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The word of the day is satori.

Satori. That means alignment. That means you close your eyes and find that peace of mind. Even though we are going to talk about airquakes. And that has many people awake at night. After this panel, we're having, again, more presentations.

Take pictures if you want. The agendas are outside as well. There are two different sessions, and we are going to have a coffee before at 11. There is a break where you can share your business cards and contacts, and then we come in at lunch.

But I would like to introduce the moderator of this panel, who has gone through a lot in the last years on this issue of airquakes and not been sleeping at night because of it. Let me introduce Humberto Lopez, the country director for Turkey.

And I will ask the panelists to come here so we gain a little bit of time, and Humberto will do the introductions. Thank you, Humberto. This is it. Thank you. Thank you. Thank you, Humberto.

Good morning to everybody, and welcome to this session with the title Richard, Resilient, Richard with Tea, Advancing Seismic Protection Worldwide. I have the honor to moderate this panel, and I have three distinguished speakers with me here.

They are Dr. Takara, who is the head of the National Research Institute of Geosciences and Disaster Risk Management in Japan, Dr. Solidum, who is the Secretary of the Department of Science and Technology of the Republic of the Philippines, and Dr.

Crowley, who is the Secretary General of the Global Earthquake Model. My name is, as Joaquin was mentioning, Humberto Lopez, and I am the country director in Turkey, and

perhaps some of you are wondering why a person that is not an expert in disaster risk management, unlike the three distinguished speakers we have here, is moderating a panel.

But it's not only on the past few years. Again, I think it's in the last 28 years that I have been in the bank, I have had a share of exposure to natural disasters, some of them earthquakes. And the last one was the one that affected Turkey on February 6, 2023.

And perhaps some of you are familiar with the impact of that earthquake, which left more than 50 ,000 people dead, and recovery and reconstruction needs of around $100 billion. Just to put it in context, this is about 10% of the country's GDP.

And I think that most of us, when we go through an experience like that, we start thinking what we could have done in the past that had minimized or mitigate, in some sense, the effect of a natural disaster, the effect of an earthquake.

What are the type of things that you can do to basically mitigate the impact of events that are not preventable, not events that you don't know whether they are going to happen. More likely they will happen, but you don't know when, how, and so on.

And looking ahead, we start wondering about how to build resilience. What is that we need to do in the future to, once again, to the extent that these events may occur again, what are we going to do to minimize the damage.

This session is about that. It's about reflecting about the lessons that we have learned in the past from our involvements in earthquakes or different or similar natural disasters. It's about reflecting about innovation and what we are learning.

What are the things that we can do differently now with the knowledge that we are acquiring in the different gears, whether this is related to the response or to engineering, to new materials that are appearing in the market.

It's also about thinking about barriers, is what is preventing us from implementing this type of lessons that we have learned in the past. And it's also about thinking about the next steps once you take into account that you have lessons that are going or aiming at reducing risk, that you have barriers that in some cases are going to be preventing you from going ahead with that, and that there will be also the possibility of having to decide about the next steps bringing all together.

And I'm emphasizing these three parts, because I think that when we start looking about building resilience, there are three different dimensions. One of them is the technical dimension, which is probably the most natural for a geologist, for an engineer, in many cases for an expert in disaster risk management.

And this is related to the technical specifications that perhaps you need to implement when you are going to be having new construction, when you are going to be in a new building. These are related to what is it that we need to do to retrofit existing buildings, if for whatever reason we think that they are not up to a level of resilience that we are expecting, or we think that we need to have there.

And this is in many cases related to deciding in which areas of a city, of a community, of a country, you can build, or you cannot build, and if it's decided that you want to go to a particular area at risk, deciding what are the type of intervention that you need to implement there so that you are going to be building in a safe way.

So this is one part, and I'm pretty sure once again that from a technical dimension, this is extremely complex, and still I was talking to the panelists before we were coming to this event. I was saying, for me, working in operations, for me this is a given in many cases, because there are two areas that for me are even more complex.

One of them, and I would refer to that, is as the institutional dimension, and it related to how you coordinate different teams in an administration, and how you coordinate not only the teams in the administration, different branches of government.

And I was thinking that perhaps from a technical perspective it's decided that in a particular city, a hillside is unstable, it's really at risk, and you have a significant number of people living there.

