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What about geohazards? Building a Global Community for Hazard and Risk Assessment. I'm John Schneider.

I'm with the Global Earthquake Model Foundation. And my co -host for this session is Malaika Umi from the Canadian Geological Survey, Natural Resources Canada. This session is kind of born out of the idea that we not forget about geohazards as a major source of natural hazard risk on the planet.

We often get overwhelmed by concerns for... I wouldn't say unrealistic concerns about climate change, but it seems sometimes the idea of geohazards, and particularly hazards beyond earthquakes, are perhaps not as important.

But I think although the risks are certainly significant, we still lack some coordinating mechanisms amongst hazard scientists, among organizations to share information, to share tools, and to collaborate more effectively in this space.

So that's the objective of this session and of some ideas that we're going to put forward in this over the next hour. So I think I've already covered that. I would just add that I guess one of the things that we'd like to focus on is hazard and risk assessment capability at national level, where much of the technical capability exists in many countries.

But in those contexts as well, there's often a lack of coordination amongst institutions and a lack of mechanisms for sharing across nations, with some notable exceptions. And I think that's part of our objective here, is to try to explore those.

I'll mention we have a complementary session on Thursday afternoon, where we'll be able to dig much more deeply into some of the issues. We have about 15 speakers representing different organizations, different capabilities.

Many of those speakers are in the room today, so that will allow us to move more towards looking at how we might actually collaborate together. So now, let's see. So what we're doing today then is we'll start with a bit of an introduction, overview of national and regional global risk assessment capability across these hazards, very, very quickly.

We have a panel discussion with Renato Soledad, and Nicholas Pondard. Unfortunately, Anil Pokharel, from the National Disaster Recovery, Response and Recovery Administration in Nepal, is not able to be here due to a local crisis.

But so we have a panel discussion. They will help to motivate the discussion a bit around the need for this type of information and coordination of our efforts. Then we'll introduce the idea of a global geohazard risk assessment network.

We're not looking for a super formal network with a big capital N here, despite what it says. The idea, though, is really to try to improve communication, develop a better community of practice in this area, and just move things forward a bit.

So that's the plan for this hour. I'd like to start with then what are geohazards? What do we consider as sort of in the box? I think the most simple definition is hazards. They are hazards with a geological origin.

I think that says it fairly simply. There was a UNDRR study. Well, UNDRR and the International Science commission that looked at developing hazard definitions, and they came up with 302 hazards, largely through a very broad solicitation process, and came up with these sort of broad categories for geohazards, which boil down to seismogenic, volcanogenic, and then surface process related.

And you will see here that, for instance, tsunamis and landslides fall under all three categories, so they can be triggered by these other, you might say, more principal or direct triggers for hazards.

But it's a complex space, and there's lots of information, lots of detail at the hazard level that we, I think, you know, within a given hazard space is often well understood, but collectively the understanding of geohazards and the risk is still very fragmented.

Okay, so some of the issues, so poor coordination, I've mentioned as an issue in general, there is no, you all know there is no geohazards organization at the international level. We have organizations like the World Meteorological Organization.

We have the Food and Agriculture Organization. We have the Health Organization. We have organizations like JAM, Global Earthquake Model, but we don't have a collective representation for the broader geohazards community.

And our understanding is, I wouldn't say poor generally, but it's spotty. Some places we understand very well. And then when it comes to moving from hazard to risk, the understanding of risk is even more fragmented, and our ability to collect that information and provide risk information in a comprehensive way is often quite poor or at least fragmented.

So again, we have an opportunity to look at across organizations, see how we can leverage them, how we can leverage tools that might be used in one hazard or one area for risk assessment, how we might share, for instance, exposure data that can be used for across hazards and how we can share methodologies.

A survey that was done under the auspices of the World Community of Geological Surveys, a very informal organization of geological surveys, which has been led largely by the Canadian Geological Survey, looked at last year a survey to see how geological survey organizations themselves perceive their role and their ability to work in this space.

