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You are here to discuss the 2022 monsoon floods as they happened in Pakistan, one of the most destructive floods in recent human history.

Killing more than 1 ,740 people and shattering the lives of millions across Pakistan. And really, our heartfelt sympathies and condolences for all the victims and people affected. More particularly, we will zoom in the floods as they happened in the mountainous valley of Swat, which is located in the northwestern part of Pakistan in the Khyber Pakhtunkhwa province.

My name is Matthias Bachmann. I'm from the Swiss Agency for Development and Cooperation. I'm with the Climate Disaster Risk Reduction and Environment team there. I'm a development practitioner, and I'm interested in DRR mostly for its linkages to poverty reduction and sustainable development.

So what are our objectives today? Our objectives are really threefold. First, we want to understand why those floods happened. Secondly, we want to find out why the floods were so destructive. And thirdly, we want to identify measures to ensure that similar such events in the future do create less havoc and damage.

So recommendations for building back better. We will do so having a closer look at an event, Flood Event Analysis, which was commissioned by the Swiss Agency and the Federal Office of Environment after actually a rapid operation that we undertook and proposed to the authorities in Pakistan, rebuilding schools, rebuilding water distribution systems, and also building suspension bridges.

So thereafter, we approach the authorities of the Islamic Republic to do such a study in collaboration with the national and provincial disaster management authorities, as well as the National Center of Excellence in Geology of the University of Peshawar.

So we will first hear from the lead author, Christoph Lehmann. We will then have two distinguished experts, which are Mr. Mohammad Shafik from the University of Peshawar and Naraya Karasco from the World Bank reacting to the study.

And then we will open for question and answers. And please note down your questions and comments already doing the presentations if you can. We really would like to have an exchange with you, if possible.

And then we will end with concluding remarks by Dr. Kaiser Imraam from NDMA, the National Disaster Management authorities of Pakistan. So now it's really a great pleasure for me to introduce to you the first speaker who will join us live from Bern, Switzerland, Christoph Lehmann.

He is with Lehmann Consultancy. He has over 25 years of experience in disaster prevention, hydrology, and hydraulic works. His passion, let's say, is really to understand floods, their linkages to river morphology, to sediment transport, and hydrology.

So his aim is really to support people to reduce the impact of such floods. With that, Christoph, live from Bern, Switzerland, please take it away.

Thank you, Matthias. I would like to talk about the event analysis of the 2022 monsoon floods in the Swat Valley, Pakistan, that we had done last year. The video in the next slide gives an impression of what the event was like.

Thanks for watching!

Not only one building collapsed, there were hundreds of them, and many people died during the flood. You might wonder why we did such an analysis. We have to learn from the event. We have to understand first how the event unfolded before we start to recommend any measures.

Above all, we should know what processes have been involved, what caused the damage. We also have to find out if there is a residual risk after the event. And finally, as we know what happened, we can start to recommend measures.

Looking at the right side of the slide, we see the Swat Valley as a quite small era in Pakistan. It is a mountainous and very crowded era. About 2 .3 million people live there. The era is about 5 ,000 square kilometers only.

Before going to the field, it was important to gather as much information about the era and the event as possible. Data is an important factor. Unfortunately, there were not many data around. We got data in the graph we can see here from the University of Peshawar.

The graph shows the annual peak discharge of the Swat River. Measurement started in 1961. Besides the 2022 event, there was one of the same magnitude in 2010. Yes, we can recognize in the graph there.

Later during our work, we learned that there was another event of the same magnitude in 1929. So we had actually three events during the last 100 years, the last two very close in between 12 years. So the question was, if this event in 2010 influenced this event of 2022, and we will see this in the next four slides.

As we can see here, a small town called Vankial. This photograph was taken 2009, just one year before the 2010 floods. We see a small river. This is a main river. This is Swat River. We see a tributary river, and we see that houses, settlements are constructed close to the river, and also the fields are close to the river.

And now we had one year later, this event, 2010, and the picture shows after this 2000 event that everything has vanished. The houses has been gone, the fields have been gone, and the river has taken his floor, his space he needs all the time, again, like it had maybe hundreds of years ago.

A few later in 2017, buildings have been reconstructed at the same place as before. You can see this where it is marked in red. And then after the flood of 2022, we see almost the same constellation again, like in 2010.

The buildings have been vanished, and the river again has claimed his space. On the photo, we also see that there was a huge amount of debris transported and accumulated by the Swat River. An important part of debris was transported into the Swat River by debris flows.

The University of Peshawar calculated about 300 ,000 cubic meters of this debris flow at the Ariani place. On the photo, we see that there was a huge amount of debris that was accumulated. At the right picture, you might see humans, less than two meters, and the accumulation was finally up to more than 15 meters.

As such huge amounts of debris come to the river by a sudden input, and temporal time was formed and upstream a lake was formed. That means that debris will be accumulated in the lake. The riverbed will go up with the effect that settlement there and the fields will be flooded.

