

MOHAN MUNASINGHE (Twas Fellow 1994), Chairperson of the Munasinghe Institute for Development in Colombo, Sri Lanka, and Director-General of the Sustainable Consumption Institute at Manchester University, UK, is one of the world's pre-eminent researchers on issues related to energy, sustainable development and climate change.

Munasinghe has been a senior energy advisor to the government of Sri Lanka, an advisor to the US President's Council on Environmental Quality and a senior manager at the World Bank. As vice chair of the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC-AR4), he also shared the 2007 Nobel Peace Prize. In the months leading up to the 2009 Copenhagen summit on climate change, he provided expert advice to the Danish Prime Minister's office.

In an hour-long phone interview with the editor of the TWAS Newsletter, Munasinghe spoke about his disappointment with the outcome of the Copenhagen Conference of the Parties (COP 15). He also proposed a series of practical steps that could be taken by civil society and business across the globe to help tackle global climate change issues. Excerpts follow.

CHANGED CLIMATE

What were your expectations going into the Copenhagen climate conference?

I came to Copenhagen with low expectations. There had been some encouraging discussions held at the UN conference of the parties (COP13) that took place on the Indonesian island of Bali two years before. But it turned out that these discussions only fuelled false expectations. By the summer of 2009, if not before, it was clear that any agreements on significant issues would be difficult to achieve. The meeting in Copenhagen (COP15), which drew more than 50,000 people (some estimates put the figure at 100,000), was heading into rough waters even before it started. It's not surprising then, given the forces of resistance it was facing, that the conference nearly collapsed.

In retrospect, global climate change policies reached their high point decades ago with the approval of the UN Framework Convention on Climate Change (UNFCCC) in Rio de Janeiro in 1992, which I helped to draft. The Kyoto Protocol, which was approved in Japan in 1997, is the only international climate agreement that includes legally binding national commitments to reduce greenhouse emissions. And even the Kyoto agreement had serious shortcomings. The reductions in emissions that were called for were modest (and, in truth, not enforceable), and the agreement itself was never ratified by the United States, the world's largest emitter of green-



house gases until China surpassed it last year. On a *per capita* basis, greenhouse gas emissions in the US still exceed *per capita* emissions in China by a factor of four.

Over the past several decades, scientists have conducted a great deal of research on climate change, and their findings have been admirably synthesized in a series of reports issued by the Intergovernmental Panel on Climate Change (IPCC), where I have been privileged to serve 20 years, most recently as a vice chair. There have also been many international workshops and conferences, not to mention events held by high-level government officials. Moreover, prior to Copenhagen, the European Union (EU) agreed to cut emissions by 20% compared to 1990 emission levels, and said it

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would boost that figure to 30% providing rich countries (designated as Annex 2 countries in the Kyoto Protocol) agreed to comparable reductions. Several large developing countries with emerging economies, most notably Brazil, China and India, also said they would pursue voluntary cuts ranging from 24% to 45%, based on 2005 emission levels.

In the days leading up to the conference, the US, meanwhile, said it would cut its emissions by 17% based on 2005 levels. That amounted to a mere 4% cut relative to 1990 levels. It was a paltry figure, compared to what Europe had offered, and it reflected the current lack of political will in the US despite the election of President Obama and heavy Democratic Party majorities in both houses of Congress.

All these pronouncements provided scant hope that something tangible would be accomplished in Copenhagen. In fact, the sharp downturn in the global economy, sparked by the worst financial crisis since the Great Depression of the 1930s, dimmed the prospects for meaningful progress on the climate change front. Simply put, it made both developed and developing countries unwilling to embrace policies that they believed would burden their weakened economies. Equally important, it made rich countries reluctant to commit sufficient levels of funding to help the most vulnerable developing countries withstand and adapt to the climate change impacts that they will inevitably face.

Let me give you an example of the severe shortcomings of the Copenhagen conference by focusing on one of the few decisions that has been hailed as a success: the creation of an international fund, stocked with money from rich countries, to help poor countries adapt to the changes in temperature, precipitation patterns, storms and sea level rise that will be induced by climate change.