I won't go through each of these, but there was a general view that a fundamental understanding of geohazard is where it starts. So for us to do DRR properly, the basis in understanding how nature works, for instance, is the first step.

So just from that fundamental point, geological organizations have a fundamental role, and yet their role is, again, it's often not well placed in this spectrum. So there are a number of other issues that come up here around the next one, for instance, resilience sits across many departments.

No single department or agency feels they own the issue. And that's true across all the hazard spaces. But I think it's particularly an issue, and often geological organizations are simply viewed as a resource for fundamental hazard data, but they're not playing a role in the broader risk space.

So there are a number of challenges here, also lack of financial resources. Lack of partnerships, lack of mandates, and lack of manpower. These are all identified in these quotes from a number of individuals.

And I think in this slide, it's quite clear, I think makes clear how information from traditional geological organizations is often targeted at, if you see on the far left, the large proportion of organizations that with the data that they are collecting, the information they're developing, is often directed first and foremost to the national disaster, a national disaster agency.

But on the other side, it's much more rarely actually accessed by, say, a ministry of finance. And I think that illustrates the gap between, say, developing fundamental hazard information and actually converting that into information about risk that can be used by other ministries, either for planning or for financial risk management.

And this slide's a bit more complicated, but basically shows that you have a wide range of capabilities across organizations, starting from those that develop information, some information about hazard, but they themselves don't consider it suitable for application to disaster risk reduction, through to those that have conducted risk assessments for the whole country for these various hazards and are well placed.

So now, this isn't to say that geological survey organizations are the only ones that play a role here. I'm using this as a particular example. But if we're not including them in the process, then we're missing.

We're missing something in our ability to better understand risk. So I think I just want to point out, at the global level, there's been quite a bit of work in each hazard space. And I picked a few here.

So we have volcanic risk, or volcanic hazard in particular, information that has been collected and put together in a database through a study by the International Association for Volcanology, that this study, this information base, is available.

And it's quite a massive effort to have collected all that data. Another one, if we look at landslides, this was a study conducted by Arup a few years ago for the World Bank to collect all the information on landslide hazard and to produce a landslide susceptibility map.

This covers both seismic and hydrological sources of landslides. And if we look at tsunami, based on a study that was done for the Global Assessment Report, the GAR 2015, led by Geoscience Australia, this map for tsunami hazard was produced.

But it hasn't really evolved since then. And there's now a considerable effort to develop a more coherent and comprehensive global tsunami modeling network as well. And we'll hear about that as well on Thursday.

For earthquake, we have maps, hazard, and risk, and exposure maps, which cover the globe fairly comprehensively. Of all the geohazards, I think it's fair to say that in earthquake, we perhaps made the most progress in developing global information and mobilizing and developing capacity at national level.

But that's been a lot of work over a lot of years. Not to say that the same cooter should be done for all hazards, but I think we could integrate information better across other hazards. OK, so now I will turn it over to Malaika.

We have some questions for.

For you, yeah. So thanks for that context, John. Certainly those gaps and challenges and successes also speak to the Canadian experience. But right now we'd like to hear a little bit from you. Do you have the clicker?

Thank you. So if you get out your phones and go to [slido .com](https://www.slido.com). Sorry if I'm confusing you from the last session that you used Menti and you have to switch platforms now. But if you go to [slido .com](https://www.slido.com) and the code should appear on the screen or you can use the QR code.

And for us just to get an idea of who's in the room and interested, please respond to that question. Someone knows who punched in first there, yeah. Great, a little bit of everything. Funny how the bottom one doesn't show very well.

Great, 38, yeah. Thanks for doing that. Still moving a little bit, we're up to 40. Great. So primarily government, but a little bit of everything in here. If anyone wants to yell out if they selected other, what type of organization they're representing, if anyone's so daring.

Ah, thank you, that makes sense. All right, next question. And you can select more than one here. What is the geohazard of most interest or concern to you in your particular jurisdiction or organization?