This is something that happens in many emerging countries, and that sometimes the minister in charge of natural disasters and the minister in charge of organization are going to have different objectives and clearly are not going to be seen with the same eye and do not want to pursue the same direction.

Or even if this administration is totally convinced and they are well aligned, you may have different branches of government. The administration may decide that the group of people in the hillside have to relocate, and at the same time, you have the judiciary that is going, in their call for due process, is going to basically paralyze some of these actions.

There is a huge thing called trust. Yesterday in the opening ceremony, people were talking about trust, and they were saying how difficult it is to gain trust and how it is to lose. And in that particular context, I think it's extremely important.

And when you are talking about trust, you have two different directions there. You have trust between the scientific community and the politicians, and then between the politicians and the population.

Let me return to the hillside example that I was mentioning before. You know that if you are going to relocate people from a hillside, there is a huge political cost. If you trust the urban planner, the scientist that is telling you that you have to move these people, you are going to have second thoughts because of the political cost.

But I can tell you, you don't trust the scientists that temptation is going to be to ignore that. So building trust between the scientific community between academics and politicians, I think, is critical.

But after that, you need to build trust between the policymaker and the population. Because when you are trying to move these people from the hillside, they are not going to trust the reasons why you are doing that, and they are going to start giving second thoughts to what you are doing, perhaps because they think that you are going to favor a particular person in the country that is going to make,

could be potentially making money in a particular in construction that is going to be a big issue. And finally, there is the need of communicating to the people. Many times we fail to explain carefully to people that are not going to have the ability to understand complex messages in a way that they can understand and why they should be moving from a particular area, you know?

And clearly, being aware that if you are relocating them, you have to have a plan for them. And finally, there is the third dimension, which is the financial dimension. In Turkey, after the earthquake of last year, we started looking at what would be the cost of building resilience for the infrastructure that was there before 2000.

In year 2000, there was an earthquake in Marmara. And basically, after that earthquake, the building costs were changed. But there is quite a lot of stock of public infrastructure and private housing that was before 2000 there.

We did the numbers. And the estimate of the cost of retrofitting these houses and this public infrastructure is $1 trillion with T dollars. This is 100% of the country's GDP. So how do you do this? How you are going to ask people that in many cases, they are credit constrained, meaning they cannot borrow to make the changes.

They cannot save to have resources to make in the retrofits to do it. These are the type of questions that go well beyond the technical part and well -distitutional part, because we are talking in some cases from a staggering amount of money.

So it's not just the what to be resilience. The how you go there and the how much is going to cost us. And if we don't pay attention to the how much and the how the what is going to be the first leg of this table that is going to be limping a little bit.

Let me stop here and go now with our panelists, who are those that know about building resilience. And I will go with a couple of questions to each of them. Let's try to keep it to around 10 minutes each, and then we move from there.

So let me start with Professor Takara. And clearly, Japan is a country that is well known because of the high risk it has for seismic events. And at the same time, it's a country that is a world leader in risk management.

So let me come with two questions. The first is related to lessons, where I was mentioning the first part of the concerns. What are the lessons learned in Japan over the years that have helped build resilience in the country to the level where we are?

And the second is related to the bottlenecks. What are the bottlenecks? What are the barriers that Japan has to overcome to basically be where it is today? Professor Takara, floor is yours.

Thank you, Mr. Rapes. I appreciate this opportunity. My name is Takara. I'm president of the National Research Institute for Science and Disaster Resilience, NYED for short, Japan. I'd like to first express my condolences and the sympathy to the victims and people affected by the not open insular earthquake that took place on New Year's Day, January 1st this year.

My organization, NYED, is a national research institute with about 150 researchers conducting interdisciplinary research on different hazards, including earthquakes, volcanoes, tsunami, floods, landslides, and snowstorms, as well as on disaster issues that are seen in all phases of the disaster management cycle.

Japan has experienced many major earthquake events which can be traced back to 100 years ago, a Great Kanto earthquake in 1923, Hanshin Awaji in 1995, Great East Japan earthquake in 2011, Kumamoto earthquake in 2016, and this year, the not open insular earthquake, just name a few.

Through the experiences of the events, NYED has developed and has continued to strengthen its observation systems that can monitor all of the land and seas in Japan for earthquakes, tsunamis, and volcanic activities.

