, come on. Anne, where are you? Big applause. This has been amazing. It's a huge job. High five. High five. Thank you. Thank you. Thank you. Thank you. Where is Mika -san? Well, that team, thank you.

Arigatou gozaimasu. Thank you very much. This team is amazing. But everything we have done, we prepare would have been useless without your participation. So as is it that it is a tradition. We want you in the stage so we can take a picture.

So come on, get up. We are coming. Yes, everybody. No, you, you, you, you, come on. Ben, come on. We're taking a picture. From everybody. The stage is safe. It's the fire department has has approved this.

Come on, let's go. I will come here if you want. Come on. Yes. You come here if you can.

See, you can't be a good actor, but you can't be a good person.

I used to, the seas would rise when I gave the word Now in the morning I sleep alone, sweep the streets I used to own I used to roll the dice, feel the feeling my enemies ask Listen as the crowd would say, now the old king is dead, lowered the key One minute I held the key, next the walls were closed on me And I discovered that my castle stung, upon pillars of sand I can't care for someone else to ring in,

rolling down the requires of sitting

at the count of three say risk one two

Three. Three.

Thank you. We have surprises for you. There is something happening on the... What's happening, Alan? There is a party on the other side. What is that? What does it say? Karaoke? Let's go. Where is the karaoke?

Can we see it?

We are waiting for you in Palais. So is the socket.

I see, so yeah.

can make you

Everybody come on up for Risky.

It's my first time and it's been an amazing experience. I get to meet a lot of people from different backgrounds, but with the same motive of making the world a better place and also to support those in needs.

For me, it's quite special. You come here to get inspired. You come here to get inspired.

here to really get to know the people that work in a really important issues.

The sessions are very dynamic and inclusive and we get to learn as well and we also get to meet other people from all over the world with the same mission and passion that we have.

Japan is like a benchmark for everything that is earthquake design and everything that is earthquake based. It's the best place to be as an earthquake engineer.

The winner is... Battle County, Vietnam, Southern Kenya.

This award is dedicated to all the marginalized communities, all the marginalized leaders in this world. We're going to do a better and greater job in as far as our Glam County, Kenya, Africa, and Wisconsin.

Today I have learned inclusion of the disabled persons, how we can integrate some elements in our project.

And understanding how we can bridge gaps with humanitarian applications to science in such an exciting and interesting place and learning about both the history and the future of Hemeiji I think has been a really tremendous way to experience the trip here.