But once the dam breaks, the water of the river goes downstream and the road banks and destroys infrastructure. Like we see is the houses and the road. You might see the house there just at the bank, the road and bank, and you might see and you're sure that these houses cannot be used anymore.

People had to go out of it. And we see also the road of the Swat Valley that was completely washed off and they partly reconstructed it so that traffic might move. In our space, a little bit more in the south, we have a small town of Bering.

And I would like to show you with this picture that was taken in 2004, four points. Point eight, you have to see there is a small rock. And remember that rock for the next slide I will show you. And point B, we have the difference between the river and the settlements and the house.

And the point C, you might see the first floor. There have been restaurants, there have been small businesses in there. And point D, it's important. Just check point D and the background. We have the landscape, how it looked just before the two floods of 2010 and 2022.

Now, next slide was taken last year. And as we remain with point D, we just see that the forest has just almost vanished. And we see that point A, this rock is now almost in the water. The difference at point B between the river and the house have completely vanished, has gone.

There's no more difference that just the river is now at the height of the settlement. And C, in the first floor where the restaurants were, where the small business were, just flooded and under water now.

So what was actually the effect? In 2010, we already had quite a lot of debris accumulated. But we need quite a lot of discharge to reach this damage line, to reach the houses, you know. But after the 2022 event at the right side of this slide, we see that a lot of debris has been accumulated again.

On this debris was accumulated in 2010. 2022, we had a lot of debris again. But it needs a small discharge in 2023 in the following years, just to reach the damage line. So what is another effect of this?

This graph shows actually the time down and the left side, the discharge, we need to reach the damage line marked in gray. The longer the arrow, the blue arrow is, the more discharge it's needed to reach the damage line.

That means the settlements, the flatter settlements. And at the right time, as the bed level with these accumulations will be a delivery, the higher these accumulations are, the less discharge we need to reach the damage line.

But this has also effect of the recurrence interval of damages. As we have the left side maybe, we have every 50 to 100 years, we have a risk of damage. But at the right side, this has gone to maybe 10 to 15 years only.

So just to see in the future, we are seeing the risk of damage has increased dramatically. But we can not only blame nature for, human also is a problem. I see this picture, I show you this picture here taken in Kalam before the 2010 flood.

Kalam is a nice place in the north of Swat Valley, and it's a touristic place. People go there, have vacation, it's a beautiful landscape. Next picture, I will show you what's taken last year. You know how it looks now.

In between, people have gone and they constructed in the riverside, all their constructions, their buildings, and many hotels have been constructed in there. And you can see the risk, of course, is done also by human.

This human nature conflict is very high in the country because we have a lot of people, and it's a mountainous country, and people cannot go anywhere in this site. They have to construct near the river.

So what is actually the problem? It's just what I mentioned already. You know, people are going to do, are constructing their buildings. The flood comes, and people build it at the same place again. And after the flood of 2022, building will be reconstructed at the same site.

But there is a law already existing since 2001. It's called the Northwest Frontial Province Rivers Protection Ordinance. And this law is not known, but if it was known, people will not follow this law.

So we have this problem actually of this kind of knowing people have to go into the river. And we see for the question if the residual risk is high, we have to say yes, it's very high, as we consider it is riverbed agrodations and the bank erosions.

You remember when I showed you the picture with these houses that were on the bank and were partly destroyed and people cannot live in there anymore. So we have actually some conclusions. I think the first important conclusion is that an event like we had 2022 and also one we had like 2010, these kind of events are too big to control by human.

We cannot go with small measures a wall here, some damn there just to control this event. The event is too big. Nature is too big for us. We cannot really control this. We have seen this 2010 flood influenced the 2022 flood.

Remember of the riverbed degradation, the erosion. You remember the picture I showed you when the 2010 flood already made the bed for this 2022 bath. And we have seen that the spatial conflict between human and nature is quite big.

Remember the slides I showed you in Kalam, people are going to construct inside there and it means that in the future we have more damage to fear. And as that we say, actually the potential risk in the future for damage has increased.

We have also to think that population is growing. It's growing by many percent per year and it's a question of where do the people go. They will go to the risk areas. And the last one I think is important that we know that data is missing.

We just had two weeks to do our study. It's a very short time. So we were not able to answer any question. But if we like to do any study in the future on our modeling, it's important that we have data.

So I'll come to the recommendations now we've done. And one of the most important is that we have a capacity exchange, a capacity development and a knowledge exchange. We have to know about in Pakistan, they're a very high class university.

They're on a world class, they have scientists of international level. So everything is actually there. But I think it is important that we can learn from them from their experience and we have maybe some experience we can also share with them.

So I think it's important that we have kind of a knowledge exchange and that can intensify this knowledge exchange for the future. But it's not only this one, not only we have the scientists, we have the engineers of this level.

But there is a gap usually to the people down that needs help, you know, the people in the provinces, you know, that maybe engineers working there, but the people that are at risk that we can also share our knowledge with them.

