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Topic 1: Ecological Civilization Governance

Ladies and gentlemen...

Thank you so much for the opportunity to speak at this unique event, and especially amongst such distinguished company.

On a personal note, I am delighted to share a stage with Professor Pan Jiahua, who has shown such leadership on climate change for many years now. Your tireless work stands as an example to us all. Thank you.

How we might go about governing emerging technologies in an age of deep ecological stress poses a profound challenge to us all, making us reconsider the very foundations of humanity's relationship with the environment.

For most of the Holocene, the climate has – on the whole - been kind to us. 10,000 years of relative climate stability allowed human civilization to flourish.

But as I consider the future for my grandchildren, two of whom were just born this year, I am genuinely concerned that this stability is potentially coming to an end, and this in their lifetime.

The increasing number of extreme weather events, married to the growing scientific confidence as to their human cause, can leave us in no doubt: we are on a very dangerous course, and if we don't urgently change our behavior, thousands of years of human progress may be put at risk.

The latest IPCC figures suggest that breaching even a 1.5°C warming above historical levels could set in train a series of events we will be hard pressed to stop.

And the numbers are telling us that the window of opportunity to avoid that scenario through emissions reductions is closing fast.

In fact, given the political realities we live in, a growing number of scientists already believe that that window may already effectively have closed.

Some scientists are now warning of a 'hothouse earth' scenario, in which breaching the Paris temperature goals may set in motion other climate events that could effectively render large parts of the planet uninhabitable.

As the scale of this crisis becomes clearer, a growing number of senior policy makers are starting to ask whether deliberate large-scale interventions in the earth system – such as large-scale Carbon Removal, or potentially Solar Geoengineering - could be (or should be) part of our toolkit to reduce the dangerous effects of climate change.

I'll say more about these technologies in a moment, but for now I will just stress that if any of them were deployed at this scale, it would have major consequences for the whole planet.

Some of those consequences could be good, some could be bad, but whatever they are, the whole world will feel their effects, and will have a stake in their development.

Yet at present there are no comprehensive international rules to govern them. This is a serious challenge which we need to address.

It is my conviction – and this is why I am here - that the ungoverned deployment of some of these technologies could pose critical environmental and geopolitical risks to humanity, as well as profound social and ethical challenges.

That is why I and my team are traveling the globe to make a simple case: that we need to kick-start a discussion about the governance of these technologies, before events overtake.

We are not saying this or that specific technology should be deployed: that is a decision for society to decide. We strive to remain impartial on that.

But we do argue that these technologies need to be governed at every stage of their development. That includes research, testing, and any potential consideration of deployment by governments or other actors.

This governance needs to be based on the precautionary principle, multilateral collaboration, and core principles of transparency and accountability.

Chairman Xi has taken a visionary stance, highlighting the essential role that good governance must play in making an ecological civilization a reality. The UN Secretary-General Guterres has called for good governance of emerging technologies.

Given how long it takes to put governance structures in place, we have little time to lose.

Let me spend a moment on terminology.

We are learning every day how important using the right words are when debating these technologies. The categories we choose can have a profound effect on how people think about these issues, and can make governance outcomes more or less likely.

These considerations may also change from language to language, as every word brings a range of different ideas and associations depending on the culture and the context. At the same time, I believe many of these terminology issues are common to all of us.

Sometimes, you will hear Large-Scale Carbon Removal and Solar Geoengineering described collectively as Geoengineering. This means the deliberate use of technologies to change the earth's climate, to reduce the dangerous effects of climate change.

In practice, however, I have found that this umbrella term includes so many different technologies that it can be misleading. Dislike for one can cloud judgment of another. That is why I prefer to split these technologies into separate categories when considering the governance of these technologies.

Briefly, large-scale Carbon Removal would push our current efforts to remove carbon dioxide already in the atmosphere to a planetary scale, thus contributing to addressing the primary cause of climate change.

Solar Geoengineering would aim to reflect more sunlight back into space, or allow more infrared radiation to escape. This would address a symptom of climate change, by reducing the Earth's temperature.