Thank you. Okay, again, a good mix. Little known fact, but in Canada we do have volcanoes too. Great. And then the last question for now, and this is open text, but just looking at what are, you know, John described some of the challenges around geohazard risk assessment.

And this can be both on the kind of supply side or demand side, so if you were either a risk assessment provider or developer, you may have data management issues, capacity issues, or maybe you're a user and the indicators aren't speaking to you, the scale is wrong.

So please, yeah, let us know and you can, yeah, open text here, add anything. Thank you. This is great, really helpful, and yeah, yeah, and multi-hazard and early warning systems. Great, I share your pain.

Thank you. and capacity and data coming up as the highest responses. This is really interesting and something we hope to dig into and part of the purpose of this conversation too is looking at what the challenges people face are and how we can collectively face those.

Legal considerations, interesting. This is, yeah, so really helpful and thank you and I hope that this is the beginning of the conversation too and we can continue this both today and on Thursday and beyond.

But right now I am going to invite first Renato Soledum Jr. up to the stage to respond to these questions. You may have been introduced to Renato at the plenary moments ago, but he is the Secretary of the Department of Science and Technology at the Philippines.

His agency has 18 attached agencies, institutes, and funding councils and he comes from an earth science background with experience at the Philippine Institute of Volcanology and Seismology and has post-grad degrees from Scripps and the University of Illinois.

So please Renato, come up to the stage. You're welcome to sit down and grab a mic. And we have a series of questions that I can put to you directly. Perfect, so first, yeah, you can't read them. Do you want to stand here then and that way you can look at them?

Great, okay, perfect.

Okay, what is your role? I am the fault finder of the Philippines, right? Sorry, okay. They introduced me as the fault finder of the Philippines because I look for faults literally and also the various hazards.

In the Philippines, I was the director of the Philippine Institute of Oceanology and Seismology for 19 years. And in concurrent capacity as the vice minister for disaster reduction and climate change for six years before I became the minister of science and technology.

There are two main geological organizations in the country from the government, the Mines and Geosciences Bureau. They handle the surface processes. But for the seismogenic and volcanogenic hazards, these are handled by the Philippine Institute of Oceanology and Seismology under the Department of Science and Technology.

The Mines and Geoscience Bureau is under the Department of Environment and Natural Resources. Now, geohazards and risk information are very critical to our country because minus the snow, we have all the hazards that you can find.

Because of the geologic and geographic setting, we're prone to earthquake -related hazards, volcano -related hazards, and of course, tsunami, and other hydrometeorological hazards which also is an important concern for us.

Although there are two organizations handling it, we decided to contribute and share data under a program that I will introduce later. Now, hazards information are critical, but the Philippines, although it's not a very big country, is mountainous in many areas, and the hazards assessment then would be affected by the terrain and the peace and order situation in many parts of the country.

But so far, both the Philippine Institute of Oceanology and Seismology and the Mines and Geoscience Bureau have finished the national mapping of all the hazards, and now we're looking at more detailed mapping.

Of course, we should share the information right away for hazards. So individually, we share it in our own website, but in 2018, through the leadership of EVOCS, but in agreement with the hazards mapping organizations, we developed the Georist Philippines integrated platform where it became the national geospatial source of hazards information, but also a platform for having a nationally consistent exposure database so that appropriate risk assessment can be done.



At EVOCS, we have developed a rapid earthquake damage assessment system, initially devoted for earthquake risk assessment, but later on, it incorporated flood, tsunami, and even agricultural risks from typhoons.

Now, with the partnerships that we have had with many organizations like Geoscience Australia and later on GEM, the Global Earthquake Model, the risk assessment that we have conducted with earthquake and the integration of a nationally consistent database with guidance from Geoscience Australia were improved.

Hence, the Georist Philippines platform was able to create platforms that would enable people, any individual, to know the hazards that they can be affected with, all the hazards that were presented by John in the slide in less than a minute.

Either you use the GPS of your phone or you zoom in on a map and double tap the screen of your phone, an assessment of the hazards will be given to you. A summary report with QR code so that you don't fake it can also be given as to the recommendation for the hazards that that area is exposed with.