It's not only a problem in Pakistan, it's a worldwide problem that there is always a big gap of what we know that the sciences know, engineers know, up there universities know, but it doesn't go down to people that really need it.

So we have to try to intensify this. And something else is important that we have to try to do our multiple hazard risk mapping. What do I mean with this? We have to reach the political level. We have to show at the politics, you know, who is in risk, who is high risk.

So we can go to a community and do a risk mapping. We can show maybe we have 100 houses halfway at high risk, maybe 50 houses are in medium risk. So we can really show what's on with these problems they have in their country.

And as I mentioned already, for future studies, it's really important that we have data. Of course, there are data by satellite or whatever, but we have to verify all data by ground station. So it's needed that we have ground stations of our precipitation measures, that we can also measure discharge, as I show you in the graph at the beginning of my talk.

And something else is important, but we have more coordination in the river management. You see here two walls, maybe one rich man at the left side of the slide has constructed this second wall there, this stone wall, and derived the water directly to his neighbor.

So it's important that we have an authority that could really coordinate river constructions. And last but not least, a sustainable forest management is important. We have seen the picture, you know, where this forest almost vanished, and it's important that we can really do a forest management.

This will not prevent any kind of large events, but it could reduce sediment erosion and sedimentation. So I think this is also an important issue. So, ladies and gentlemen, thank you very much for your attention.

If you have any questions later on to me, my email address is indicated here. And there is a download, there is a report you could download for free, and the link is indicated in there as well. Thank you very much.

Thanks a lot, Christophe, for this very insightful presentation and for highlighting the challenge which we have in this very narrow valley, not much space, the difficulty to bring such an event under control by humans which is merely impossible, but also for highlighting some measures for building back better which we can further deepen in our conversation with the other colleagues.

Now I would like to introduce the second speaker, Dr. Mohammad Shafiq. He will join us live from Peshawar, Pakistan and let me first say Eid Mubarak. It's a very important holiday in Pakistan today and particularly grateful that you take the time to join us here.

It's really thankful for that. Shafiq, you are an associate professor at the National Center of Excellence in Geology at the University of Peshawar. You are also the director of the GIS and Space Applications Laboratory.

Shafiq has really two decades of experience in multi -hazard assessment in GIS and remote sensing, particularly also for geohazards, natural resource management and exploration. He's a principal investigator for many national and internationally financed research projects and his current focus is on the beautiful mountainous areas of northern Pakistan.

So, live from Peshawar, Mohammad, you have the floor please.

Thank you. Thank you, Mathias. Good afternoon and good morning from Pakistan. Thank you very much. I will just try to be quick on what has happened in Swat and why actually it's been happening. Let's go back to the history of Swat.

Swat is the, as Tristan already mentioned, it's a district in the north of Pakistan. But topographically, it's quite rough terrain. We have rough terrain there. And climatically also, it's a monsoon season.

So monsoon means that you have the most of the rain actually in one of two months that caused the floods. So climatic, I mean historically, Swat is also prone to a historic flood like in 1987 we had a big flood, 1982, 2001 and 2010.

But if you look at these numbers, I mean, as Dr. Christopher mentioned, there's a gap between these. But what we have seen in recent past, because of the climate -induced global warming, present temperature that triggered the melting of glaciers in Swat, and also the changing pattern of precipitation, the flood frequency has increased significantly.

In last almost three years, we have seen the flood almost every year now. As Christoph mentioned, in 2002, 2022, we had a big flood even in that year that caused many damages. A lot of people would be killed.

In 1923, we also had the flood in the same region. And even this year, what we have seen in this year is also quite astonishing for us, also surprising. In 2024 year, we see a big climate change. We didn't get, usually we get the snows actually in December and January that got solidified in this February and March.

But what happened this year, we had no snows in December and January, and we got the ventilated snow in February, which is not, didn't get time to solidify. And then in April 2024, we got the highest rainfall since 1961.

So highest rainfall we got in this almost 50 years. And then we had heat waves nowadays. I mean, just yesterday, we had the heat, but that was the warmest day of the whole year so far. But that's what actually we've seen.

So we had the rainfalls and then followed by heat waves. And then also we had the flood warning in 2024 also. So you can see the frequency has increased significantly. But we are seeing the floods almost every year.

But before, with that also, climate and human interference also had changed the changing nature of the hazard. Initially, we had all new floods there. But now with the human interference, like Christoph Penscher, there is a cutting of forest upstream, human exposure to the disaster that has actually leads from the flood into debris flow and land start.

And if we look at the impact of those, it's quite significant. I mean, the flood, maybe the hazard we can sustain. But in debris flow, it just vanishes everything that comes in the front. So the impact is quite significantly higher that day.

But the worst part is concerning the climate projections that show there would be increase in precipitation also. And also we would be shortening of the months of season. And also the land use change patterns because of the exposure into the flood pair areas, population increase.