There are some features they share in common. None can be used effectively on its own without radically reducing emissions. Furthermore, none of these technologies are currently ready or feasible at the scale or speed of deployment needed to keep global temperatures below 1.5-2°C.

There are constituencies who consider even talking about these proposed technologies to be a moral hazard, which could detract from the primary goal of reducing emissions.

Some see all these technologies as illusory techno-fixes, as magical thinking, which steer us away from the hard work of reducing production and consumption, changing high-resource use lifestyles, and decarbonizing the global economy.

But I take a pragmatic attitude, based on managing risk and uncertainty. Research and development is already happening. Pretending it isn't would be a mistake.

We are reaching a point where any choice of action or non-action bears existential risks. The more we understand about our options, and the more of that understanding we bring to our policy decisions, the higher chance we have of limiting the negative impacts of climate change.

Given their global impact, at some level all these technologies will need international governance. In all cases, this should take a precautionary, and evidence-based risk management approach, which weighs potential outcomes against the reality of a warming world.

Their governance will also need to be considered in light of their interaction – positive or negative – with the Sustainable Development Goals, or whatever may follow them after 2030, and to involve broad and diverse participation in decision making.

The specific mechanisms we may need, however, will depend in each case on the technology in question.

Let us look at the governance issues that arise, starting with large-scale Carbon Removal.

The idea that we might deliberately remove carbon from the atmosphere has been part of our approach to addressing climate change for some time, but not at the planetary scale now being envisaged.

Proposed technologies include nature-based approaches, such as Afforestation, technical approaches, such as Direct Air Capture or alkalinisation of the ocean, and hybrid approaches, such as Bioenergy with Carbon Capture and Storage.

The large-scale use of Carbon Removal technologies is implicit in the vast majority of 2°C-compatible scenarios in the 2014 Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC), as well as in the majority of modelling studies to date. The recently published Special Report of the IPCC on the 1.5°C pathways goes further: there are no pathways that can keep the temperature below 1.5C without recourse to carbon dioxide removal of one kind or another.

Most of these scenarios require a balancing of global emissions with removals. The more we delay reducing emissions, the more removals we will need.

The Paris Agreement also indirectly recognized the potential for substantially scaled up use of current and new Carbon Removal technologies. Article Four calls for a balance between anthropogenic emissions by sources and removals by sinks in the second half of the 21st century.

As I and my team see it, the conversation around these technologies is evolving quite quickly. A growing number of scientists, environmentalists and policy makers are now openly considering which technologies exist, and which might be deployed in a timely and safe manner.

This doesn't mean they could replace aggressive emissions reductions. That still remains the priority. But the argument is now being made that both are now needed together.

We also see growing private sector interest in these technologies. And there is some pressure to consider emissions, capture, removals, utilization and storage under one holistic Carbon Management approach, taking also account of the Sustainable Development Goals. We are not quite there yet, but these ideas are gaining traction.

So what might governance of these large-scale Carbon Removal technologies look like?

Firstly, we think it would build on existing provisions for removals – many of which might still be applicable, even at scale. It would take place at multiple levels, nationally and internationally.

International governance will be needed to address a range of issues, including questions around responsibility, monitoring, liability and compensation, and international cooperation.

In our view, the UNFCCC is an appropriate body for this work. It has already developed numerous elements which could form the basis of a future governance framework, and it makes sense to build on these.

We are now working with leading experts to determine what the gaps are.

Other international processes can also play a role. This can include, for example, the Convention on Biological Diversity, or the London Protocol of the London Convention. Other intergovernmental processes could also play a part.

We encourage countries to start looking more closely into the details of what this might entail.

Let us also look at the governance of Solar Geoengineering.

Whatever progress is made on emissions reductions and carbon removal, scientists tell us it will still be a challenge to avoid overshooting internationally agreed temperature goals.

There is also growing evidence that this might not be so easy. Overshooting these goals could trigger tipping points and feedback effects which become difficult or impossible to reverse, and which could have catastrophic impacts.