We call it the hazard hunter, but before the hazard hunter, we created an app because in general, all races all over the world are social fault finders. They find criticism on anyone, right? So we named the app the Feavox Fault Finder because people are interested to look for active faults so that they don't buy a piece of land where the fault is or they don't build exactly on top of the fault.

So Hazard Hunter was developed in 2019 and it became the national source of information as ordered by the president then. Now, we also developed the geo -analytics platform. It can actually provide you with exposure, percentage of the land exposed to virus hazards, the population by ages, by sex, or the exposure to different hazards and many other critical facilities as long as you have it in the exposure data.

Now, to promote the use of a nationally consistent exposure data, we have the GeoMapper that can be used by any local government and national government agencies to standardize the input to the Jures Philippines.

We have devised a 16 -digit code for any entry following the standards of other mandated organizations. So given this hazards and exposure data, we now move on in 2022 to the development of the automated planning for recovery.

The first part there is to provide hazards and risk assessment together with the socioeconomic and physical profile of each city or town. And because of that, then we can actually have an automated application for writing, with correct English and grammar, and all the technical details.

And the user would only look at the hazard and risk result. And then through a series of drop -down menu, they will now have a sequential way of putting in the options for intervention, including the financing and the source of the fund.

And at the end, you push a button and a recovery plan will be given for you. That actually has helped us inform the people of the hazards and the local government and national agencies on the risk. Because the hazards are just simply there and people will not really react to it until they're able to have an imagination of the potential impact of the hazard on their house, or if you're a mayor on his locality,

or if a national government leader on its people's lives or the Philippine economy. And because of that platform, other agencies are now asking us through fee walks to develop an automated planning for resilient and sustainable human settlement or for safe schools, for example.

So our experience is really, of course we want everything to be very ideal and very much improved, but people are hungry of the information. You don't need to be very sophisticated, like having a model of the risk of a building that is done by the professional, or we can do it ourselves.

But making sure that people are able to understand the hazard in their area and how they can be affected. For example, will they die? We have another app for that, HowSafe Is My House? Using an app, 12 questions, they can see if their house will collapse or not.

So crucial for us is to combine hazards and risks so that people will now understand the usability and importance of hazards and risk information. Now, having this, though, needs a lot of manpower. A manpower to train other people, and also the need to improve the hazards mapping as more scientific processes and modern way of doing things, or improved ways of doing things are discovered by many partners,

so we need to train more people, both internally in the government organizations, and of course, to train those in the communities. Now, having the global network as a partner, or a global community of practice, to assist an organization is very helpful.

Our journey, when I was the head of Pheavox and up to now, with our director of Pheavox, he's here, Dr. Bakol Kole, has been hastened by partnership with various organizations. So our effort has, built upon many of our own initiatives, but also organizations that we worked with, university researchers from various countries, and government organizations like those funded by JICA or US and Australia,

and of course, international partners like JEM. So our goal is to further improve our risk assessment, but we need to put out the information, because the earthquake, the volcanic eruption, the tsunami will not wait for our hazard and risk maps to be very ideal, but at least use the latest science and technology and innovation during that time to produce the result.

So having an organization globally is good. We have the World Organization of Volcano Observatories. It's not part of the list. We meet a lot back then when I was involved to look at hazards and risk assessment.

Science communication, of course, is very critical in all of this. So far that is what I can share with you. You can ask other questions later. Thank you very much.

Thanks so much, and there will be an opportunity for discussion in Q &A after.

Can I see Trish there?

Yeah, go sit and we'll bring everyone up at the end. But yeah, next we've got Nico La Ponder, who is a senior disaster risk management specialist at the World Bank who has a long career in disaster risk reduction, serving as the lead catastrophe specialist for the Bank of England in reinsurance for Willis -Ree and as an earthquake risk modeler in New Zealand.

Also an earth scientist, Nico's PhDs in geophysics from the Paris Earth Sciences Institute. So Nico, you've got some slides to respond to these questions, come on up. And this clicker advances them, so.