The human, the flood induced risk would be also higher in the coming picture. But plus with that also, we also see a big climate change. There's also human which are also responsible for this disaster and what the repellent is.

And as all the Christopher mentioned, I mean, this area. We even look at the maps here. We have mapped the flood plain, which is the active flood plain in that area. But if you

look at the second map that we've seen, which shows the houses that are built right inside the flood plain.

So we are seeing that because since it's a touristic spot, most of the hotels actually trying to build close to the river. But when they close to the river, I mean, they're actually building the hotels and the restaurant right inside the flood plain.

So and that because if there is a big even, even a big, a normal flood even happen. All these houses, all these buildings, all these hotels are completely flooded. And that's the same you can see in the picture on the here.

And we see the situation before the flood. We are seeing that actually the river and the roads and hotels are built inside the flood plain. And when there was even a mid -level of flood, all these roads, all these hotels are being banished away.

So the humans also have to play a big role in this case to increase the vulnerabilities of infrastructure and also the community to the flood. And as we propose here, and also mentioned by Christo, one of the problems in district SWAT is that it's been frequently affected by the floods, but there is very less data.

And that's why what we propose, that's what we plan to install a dense network of hydro -metallurgical sensors to help us monitor the climate, help us monitor the weather, the changing patterns, also how much discharge is happening in that area.

And we can use that data coming from those sensors into the AI at physical targets based comprehensive flood and debris flow warning. That will tell us why things happen and in which aid can be inundated in different levels of the discharge.

And that will also help us very significantly to do the risk analysis, preparedness, and also early warning. And unless we don't have this sensor to count this data, it's hard to do this warning right now in that area.

With that, because the area is not prone to only a single hazard, like only the flood, we have seen that in the area, we have seen the increasing occurrences of the debris flows. The area is also seismically active.

What actually records a very big earth with that area. We're just seeing the increasing occurrences of the land site. So because of those multiple hazards, we propose there should be multidisciplinary.

It's not only science. We also have also the preparedness, also the policy guidelines. So multidisciplinary, multistackholder, and dynamic multi -hazard over liberty risk assessment. Why we call them multi -dynamic?

Because the climate is changing in that sense. We are seeing that there would be increase in temperature. There will also be increase in precipitation. So we want to do the modeling, the multi -hazard warning, considering the future climates.

Probably what is happening now might not be applicable for two years from now because look at the high frequency of changing the climate. So we want to understand how the future climate will look like.

And based on that, we can do the multi -hazard liberty risk assessment looking at the future climate. Plus, we also propose there should be nature -based solution, or that's the management. Basically, there are good studies where they have tried to stabilize the slope.

They have tried to degenerate the forest to slow down the erosion. And that will really help to stabilize the slope and also causing the damage. With this, public awareness is critical. Because if we do science and we don't take the public on board, probably we'll not get the result that we expect from it.

So we strongly propose the public should be involved, the community, the policymakers, the local government, and also the national government. They all should be taken on board by developing those policy to help disaster management activities.

With this, also, the last proposal we have, that there are buildings in that area, portals. But unfortunately, they're not following the engineering guidelines. So we also propose to the government also, we've tried to talk with the government also, to ensure there is a engineering guideline for disaster resilient buildings, for building a hotel industry, and also to help building a build -back pattern.

We'll just always talk to you. We'll be looking forward to take more questions, if they're awesome. Thank you. Thank you very much.

Thank you very much, Shafik, also for highlighting additional points, the whole question of land use, changes, the challenge of population growth, but also for highlighting the linkages to climate change, which appears to identify the magnitude and frequency of such events going forward, so that's an important consideration to take into account, of course.

But also, thank you for highlighting additional measures, also in the area of disaster risk management, the interplay of different levels of government and institutions, as well as the natural -based solution, which is, I think, a topic which is very much discussed here also at this conference.

Before opening for question and answer, we have a third speaker, Naraya Garasco, she is here in the room, and Naraya, please, yes, join us on the stage. So Naraya is a senior disaster risk specialist with the World Bank, the Urban Disaster Risk Management Resilience and Land Global Practice, before she was also working at GFDRR.

Naraya has over 15 years of experience in disaster risk management, mainstreaming disaster risk management in different sectors. She currently focuses on Haiti, a country in the Caribbean, of course, which is very prone to different kinds of disasters, but Naraya had assignments in different parts of the world, including also, for example, Central and Western Africa.

So Naraya, I'll join you here on the floor. Thanks again for being here. How are you? Is your mic working? I think you have to. Yes. Great, yeah. Naraya, well, to start off, I just

would like to ask you what are your main takeaways from this study, particularly with regard to building back better and the use of this kind of event analysis for the prevention and recovery phases.

Thank you, Matias. Thank you for inviting me to this session. And just like also a little background, before I used to work also for SDC and the SUS Corporation in Switzerland. So that's why we have the connection and just reminds me of my time in my former life when I was working for the SUS government.