NYED's Network Center monitors these activities, utilizing the MORAS system. MORAS stands for monitoring of waves on land seafloor system that acquires real -time data, including those acquired from our 2 ,100 seismographic stations installed across Japan.

During and after the not open insular earthquake, data obtained from MORAS was instantly used to monitor and analyze the earthquake events. NYED's other research divisions also initiated analysis for possible cascading disasters, such as liquefaction, land rise, snow damage, and structural damage caused by the earthquake.

NYED has also been supporting the government and the central government, the general public, by dispatching a disaster response team called ISUT ISAT. ISAT stands for information support team. We have also been consolidating and disseminating disaster -related information through our information products, including BOCI CrossView and ISAT site.

We had just shared our activities related to the not open insular earthquake. At the online knowledge sharing session yesterday, at the U .R. 24 venue, you can still see the recorded session at our exhibition booth located at the Japan Pavilion throughout this week.

As Japan anticipates and prepares for the Nankai -Trough catastrophic earthquake and Tokyo inland earthquake that are expected to take place with high probability within the next 30 years, our effort at NYED to serve our society for disaster -related years continues by learning from the past and predicting the future throughout our science.

With this said, I look forward to discussing more which my esteemed fellow panelists and with the participating audience today. Thank you very much. Should I answer your questions, Rita? Please, go ahead.

Now? Okay. I think... Just a minute. So I think the awareness and the preparedness is very important. Of course, it is said for many years. And this conference team is understanding risk. This is very important.

And as an example, 1950s and 60s, we were hit by strong typhoons. One of the strongest typhoons was Isewan typhoon, which killed more than 5 ,000 people in the year 1959. After it, the basic act for disaster management was concluded in 1961.

Then our organization, NYED, was established in 1963, more than 60 years ago. And then many infrastructures were built to cope with storm flood disasters. Nowadays, flood disasters kill people who less than 100 per year.

In this sense, preparedness for floods has become better. So infrastructures are OK. And people know the risk of floods. However, some people still don't evacuate when warning is issued. They are aware of the risk.

But the awareness is not linked with actions. They are not ready to take proper actions. Some people said in 2018, when the wide area of flood disasters happened in the western part of Japan, a lady said, oh, I did not imagine actual flood come to my house.

She knew flood has a risk map. But she has no imagination of disasters. She aware of the risk. But she didn't take proper actions. Likewise, the understanding risk is very important. And as I told you, infrastructures are already strengthened for seismic motions.

Buildings are strengthened after COVID earthquake in 1995. And we are managing the nationwide observatory systems for earthquake tsunami and volcanoes. So infrastructures and the information systems are OK.

But the important thing for people is to aware of the risk and prepare to the risk and take actual actions when something happened. And in Japan, currently, social problem is very highly aged society.

30% of the population is already more than 65 years old. It is called super -aged society. So such super -aged society is very vulnerable to the disaster events. And the society is very much advanced in terms of information systems.

So advanced information system is very important for disaster management. However, aged people or handicapped people cannot make use of such highly advanced information systems properly. So this is also a social problem.

So this is kind of a recent land in Japan. Thank you very much.

Thank you very much, Dr. Takara. It's quite interesting that you were mentioning that even in a country like Japan that we consider an example of how to do things, there is still the issue of how to convince the population to take action even in the midst of a natural disaster.

So I can imagine, as I was mentioning, in many countries where trust is not at the level of the magnitude that you have in Japan, how these things are. Thank you, thank you very much. Let me move now to Dr.

Solidum, and I also have two questions for you, and feel free to start with a few reflections, general reflections if you want, but let me start with the first question would be the governor of the Philippines is working with the World Bank now in a project to increase seismic resiliency in Manila and to improve preparedness.

What are the lessons that you are taking for that project, and what are the parts that you think are positive, what are the parts that probably are not that positive? And also a second question is the Philippines is also pioneering the use of tools for risk assessment.

Can you share with us some of the good practices that we can support to other countries?

Thank you. The project that is being mentioned by the moderator is the Philippines seismic risk reduction and resilience project. It's still being implemented, but let me just share with you the story behind the successful proposal and acceptance of the Philippine government to work with the World Bank.