Okay, thank you so much. And thank you so much for the invitation. So yeah, same as Secretary Soledum. I'm going to try to respond to the few questions that were asked to me. And so first, introducing myself.

Yes, I do work for the World Bank. My job is to assess risk and to help government designing risk financing strategies and risk reduction strategies. So it could be building financial protection programs.

It could be investing in critical infrastructure. So of course, how important is GEO has that information and risk information for the World Bank? It's actually absolutely central. Because for us, it's the only way that we can manage risk using a risk -based approach.

So what we need is scientific evidence in order to make decisions. Because if we don't have that, we will simply rely on emotions or political decisions, and that's generally not a good thing. So generally, specifically at the World Bank, why do we use risk information?

So we use it to prioritize investments. So let's say we have a limited budget and we need to retrofit schools, but we can maybe only retrofit 10 schools out of a portfolio of 1 ,000. How are we going to do it?

So we will use risk information in order to tell us which one are more at risk, which one are more beneficial to retrofit. And so that's what we do. When we come also to financial protection, risk data is also critical to help us determining the level of financial protection is needed and the level of budget allocation is needed in order to manage disaster risk.

And finally, we use this information to select cost -effective risk financing instruments. So should the government use reserves? Should they use a loan? Should they use insurance? And so this is informed by risk data.

And I'm going to show an example. So this is an example developed by the ICRM in Singapore. So this is the Adafie platform. Long story short, risk information is crucial to get this red curve that you see on the left, okay?

So those shows the losses at vertical axis and the likelihood of experiencing those losses. So if we have appropriate geohazard information, then we can build this curve and this will help us, as I said, quantify and select the financial instrument that are needed.

So for example, for low losses and losses that are relatively frequent, that happen every year, maybe the budget of a government is sufficient in order to manage it. So that's on the right side. That's the bottom layer that I'm showing to you.

But then let's say for events that occur perhaps every 20, 30 years, perhaps this goes beyond the budget of a government. And so in that case, maybe considering having a loan is crucial. And finally, for very devastating events that occur maybe every 100 years, every 200 years, that's the top layer then.

In that case, perhaps it is good to consider how to transfer the risk and how maybe to buy insurance. And so with the risk information, we can have a measure, a sense of numbers, and we can really quantify what's the most cost -beneficial instrument.

So what are the strengths and weaknesses and application? So I think the key strengths, as I was saying, is that to me, risk information is a bit like a long wage. So it's

a common information that every stakeholder can understand and discuss on the same basis.

So for example, if you're an insurance company and you're a policyholder, you need to have an understanding of the risk that you're taking. If this understanding is not the same between the two stakeholders, then it's not possible to make any transaction or to create any mechanism that will build the instruments.

So that's the strengths of having risk information. What are the weaknesses, however? There's quite a few here. So I focus more on most of my slides on the weaknesses, okay? So obviously, when it comes to risk information, risk data is scarce and sporadic, and particularly when it comes to geo -hazards, because geo -hazards occur at a frequency that is very low, you know?

And I just can't count anymore the number of discussion I've had with people who are telling me, oh, there's no volcanic risk here because since my daddy was born, there never was a volcano, when they're actually living on a volcano.

I'm personally living in the city of Auckland, for example, and there are 60 volcanoes in the city of Auckland, New Zealand. Each time I meet a New Zealander, they are surprised that there is a volcano, when I tell them there's a volcano.

They just don't know. It's just crazy. Why? Because they didn't experience it. And so we need data, and we need geological data. We need an historical record that goes over thousands and thousands of years.

And this is lacking, and of course, this impacts the development of appropriate risk assessment. Then, of course, there are issues around the hazard. So I'm an earthquake scientist by background, so I'm giving examples.

I'm not necessarily enlisting them all, but it's very difficult to be able to identify every single fault in an area, or to know the history of each of those faults. Of course, this creates gaps in the knowledge.