And yeah, so these studies particular because we are used to having analysis assessments mainly for assessing the damages, but not really understanding what really happened during the event. And we can see here that it is really important to not only assess the damages and how many losses and damages we had and monetary terms, but it's also important to know what really happened in nature in the valley itself.

And we can see that the 2010 event already changed the morphology of the river with all these accumulation of sediments, increase the bed floor, creating actually a higher risk. And then when you had the rain in 22, there was the conditions to have a higher impact.

And I think that is very important to notice that depending on what hazard we are assessing, that previous event can really have an impact and increase the risks that we have. So now the Suede Valley is probably very particular because it's very narrow and people are living in that very narrow valley.

There is not enough space to really go somewhere else to settle and have your buildings and houses and living there. But I think for the, this study is probably very important for the government of Pakistan because it really show how past events can influence future events.

And it's really good to understand that because that is increasing the risks that we have now. And now with all climate change, we are having more rainy events, but in this situation, we don't need like a big rainy event or a big flood to have big damages because the river bed is already very high, as you mentioned in some of the images.

It's impressive to see that before it was like several meters below and now it's just the water is just on the windows of people. So that's something that needs to be considered in everything related to not only building back better, but also on the prevention side.

There was mentioned all the land use regulations and enforcements of all these laws that exist since 2001 or 2002. And probably that all these policies, they also need to be reviewed because probably now the situation that for morphology is different.

And then maybe these 200 feet that they indicated you don't need build, you need to build further away from those 200 meter from the river. But now maybe that's not even valid anymore. So you need to change your policy according to what was changed in your reality where you are now in the valley.

So that's why it's very important to understand what happens and how those previous events influence future events so they can really inform decision making at the level of the government, but also people around that they really need to understand that probably living in those areas is maybe not possible anymore.

And then it's a big change to think also culturally people who lived there for so many years and suddenly they realize that living there is too dangerous or you need to move up in the mountains or change.

I mean, it's big changes and big decisions that people living there and government authorities needs to make.

Thanks a lot, Naraya. You have mentioned the event analysis as an instrument. And I was wondering, at the World Bank, you post disasters. You have different instruments that you are applying. I mean, the most famous perhaps is the post -disaster needs assessment.

So there's various great, I think, rapid assessments to assess the damage of the post -event. So what do you think, what is the niche for kind of a labor -intensive, on -the -

ground kind of study like this one in comparison to other approaches that the World Bank uses?

In particular, with regard of informing the recovery phase.

Well, this is, I mean, this is very different from this PDNA or post -disaster read assessment because the objective is totally different. Now, PDNA and all these rapid assessments is to really have a picture as quickly as we can of what are the damages, the losses, and how much it will cost to rebuild which are the most affected sectors.

It is usually housed in most of the cases or in transport or energy education. So that has a different objective. Here is really to understand the process itself, how the hazard influences the rain, the rivers, I mean, the morphology, how everything changes and how this influences the building up of more risks in this case.

But I think that it's good to do this kind of analysis to really better inform all the disaster risk reduction measures that we need to put in place. And in terms of labor intensive, you said, I mean, these PDNA's, they are done with the government, all the sectors, the World Bank is involved, the EU is involved, the UN is involved, is a huge exercise.

And the other, you mentioned GRADE is a faster analysis, a method that was developed also at the World Bank in GVR that uses more global data, existing data, and to try to quickly also in less than two weeks to have an idea of which ones are the most affected sectors and how much it will cost to rebuild so that donors and the government can start planning for the reconstruction.

In this case, you did a very, also very quick assessment in two weeks. I understand that it's based mostly on expert knowledge, but you also use satellite imagery and you have drones, and the University of Pasha, I think, was also involved in some aerial pictures and you analyzed it with what was available at that time.

So I think it's still valuable, even though you said there is no really data from the event, but at least you were still able to assess and provide an interesting, a very interesting

result, saying, like, hey guys, here the risks are higher, you need to consider this, very fast events have influenced the future events and thus will continue in the future.

So I think it is important, even though with little amount of data with what was available and expertise that you have in Switzerland with Peter Lemann or others, it's really important because you can very quickly have an assessment of what happened and then inform decision -makers.

And I think this is very valuable, especially because in developer countries we don't always have all the data we want, nothing is really available, in some cases it's more complicated than others, but it shows that it's possible to do when you have the right expertise and you know where to look for available information and so it's possible to do it and that's high value, I think.

Thank you very much, Naraya, for highlighting the use There's one question which is still bugging me, which is, it seems that at the heart of this disaster has been this whole question of student transport, of erosion, of riverbed aggregation.

And then this dam creation and so on, so my question there is, I mean, and with the understanding that this kind of event, as Christoph said, cannot be brought under control by humans, actually, Christoph, I was just wondering, is there any measure that you can that can prevent this sediment transport and riverbed aggregation in the first place, or is there realistic approaches?

you know, which are feasible in such a context. I know that, you know, in some places, It was also, you know, you go with the river bass. Once in a while, I know it takes them to do it, you know. This is a kind of

Mattias, can you hear me? Mattias, your sound has gone.