When we look at resilience, we look at not that definition of resilience, we consider the technical, institutional, and financial requirement, but we need to pin down what are the three operational goals that you want to achieve in any project to achieve resilience.

The first goal is to reduce the impact or reduce the risk before the hazard would occur. And that would mean that information on hazards and risk are shared to the whole community, from individuals to family to the national government.

And impact scenarios must be developed so that people are able to imagine the disaster that can happen if we don't do anything. Second operational goal is to have an efficient and effective response, and that would mean capacity building and preparedness must be done at the individual to the national level.

The third is if you are able to lower the casualties and if you lower the impact, the buildings, the properties, the businesses, then the scale of the disaster that you will see is much less if you don't do anything.

Therefore, with a scaled down impact, you can have a fast recovery, and that's the third goal. The Philippines seismic risk reduction and resilience project built upon two major studies conducted in the Philippines which looked at the most at risk metropolis in the Philippines, which is the greater metro area.

The first study was conducted way back in 2004 with JICA, the Department of Science and Technology to the Philippines Institute of Oconology and Seismology, and the Metro Manila Development Authority.

The second study conducted in 2013 with the DST -FIVO and Geoscience Australia. These two studies showed that metro Manila, which is home and the greater metro Manila area with the regions 3 and 4A added into it, is composed of around 28 million people, the home of our economic centre, contributing to around 60% of our GDP, and if a magnitude 7 .2 earthquake, we expect around 50 ,000 casualties right away,

around 25 ,000 very seriously injured, and in metro Manila alone, the direct impact to building damage is around 50 billion US dollars. So with that scale of impact, the whole Philippines can be directly and indirectly affected.

The Philippine government has decided to really focus on increasing the resilience of metro Manila, and we outlined more than 100 action plans to be developed and implemented at the community up to the national level.

So this project is focused on two major operational goals. The first is to be able to reduce the impact before the big earthquake happens, and that would mean that we need to focus on public buildings.

As public buildings were estimated, 10% of the public buildings would be heavily damaged. So we focused on schools and hospitals. So the Department of Public Works and Highways is the lead organisation in partnership with the Department of Education and the Department of Health in consultation with the Department of Science and Technology, which I actually lead.

That is the first, to retrofit schools and hospitals. The second is the capacity building of the public works and highways to immediately respond after a major earthquake, and their main first role is to ensure that roads are cleared and bridges, if still usable, are possible, so that response teams have ready access to collapsed buildings, and second, to link the responders to hospitals, which are still usable.

So capacity building is very critical for them to be able to respond right away, and that would include procurement of graders, bulldozers, and making sure that the public works and highways would have an operation centre that will be able to monitor the events happening within metro Manila and the surrounding area.

It's still being implemented, but I'm very positive about it, because as a result of the project, another project is on the pipeline and focused on strengthening and retrofitting additional school buildings in metro Manila and other major cities in the Philippines.

And these projects, again, are born out of the scientific results on hazards and epoch assessment done by the Department of Science and Technology. Now to answer the second question on the innovative tools that we have developed in the Philippines, for people to accept that they need to do certain action, whether you're the father or you're the mayor or the governor or the president, you need to imagine the consequence of any hazards in the Philippines like an earthquake.

So to do that, we have developed initially in the mid -2000 the rapid earthquake damage assessment system that can quantify the impact. But these would use certain training and we need to develop an app that is available to every individual.

So we established the GeoRisk Philippines Initiative, a geospatial platform that can collect, share and analyze hazard and exposure data and be able to show the risk. An application that was developed was called the Hazard Hunter, where you can tap the screen of your phone and all the hazards that can affect an area can be shown to you in 30 seconds depending on the speed of the internet in the area.

Second is the geoanalytics that can analyze the exposure to any hazard per village, per town or per province. We need to develop a nationally consistent exposure database. So we also developed the GeoMapper.

Once these three applications were done, then the next step was to develop an automated planning tool on how to recover after a major disaster. So you can actually prepare how to recover or how to respond with that tool.

But we started with the recovery because there are existing disasters that happen in the Philippines and the brand name is called the PlanSmart. So we have the PlanSmart ready to recover. Just type the name of a city, everything will be done for you, the

intervention will be dropped down menu, you push a button and the recovery plan will be written for you.

Then you look for the financing. So the next step is for the assistance for banks like the World Bank to guide us in developing an investment plan so that we can see how much we need, where we can have an impact to our mitigation efforts.