When it comes to exposure, we tend to model the risk as it is today. The problem is that cities grow over time. In 20 years, 30 years from now, cities will be very different from what they have. But we have to make a decision now.

And so it is important, and the decision we're making now will have an impact for the future generation. So it is important for us to anticipate those dynamics. And this is something that's not necessarily well done right now.

Finally, when it comes to vulnerability, so generally, when there's a disaster, the focus is really to go on emergency response, saving lives, and that makes sense. But we don't necessarily record, actually, the impact and the damage of those events.

And as a result, there's a scarcity of information in that area. And so all of that combined leads to a risk, is that, as I was saying, risk information is crucial, risk models are essential. But if you over rely on this information, if you don't understand the limitation of this information, you will make a wrong decision.

And basically, it's like thinking you have a great car, like this nice Ferrari, when actually you have just my crappy Citroën right there. So that's very important. So I'll finish with the last slide.

So of course, do I see value in a global community? Yes, of course I do. I think, I'm just giving a few examples where I think there is value. First, I think there's a need for a consistent approach on risk data standards.

Every single academic institution tend to build their own model, and the data standard is generally different. As a result, it's very difficult to communicate information or to have consistent risk assessment.

But you need to be able to compare bananas with bananas. And so, this is, I think, very crucial. Of course, there are potential operational cost savings, you know, if maybe there's joint or forces, you know, for some management of data.

But for me, the most important point is that I think a community is good because it helps building a story, actually, around the need for geohazard information. And I think a good example, the geohazard community could take is from the climate change community.

The climate change community, they've been very strong at explaining to decision makers what are the potential impact of climate change in the future. And as a result, I mean, I know there's still a lot of difficult decisions and it's not going as fast as we can, but at least now everybody knows there is a risk for climate change.

I think when it comes to geohazard, we should be able to do the same thing. So, I'll stop there. Thank you.

Thank you so much, Niko. And again, we'll have time for questions shortly. I'm going to share a little bit about the Canadian experience now and talk about some existing networks. So again, my name is Malaika Almi, and I am the acting director of the Pacific Division of the Geological Survey of Canada and the manager of our National Natural Hazards and Climate Change Geoscience Programming.

So we traditionally, and for decades, worked in natural hazard assessment. So just seeking to better understand the extent, magnitude, and likelihood of the various geological hazards, creating peer -reviewed publications that were generally read by other expert users contributing to things like national building codes.

However, this left a gap. It wasn't being very well placed in other realms for disaster risk reduction and resilience decisions. So we sought to place our knowledge and information and decision -making frameworks that could be used and applied for resilience.



So we did that thanks to partnerships that we certainly had to partner with municipalities on the ground, emergency managers. And we needed expertise and capacity to do that and lent on partners like the Global Earthquake Model and like others, including partners in other countries like FEMA, for example, to help us understand some of the work they had done with Hazus.

So through this collaboration, we have developed tools specifically for emergency managers and planners and have partnered with and developed networks both domestically and internationally to help position this knowledge.

And some of this, and John spoke to this a little bit, through the world community of geological surveys, which again is an informal association, which membership is a low bar, basically requires a letter of intent.

We convened a series of three -hour workshops last, so February of 2023. One on looking at kind of what, who are the enablers in the space who's needed to come together to work on natural hazard risk assessment.

Another one on the science and technology behind natural hazard risk assessments and a third on the actual disaster risk management space. And these materials, the webinars are all available on YouTube and there's a link from the American Geosciences Institute.

So from that too, spawned a subcommittee of WECOGS is what we call the world community of geological surveys. So we struck a subcommittee on disaster risk reduction with the objectives that you see there.

And I'm hoping that through conversations today and on Thursday, we can forward some of these objectives. So we can move forward through a broader network perhaps in fostering collaboration and linkages, in sharing best practices, in fostering capacity development and generally like looking at each other at governance structures that have enabled effective disaster risk management.

So hoping that some of you here in the room today might be interested in taking part in such a network so that we can do this, develop coherence to take something that Niko said, maybe we can take our fruit salad and all create bananas.