Sorry about that. So, do you hear me now?

now, you're back now.

Yeah, sorry about that. We had to switch microphones. My question was, at the heart of this disaster was really the sediment transport, the aggregation of river bands, debris flows, et cetera. And my question there was, is there a way to prevent that from happening so that the riverbed doesn't increase in height?

Or is there perhaps a way to, once the riverbeds are increased in height, that we can lower it again? I know in Europe, and as you know also in Switzerland, some valleys do that. They lower the riverbeds once the sediment transport was too considerable.

Do you think that would be an option in the context of the Swat Valley?

Well, we have to see actually what is the eras, you know, as we compare Switzerland. Switzerland has quite small eras, small catchment, actually. If you have a small catchment, maybe 10 square kilometers, you might control.

You can do sediment traps, whatever. And if you control your sediment in the side valleys or in the sediment traps, you know, less sediment will go in the main river. But as we have a large era in there, you know, we're talking about 5 ,000 square kilometers.

And very huge, a very large river. So this kind of control is not really possible because, you know, we have such amounts of sediments. We have talked about maybe 300 ,000 cubic meters coming in one event, as I showed this example.

And it's really too much to control because this was just one example. We had various of these debris flows taking sediment in. So actually, it's nature and this cannot, in my opinion, cannot be controlled.

Thank you, Christoph. This is just a point I wanted to clarify. Before opening, actually, for questions, if there are any in the audience, comments, questions, please. We have several. Start with you.

Sorry, please introduce yourselves shortly before you ask your question.

Good afternoon. My name is Jerry. I'm with Asian Desert Reduction Center. So I just want to go back to what you mentioned in the beginning as the objective. One is to understand why, and then second is why it's so massive the impact of this flood.

And I think that's the point where I didn't get some of the results. Why it's so massive the impact of this flood.

Shafik, do you hear the question? Can I address it? Why was the destruction so massive? What is your take on that?

Yeah. Thank you very much. It's quite obvious. I wonder if one of the reasons that I mentioned earlier that I mean, usually we had the floods there, but because of the last few years of the humidity, actually of the cutting of the forest, we see a very high rate of erosion.

That has actually leads to the debris flow. So from the flood, now we see the debris flow and debris flow with a very high intensity and also high velocity. That will vanish everything. That is one. So we have grown our flood.

We have floods plus the debris flow now, which has a higher velocity. Secondly, there is very high exposure. As I mentioned in my talk also that most of the, but most, but actually there are a lot of hotels, construction roads built right on in that floodplain, an active floodplain.

So even if there is a mid level of rainfall, actually triggered the erosion, debris flow, and then the flood. Even if mid level of flood, the house is built inside the floodplain, the roads, the hotel, they actually vanish away.

I mean, they're fucked away. And that has actually caused the intensification of the damages here.

Thank you, Shafik. We have the next question.

Yeah, hi, this is Deboure from the Climate Center of the Red Cross. I had one comment, I think something that came out after the 2022 event was also the fact that climate change had a major impact, there was an attribution study done that found that it was multiple times more likely to have this amount of rain due to climate change compared to pre -industrial levels, so I think that's relevant to mention.

And I had a question for I guess the panel speakers, you really clearly explained a lot of the physical dynamics that led to exposure of communities in the Swat Valley, but we also know that of course there's other vulnerability drivers, such as displacement and also large refugee populations in the broader area, also given the pre -Afghan crisis just before the floods happened, was this something that came up for you in your analysis and how can we better connect these sort of physical studies with the understanding of vulnerability of communities as well,

especially those that aren't captured in some of the data and assessments.

Thank you very much for bringing in these new considerations also of displacement and the Afghan population. I'm not sure if anybody is particularly keen to answer this question. Maybe Shafik, again, I mean, you live in Peshawar, which is on the doorstep to Afghanistan, and you're very much familiar with all this dynamics, IDPs in the in country.

So maybe you could answer this question, please.

Well, thank you very much for bringing it up actually, because if you focus on the general Pakistan, yes, I mean, IDPs has a big issue because of, you know, this movement, because of multiple reasons, terrorism, climate change, also the lake of water.

But if you focus on the swath, actually, we didn't find that issue very big. But of course, there is a big problem actually. People who were used to live in the upstream of the area because of the melting of glacier, they don't get the water now.

So they're actually moving to the down country, down, down balance. So everybody wants to live next to the river, actually. And that has called the internal displacement inside the valley. So if they move in the valley, there is no safe place.

I mean, because I would not say there is no safe place, but actually, mostly they tend to live in the flood plain, right, because close to the river. So that includes their exposure. Yes, because of the internal displacement of moving from upstream into the valley, they increase the exposure to the hazard.