So the PlanSmart ready to rebuild has been worked out together with the Department of Science and Technology, the Office of Civil Defence and the World Bank and because of that success, we're developing a PlanSmart for sustainable settlement, a PlanSmart for land use planning, a PlanSmart for ready to respond, a PlanSmart for safe schools and so many others.

So in the end we envision that we will provide an automated planning and these are used by the national government agencies and more importantly the local government and they can now imagine the impact that can happen in the area and the possible solution.

Thank you very much.

Thank you very much, Dr. Solidum. Two points that I take from your intervention is how, in the Philippines, you are looking at the problem in a very comprehensive way and touching on many, many issues.

But second, something that I think is critically important and sometimes is forgetting is the capacity building that is needed at the country level, because if you don't have the capacity, that can be a big issue.

Let me now move to Dr. Crowley. Once again, if you want to start with a few reflections, perfect, but two questions for you. One is related to the partnerships that the global earthquake model, the GIM, has been building over the past few years, how you have been using these partnerships.

And the second part is related to what are the key areas of change that are still needed taking into account that as we continue talking about building resilience, we continue seeing the devastated effect on many of the natural disasters, the earthquakes.

Over to you.

Thank you so much. So it's an honor, really an honor for me to be here on this stage with my esteemed colleagues here and to tell you a little bit about GEM, if I can spend a few minutes just to explain GEM, the global earthquake model.

So it's now 15 years old. It is a nonprofit foundation that's based in Italy. And it really grew out of the OECD's Global Science Forum. So a number of countries in the Global Science Forum came together and discussed the need for a global initiative that's looking at earthquake modeling and bringing together many countries.

We've been going, as I said, for 15 years. And our mission is to develop transparent tools, methods, and data for earthquake seismic hazard and risk assessment. So we have an open source software called OpenQuake.

And we are focusing a lot, indeed, on capacity building when it comes to the OpenQuake engine and training people all around the world to make use of this software for running hazard assessment and running risk assessment.

We also focus a lot on open data, on making data and models openly available, and that transparent knowledge of how we calculate seismic risk around the world. For us, we've been a good partner with the World Bank from the beginning.

I remember in 2010 that being at the Understanding Risk was the very first Understanding Risk Global Forum, which was in Washington. And GEM had had quite a key role there. We had our annual meeting.

And it actually led us to meet some software engineers and some really innovative people who helped us to really kickstart that open source engine, that OpenQuake engine that I mentioned. Another thing, when it comes to partnerships, is that GEM is a public -private partnership.

So we combine both the public and the private sectors. We have public partners, which could be from civil protection departments or geological surveys, universities, research centres on one side of our governing board.

And then we have the private sector, which is from insurance or insurance industry typically, but also engineering sector. And I think that public -private partnership is very important, bringing together those two sectors to understand the needs, sharing knowledge, and really making sure that we're covering the full range of needs from risk mitigation, considering building codes, but also emergency response,

but all the way to using disaster risk financing and insurance. So this public -private partnership is really quite a unique feature, I think, of GEM. And from the beginning, partnerships have been very, very important.

And we've worked with many scientists and academics around the world to develop our global hazard and risk models. So we have now a global seismic hazard model, which is really a mosaic of a number of hazard models from around the world.

And it's through those partnerships and through those collaborations that we've been able to establish this global model of hazard. And I'm particularly pleased to be on the stage here with colleagues from Philippines and Japan, because they're two countries where we have had quite a long history of collaboration.

With FIVOX, GEM was involved in developing, together with FIVOX, the National Seismic Hazard Model for the Philippines. That's been used in the Seismic Design Code. And I was hearing earlier about many other uses of that hazard model.

Also in Japan, with NIED, we have a strong and long collaboration of working together, especially on National Seismic Hazard Modeling. And I think being here at Understanding Risk, we're looking forward to sort of developing the partnerships going forward.

So we do have a booth and we invite you to come and speak to us and to discuss how we might partner together for the next 15 years or more. I think the second question you asked me was about we're seeing very devastating earthquakes in the past few years and what needs to change for us to potentially reduce those losses in the future.

I think everyone knows the expression that earthquakes don't kill people, but buildings do. Maybe I could specify that to say earthquakes don't kill people, but poorly designed and constructed buildings do.