I don't know if that makes sense to you. So just looking at sharing capacity, sharing methodologies, sharing data, creating a space to better move forward and better learn from each other. We certainly have learned a lot from partnerships and collaborations, but we have a long way to go as well.

So with that, we invite you to join us on Thursday, Thursday afternoon for that session, where you'll hear from a large number of people on what collaboration has meant to them and how we might move forward to collaborate in this space.

And I'm gonna invite you again to bring out your phones and go to Slido .com.

Hm.

This is still the first poll. Thank you. Yeah, I wonder what. I can't even forward, I can't move the slide forward. Uh, if you want to go away. Sure, go for it, John.

Maybe while we're waiting for the slider to work. A follow -up question for our panelists. Renato, as you know, we've worked together for a long time. And I think it's been evident to me in the Philippines, the organizational structure around the collaboration across institutions has been fundamental to making things work.

Of course, you had a major role in making and helping make that happen. But I wonder if you could make a comment or two on how important that organization has been to actually being able to get to where you are now in the Philippines with developing the geohazard information with informing communities.

How important is that governance for you?

Unlike many other countries, we don't have many geologists or engineers who are working with us. But the positive thing is we are the master of the others. Only one organization. We are not first place.

Sorry. Good, I was not recorded. The Philippine Institute of Oconology and Seismology is an organization that handles monitoring, hazards and risk assessment, community preparedness for all geological hazards.

So we can actually combine hazards and risk assessment and warning altogether in the same messaging. And like, for example, in Indonesia, we have three counterparts. In Japan, you have a committee and JMA.

So we can actually really push a program that is consistent all throughout different administrations. Second is the National Disaster Risk Reduction and Management Council. We have been sitting there for quite a while.

And one good thing is the minister or secretary of the Department of Science and Technology is the vice chair of the Prevention and Mitigation Pillar. And we provide hazards and risk assessment and guidance to other partner agencies, like on the public works, on mitigation, on the risk transfer for the Department of Finance.

So the understanding that hazards and risk information are critical for other government agencies to do their job is well defined because of the structure. And the National Disaster Risk Reduction Management Council is replicated at the regional level and down to the provincial level and down to the city or town level.

But the Department of Science and Technology is down to the province level. And VIVOCs is not. It's a national agency. But one good thing is since we're one department, they can actually invite the specialists from the VIVOCs to go to the provinces or towns if needed.

So that has been a very good support. And in fact, even the partners like the US and Australia and other groups look at the National Disaster Risk Reduction Management Council structure as the major government organization to work with.

Because we have, as part of the government, we have decided that we will look from the perspective of multi-hazards. So it's not simply geologic hazards as defined. But we also look at other hydrometeorological hazards.

So the Office of Civil Defense is part of our team. Whenever we have a program, civil defense, we ask them to be partnered with us. And the support organizations like the National Mapping and Resource Information Authority, which provides the base topographic maps and new information from satellite images, would also be the ones providing us with the latest information.

We learn from each other. And one good thing is when we started to really share the hazards and risk information to the whole country, we have the project ready. And if we're not there, the other government agencies can explain for the community the role that we have.

So it really adds on to, it complements to the manpower from other government organizations. So that's why I think having a group to work together, although you might have different functions, will be very beneficial for any country that would go down to the community level.

Thank you, Renee, thank you very much. I have a question for Nico. You made a comment about that the geohazards community could learn from the climate change community. I think it's an interesting point.

Because I think from a risk assessment point of view, from a quantitative risk assessment point of view, perhaps the geohazards community, and maybe particularly the earthquake community, has done more in that space.

However, what the climate change community has been doing, as I think you mentioned, has been doing storytelling, which may not be as quantitative, but it is perhaps more understandable. Maybe you could, and that is to the general public, so maybe you could expand on that thought.

Yeah, no, absolutely. And I agree with you. So from a technical point of view, I think the geo hazard community has been more advanced and more mature, and other communities from other perils have learned from them.