That's one of the reasons to increase the vulnerabilities. But generally, people coming from Afghanistan, we see very few people coming from Pakistan. Most of the action people are locals. So they belong to the area.

But of course, they tend to live in the valley of that exposure and also their vulnerability to the hazards.

Thank you, Shafiq, for these clarifications. I have the gentleman there.

Yeah, thank you very much. And thank you very much for putting together this very interesting panel. Thank you for for the panelists. My name is Thomas. I am with the anticipation hub. And I actually have three questions.

So the first is to the aggregation. This is something that we observe every time when we have just a massive rainfall event. Is that is that correct? Because I'm not so familiar. The second question is also, do we see this aggregation then throughout the entire riverbed?

Or is that having peaks in some places and others remain at the same level? That will be the second question. And the third question, what do we observe in the past one and a half years since 2022 in terms of reconstruction going back into this 200 feet or not?

So what are we observing since then? Because I mean, it's an impossible choice. I mean, it's my livelihood versus my risk. And I mean, we see that so many times. So what are we seeing since then? Thank you very much.

Thank you very much for these interesting questions. Maybe the first two questions. Christophe, I hope you heard them. So the question is, is this riverbed agradation happening each time we have lots in the valley?

And also, if there are differences along the river in this agradation, I mean, there are peak areas and others where the agradation is less pronounced. And then the third question I would then like to ask again to Shafik, perhaps, what you are closest to the Swarpe Valley.

So what have you seen in terms of reconstruction since the disaster in 2022? Christophe, first to you.

Yes, thank you for the question. I think the first question was, if this accreditation happens after every rainfall, I think it's, finally this is a morphological river, morphological problem, you know, there are accredations happening at special, at special places in the river, you know, you have to have a less, the river has to be quite wide, you know, the river has less slope, whatever, then you have this kind of accreditation.

If it happens in any kind of rainfall, that depends, you cannot say in general, it's the same, because, you know, you have a large event and then we have at the special places in the river, we have this kind of accreditation, but we have decades or years or decades to come, you know, this accreditation might be washed away by water, by and by, so it depends a little bit how it is and what kind of rainfall it is,

so we cannot actually generalize it, that every rainfall we do any kind of aggregation, so it depends the space. And the second one was, if the, if there are special places for riverbed accreditation, is that correct?

Yes, that's the question. You know, if there are differences in different parts of the river in terms of riverbed aggregation, Yes, of course.

You know, exactly. You know, if you have a long river, you know, we have maybe hundreds of kilometers of a river, this water river, you know, from all North to South, you know, and it changes all the time.

We have, you know, we have sections, we have a gradation, we have sections, we have erosion. We have also sections that nothing happens, that, you know, no erosion, no, no aggregation. So that changes.

So we can actually go and map riverbed sections. We believe that they will have erosion during a large event and we can map sections. We believe that will be a gradation. So as we have seen in Kalam, there is the typical a gradation section.

So I mean, if you're going to construct your house in there, you always have to fear that it will be flooded, you know, because the riverbed will stay at this kind of stage at that time. And then there is, as in others, and more in the South, if the slope is a little bit bigger, you know, large slope, so we have more erosion.

You can map these sections, if you're sure there's erosion. So there are typical parts of the river. You can already say, okay, we'll have some degradation or erosion. This is possible.

Thank you, Christophe. Shafik, very shortly on the reconstruction question, please.

Yes, if I just make one comment on the previous question, I mean, yes, there are some specific watersheds where we see a lot of erosion, of course, a lot of degradation. I

mean, so that can be very easily mapped and defined and also we can know the reason why there is erosion.

Coming to the post disaster situation, it's quite unfortunate. I mean, the problem is that we know where we had the flood pin, but we've seen the reconstruction actually also happen again at the same location.

And so that's why we're saying that there has to be a strong enforcement of the laws that stops the construction of the building and infrastructure right in that active flood pit.

Thanks a lot, Jafik. We're actually advancing in time, but I have one more question for Naraya. And we have heard by Christoph also the need for capacity development. Now, this has been like a study undertaken by a Swiss expert, and it was really a great study.

But ideally, this kind of study could be undertaken as well by the local stakeholders. So we could localize this kind of approach that local stakeholders can undertake such studies autonomously. With the experience you have in different contexts around the world, in Haiti and elsewhere, what do you think is needed for that to happen, that this capacity can be put in place?

Thank you. Well, that will depend on the country we are talking about because probably Pakistan have bigger capacity, more capacity than Haiti or other countries. It depends where we are, but if we have countries where you have universities, I think it's a good place to start in building that capacity or professionals so that they can improve their knowledge and their expertise.

But I mean, that needs the awareness and the willingness of the governments and universities to take on this challenge and also partners to support increasing that capacity, because that's very important.

And in the long term, it's better if each country has a capacity to do these kinds of assessments. But I was wondering also that even if you can use, if you have data grade,

if you don't have data, but still it's important to have a systematic approach when you do these kinds of assessments, especially if you're using human expertise.