To avoid or manage an overshoot some scientists are exploring the potential for technologies that could cool the planet temporarily. Proposed technologies include Stratospheric Aerosol Injection, Marine Cloud Brightening and Cirrus Cloud Thinning. Collectively these are known as Solar Geoengineering, or Solar Radiation Modification, to use the IPCC terminology.

This concept may also include some other albedo modification technologies, for example efforts to refreeze the Arctic, depending on scope and impact.

None of these is proposed as a solution to climate change, but as a potential way to reduce the risks of a temperature overshoot while we tackle the underlying causes. Again, this means reducing emissions to net zero by mid-century and then going to net negative – in which remaining global emissions are increasingly smaller than removals.

I cannot judge which, if any, of these technologies are realistic prospects. What I, our team and increasingly senior leaders around the world do believe is that the lack of governance surrounding some of them, such as Stratospheric Aerosol Injection, poses a critical global risk.

Right now, the international community simply does not know enough about the risks, costs and potential benefits of Solar Geoengineering technologies, as well as of their governance requirements, to understand if they could or should be considered as part of the toolbox to manage risk, and if so to decide whether to deploy and when.

In the immediate term, governing their research must be our priority. A group at Harvard University is planning an outdoor SAI experiment as early as next year. There could be others planned as well.

The world needs internationally agreed rules of the road; guardrails to ensure we don't automatically slide down a slippery slope to deployment. We need a wider debate around what this research means to the general public.

Looking ahead, we feel we will need to convince a wide range of bodies and processes to get involved in the governance of Solar Geoengineering.

That is because no one international forum is sufficient to create global governance for Solar Geoengineering alone. Each has specific responsibilities and powers. These could include the UN Environment Assembly (UNEA), the Convention on Biological Diversity (CBD), the UN General Assembly (UNGA), and various regional bodies.

Right now, the Swiss Government is proposing a resolution to be considered by the UN Environment Assembly meeting in March 2019, which if adopted would call on UNEP to prepare, with the help of an expert group a state-of-play assessment on these technologies. This is an encouraging development, and we think it would be very helpful if governments endorsed this approach.

However we proceed, I would leave you with some key thoughts on how we tackle these challenges.

First, the debate around and pressure to use these technologies may be moving faster than we thought.

On large-scale Carbon Removal, discussions are advancing as we speak. Over the last six months some important actors have declared its deployment to be an integral part of the future – most notably the IPCC in its Special Report on 1.5C. There is an opportunity now for countries around the world to take positions on how it might be governed, before real world developments put them in a position of playing catch-up.

The Solar Geoengineering conversation is not so advanced, but research is happening now - including here at the Beijing Normal University. Only last year the US Congress held a hearing on solar geoengineering research and the potential need for federal funding to accelerate efforts.

And just yesterday, the National Academies of Science of the USA announced the formation of “a new committee to develop a research agenda and research governance approaches for climate-intervention strategies” related to solar geoengineering.

We are at the brink of small -scale outdoor experimentation for stratospheric aerosol injection. And ice restoration techniques for the Arctic and elsewhere are gathering pace.

The second thought is that effective international governance in the 21st century involves many processes and communities coming together.

No one international forum is currently sufficient to create global governance alone; each has specific responsibilities and powers. Effective governance will involve a multiplicity of processes and centres of power and influence, rather than one with paramount command and control.

This will be a long and complex process. Is the international community able to design a global architecture fit for purpose, in the limited time that may remain?

Finally, I would underline that the risk of not discussing the governance of large-scale Carbon Removal and Solar Geoengineering has become greater than the risk of doing so.

To ignore these emerging technologies, and the possibility they may one day be used, increases the risk they will not be properly governed. The lack of such governance poses risks to health, peace and security.

But to make changes at the scale we need requires leaders, with both the vision and the wherewithal to make it happen, as well as an engaged and informed global society.

I and my team look forward to working with you to make that happen.