The problem is that there's a difference between doing good science and then making a decision. And in order to make a decision, particularly in our space, in order to develop our science and do risk management, we need funding.

In order to get funding, you need to convince a donor. And so I find the climate change community has been good in building this narrative of this absolutely essential issue that is climate change, of course.

But the geo hazard, I think it has been a little bit to the detriment of other hazards. And in a sense, geo hazard, even though it's still present, it's not necessarily as well -funded as it used to be.

And you may find difficulty. And I think it's fairly easy, actually, to build a story. People need to remember that more than 50% casualties from natural hazards come from geo hazards. And so this is a compelling argument to say, hey, we need to invest in this science in order to then be able to make a decision.

So that's the distinction I'm making between the science itself and then the decision that comes.

Actually, it's not a bad thing that the climate change hazards are getting well funded because that's less understood area. I think as a geoscientist, part of the issue I have with that is that it's perhaps gone too far in one direction.

And so oftentimes, for instance, from a gem perspective, we learn about projects that have been defined in a climate change space. And then we get a call that says, oh, yeah, we discovered these guys have earthquakes, too.

Maybe you guys could help us. Or maybe you have data that you've already collected, or studies already been done for geohazards context that could be used. And so it's this kind of thing, too, I think maturing of the processes and the risk assessment is all part of it.

Do you have your slides going?

Can you actually, can you go to this last one that they're, we're running out of time, I'm just, yeah, perfect. Thank you. Is this mic, oh, there we go. So yeah, if you are interested in being part of such a network, again, this is informal.

We're looking to collect your name and email address so we can be in touch and try to further this conversation. But I think while you're putting that in too, if you have any questions for any of our panelists, please, we wanna leave people with time to get to the next session, which is meaning you'll probably have to leave in a minute.

But please go ahead, put up your hand and we'll welcome that. But also wanna remind you again, please join us on Thursday afternoon in the Focus Day session to continue to have this conversation. So yeah, of course your names and email addresses are not gonna show, but we will collect them and be in touch.

That's it, yeah. I didn't do the other two because we didn't, we're out of time. I mean.

May we have time for one or two questions or comments from the audience if you have any or for the panelists?

And other networks that we should consider too, I know we were talking about data and John and I acknowledged to the Global Resilience Hub as a great source of hazard and risk data and who have done some great work.

So just looking to what else we can consider and how we can move the conversation forward.

Bye. Michael.

I have a comment related to this potential conflict between geo hazard and climate change. Because in our experience, there's also a lot of common ground that maybe we should try to leverage from when we are designing the projects that then are implemented.

For example, all the part that is related to the exposure should indeed be approached in a multi hazard dimension rather than a perspective that is just looking at earthquakes or climate change. And also in terms of the calculation of the risk, there is a lot that can be done that is using an approach that is completely agnostic from the hazard on which it's based.

So that's probably a more, let's say, positive perspective that we should try to do.

Yes, yes, no, absolutely. And if I can clarify, I was not trying to oppose the two, you know, I was just saying there's good lessons to learn from the community. And yes, you're right. I mean, me as a risk manager, I need to deal with all hazards at the same time.

So no, no, I'm just saying it's good to learn from people. I'm not saying.

Any other comments?

I think one of the important challenges, I have been doing this one in several Asian countries, risk assessment, multi -asert risk assessment. And one of the biggest challenges is the capacity of the people in the ground.

I mean, I have done some world being project, very large project, but many those results goes to the implementation level. This, the government, they're not sufficiently educated enough to absorb that information and do something mitigation level is meaningful, right?

So many of this kind of risk assessment are not fully utilized. So I think capacity building awareness at the ground level, at the local level is very, very important. Otherwise, I think you will not be able to get the fruit out of it.

Thank you.

Thank you, really good point, and that's why also we are looking to expand this network. We had the World Committee of Geological Surveys, but want to make that more broad and make it practitioner based as well and ground it in what's needed on the ground to make those decisions, kind of placing the knowledge in that decision making framework for people on the ground, certainly, so thank you.