We've seen that in Turkey last year in the earthquakes that the buildings that have been designed to the code, that have been properly constructed following the regulations, they're not having those pancake collapses, they're not causing catastrophic death and destruction.

As engineers, we know how to design buildings to avoid those very brittle catastrophic mechanisms of failure. I think it's quite obvious to say what needs to change is that we need to be enforcing design codes, both for our new buildings, but also for our existing building stock and retrofitting buildings.

What we've done at GEM is that we have also looked at low -cost solutions to retrofitting buildings, solutions that are not changing the cultural practices, let's say, or the traditions within countries, and looking at benefit -cost studies to see how that has an impact on the reduction of the impacts of earthquakes by implementing, as I say, these very simple low -cost solutions to retrofitting.

It's important to look at not just the economic impact in that case, but also to look at the reduction in injuries, in fatalities. We're even looking at the reduction in environmental impact. Maybe I'll come back to that in a moment, but we, as I say, we focus a lot on

demonstrating through our models the impacts that what we are changing in the built environment can have in the future.

Thinking more towards new buildings and the future of new buildings, we have here with us an initiative called Tomorrow Cities, and I invite you to meet the colleagues of Tomorrow Cities. This is another partnership that GEM has with Tomorrow Cities, and they've really highlighted to us the future of our cities, and thinking about how in the next 20, 30, 40 years we're going to see a massive increase in urbanization,

that we're going to see migration of populations from rural areas to cities, we're going to see more people as population increases, and so we're going to be building a lot of buildings in the next 20 to 30 years, and so it really is an opportunity, we have an opportunity to change the future, to really affect the way that the earthquakes will impact us in the future by focusing on introducing those building codes,

and so what we are again doing at GEM is to try and forecast what the future might look like, so forecasting future exposure, forecasting future scenarios of what the vulnerability of buildings might be if we do nothing, or if we do actually retrofit or improve our building stock, and I think through this we can start to show what could be the positive outcomes of intervening today, so we can see a reduction in the future,

and I mentioned environmental impact, our built environment, our construction sector, I think is responsible for, if I'm not wrong, around 40% of global greenhouse emissions, and so another thing that we're doing at GEM is to really try and estimate the embodied carbon of our built environment, so we have models for exposure, global exposure models of the buildings around the world, and we're estimating what is the carbon,

the equivalent greenhouse gas emissions coming from the materials that have been used to construct those buildings, the production and the end -of -life demolition of those buildings, and then we can use this information to look at what's the environmental impact of earthquakes and other natural disasters, because these events are causing our buildings to be damaged, we're repairing and replacing them,

and we're causing more greenhouse gas emissions, so one thing we're looking at is to demonstrate the environmental impact of earthquakes, of other natural hazards, and also how we can in the future through more sustainable methods to design and construct buildings, actually reduce the environmental impact.

I think this is just another incentive that can be used to encourage governments and policymakers to actually build back better and to improve the building stock. And just maybe a final comment on communication, and I think it's not just about governments having to enforce seismic design codes, but I think we also need to communicate to the individuals the importance of the safety of the buildings that we live in,

and we need individuals to be demanding and to really be worrying about the safety of the houses that they live in, in much the same way as we worry about the cars that we drive, we care when we buy a car that it's safe, we think about the safety of our children, and I think we need to also be communicating well so that people are thinking about the safety of the places where they live and work, and I hope in these two days to meet many colleagues and again make partnerships of people that are working a lot more in this space of communication than we are at GEM to see how we can make a difference there.

Thank you.

Thank you, Dr. Corralle, to take on your intervention as well. The first one, I think, is that Gen can be an asset for all of us, to enhance resilience in all the countries. And you were making a call for people to reach to you in the corridors of the forum.

The second is something that I also take with an smile, which is the efforts that you are making for low -cost solutions to some of these problems, because in many cases, this is one of the bottlenecks.

I'm not going to try to summarize what the three speakers were saying, because I would be able to come with many more questions and spend a long hour here discussing with them. But what I'm going to ask is all of you to reach to them in the corridors if you have an opportunity.

I think that you are going to be able to learn from the experiences of Japan, from the spirit of the Philippines, from the global experience of year. And let me ask you for a round of applause for all the three speakers.