So I was wondering, it would be interesting to have the approach that you did if it's possible to develop some sort of guidelines or some sort of basic checklist to follow. I mean, if you want to have a systematic approach and analyzing these based on expertise, what does it mean?

What are the things that you were looking at so that you make sure that even if it's based on expert knowledge or even including communities, they also know the region and with past experiences, if it's still possible, because climate change, of course, is changing the whole scenario.

But I mean, it would be interesting to take like different approaches to increase that capacity. But I mean, of course, it's important that universities are involved and with the support of different development partners and also the willingness from governments to take this challenge on.

Thanks a lot, and that's a recommendation I'm gladly taking back to my colleagues at headquarters as well. With this, actually, I would like to introduce our final speaker who holds concluding remarks.

It's Dr. Kaiser Imron. He's from the National Disaster Management Authority, NDMA. As I said, NDMA closely collaborated in this study. Dr. Kaiser Imron is a manager of methods and evaluation there. He's particularly within NDMA, part of the National Institute of Disaster Management.

Dr. Kaiser Imron, Ithma Barak to you as well. Great thanks for sharing your time here today. Please, live from Islamabad, you have the floor.

Thank you and welcome for this special evening for us. I'm Dr. Keshan Raun, Director of Research in National Institute of Disaster Management, NDMA, Pakistan. So you know

very well NDMA, the National Disaster Management Authority of Pakistan, is undergoing a significant transformation of reactive to proactive operation in disaster management.

This shift aims to enhance the county capacity to anticipate and mitigate the impacts of natural and human -induced disaster living in the lawns, technologies, and comprehensive planning. You know, we have taken some proactive measures like National Emergency Operations Center, a state -of -the -art facility has been established, equipped with satellite feed, softwares, and artificial intelligence tools to create a national common operating picture.

This will enhance digital risk assessment early warning systems and preparedness strategies. We have policy and planning the NDMA's formula to the National Disaster Reduction Policy and the National Disaster Management Plan.

These policies aim to maintain disaster reduction into development processes, improving national resilience against potential disasters. Utilizing modern technologies, including AI and satellite data, to better predict and respond to disasters.

This approach allows for more effective assessment and early warning systems, crucial for timely evacuation and preparedness. There is an emphasis on collaboration with federal and provincial stakeholders as well as international partners who reuse disaster risk, enhance preparedness, and establish swift response mechanism.

The NDMA's strategies include resilience infrastructure, development, improved disaster preparedness, adherence to building codes, efficient water use, management, sound agriculture practices, and increase air frustration.

You know, we have developed the new warning of NDMA's practical approach. We have two success stories, like bipolar joy, the cyclones. We have evacuated the paper safely from the coastal line, and we have, as Dr.

Shafik has mentioned, about the 2023, the flood in Sathloosh, we have timely response, and the people, and we have successfully respond, and there is no single loss of life. So we have faced the flood to the 10 and 2022.

As Mr. Krosut brief very well, what they have done in the Sathloosh Valley, their research and the analysis and the recommendations. So on the basis of these all type of things we have done and established as I mentioned in the National Emergency Operations Center and we have also established the mobile app.

We can be predict and foresee the fog weather system. We are trying to go through six months of the predictions and mobile time and regarding flood and regarding swathe valley we have also a Department of Infrastructure Resilience.

We made some conclusions and we're trying to design the infrastructure regarding the according to their area as we are have different scenes of areas in Pakistan like the GB and upper kpk and Punjab and seen then those are some we have the different scenes of work anomalies like loaves, avalanche, landslide, flood, sea water intrusion and so many disasters being in Pakistan we are facing.

We have a lot of experiences about the capacity buildings and facing life disasters. As the one of the speakers mentioned about the academia of Pakistan must participate and come forward and take these problems and being an IDM representative in National Institute of Disaster Management we are directly coordinated with Pakistani universities with the international universities as Mr.

Speake is in front of you and we have also connected with the SUS university, zero university of applied sciences and the EPFL and the leading house and Christophe is in us one of those examples so we are very much coordinated with all academia and we are trying to get some best practices and suggestions and we have launched last week a book of best practices national and global best practices and we have also launched the anticipatory actions in terms of frameworks and in terms of guidelines we have well coordinated with our provinces with the PDMA's and the DDMA's so we have also shared our advisories and our alerts to their respective provinces we have viable media they disseminate all such type of information and like that and I guess being the state of heart and national emergency operation center we are trying to monitor our disaster we have also launched and we have also launched we have also launched we have also

launched a mobile national emergency operation center as we are facing in the Swat Valley flood so we want to be the replication of NUC in in the respect like we are facing in the GPG,

the ball this time our upper kpk we are have no signals and no satellites we can we can send our mobile when we have with the well -equipped supplies instruments so these are the measures and takens by the NGMA and we will be catering future and we are trying to best mitigate these practices and this is from my side I guess is there any question I'm here to be answered.