Studies show that these countries will need some USD200 billion a year over the next 10 to 20 years to address this challenge. In Copenhagen, the rich countries pledged USD30 billion over the next 2 to 3 years, and agreed to provide USD100 billion a year from 2020 onward. That means the very best that can be hoped for is a fraction of what is needed. And the announcement of this fund in Copenhagen has been cited as one of the few successful outcomes of the conference.

What do you make of the document signed at the conclusion of the Copenhagen conference?

The accord was put together in the final hours of the conference by five nations – the United States, China, India, Brazil and South Africa. Yet, officials (including many heads of state) from 192 countries, the same number that is in the UN, attended the conference. The two-page document contains no framework for action, no timelines or benchmarks for measuring progress and, most importantly, no legally binding commitments requiring countries to act for fear of international sanctions or penalties. It's all based on good will, voluntarism and self-policing. Although there is a broad statement of principles, claiming that efforts will be made not to allow average global temperatures to rise more than 2 degrees Celsius before the end of the century, any specific targets for cutting emissions are voluntary and have been placed solely in the hands of the national governments themselves.



There has been talk of picking up the pieces and reaching a more meaningful agreement in Mexico at the next annual convention of the parties in December 2010. But I am not optimistic. The same economic and political forces that scuttled the prospects for an agreement in Copenhagen will continue to be at play – and, in fact, could prove even more prominent – in the months ahead. Few economists expect the global economy to grow at a rapid clip in 2010, and even fewer anticipate significant job growth, especially in rich countries.

What impact will the outcome at Copenhagen have on greenhouse gas emissions in the future?

As I stated earlier, countries signing the accord in Copenhagen agreed that increases in average global temperatures should not exceed 2 degrees Celsius by the end of this century.

The consensus among scientists is that for this to happen, the level of greenhouse gases in the atmosphere must be capped at no more than 400 to 450 parts per million (ppm). Today, emission levels stand at 385 ppm (compared to 280 ppm before the Industrial Revolution in the 17th Century). If these levels continue to rise at their current pace, it's possible that average global temperatures will increase by as much as 4 degrees Celsius by 2100. That would be a disaster for all the reasons that have been analyzed in the scientific literature and discussed in the media. Extreme weather events would become commonplace, sea levels would rise, many dry environments would become even drier, many wet locations would become even wetter, coral reefs would likely disappear and species loss would accelerate.

We do have a window of opportunity to put in place the technologies and policies that are needed to curb emissions by the amount that is required. But that window is closing fast and could be shut tight by 2020 unless we act quickly.

Here's the problem. The voluntary cuts in emissions that countries tentatively agreed before and during Copenhagen add up to only a 15% reduction in emissions. That's the best we can hope even if all the countries live up to the public pledges they have made.

Yet, scientific studies indicate that a cut of at least 40% relative to 1990 emission levels will be necessary to prevent average global temperatures from rising more than 2 degrees Celsius. That leaves a 25% gap between the minimum reductions required by the best available science and the modest voluntary plans that have been laid out to achieve this goal. Most significantly, the gap translates into increases in average global temperatures of about 4 degrees Celsius. This far exceeds the 2 degrees Celsius now widely accepted as the danger point for climate change impacts.

What can be done, particularly by the scientific community, in light of the disappointing outcome in Copenhagen?

I know that I've presented a bleak picture of what the future might hold. Yet I am not as pessimistic as you might think. Progress in meeting the difficult challenges posed by climate change can be achieved, but it will depend on several factors, some of which are scientific and some that are not.

The scientific community must work much harder to provide country-specific information about the potential impacts of climate change. There has been a great deal of research on global trends in greenhouse gas emissions and the impact this is having on climate and on socio-economic and environmental systems. But what really counts for people and therefore politicians is the impact that climate change will have at the regional, national and local levels. That's where political decision-making comes forcefully into play. Or, to state it more directly, that's where political will is needed to turn talk into action.

Scientific studies must also focus less on mitigation and more on issues related to vulnerability, resilience and adaptation. The level of greenhouse gases currently in the atmosphere, together with the increases that are expected to occur over the next several decades, mean that significant climate-change impacts will undoubtedly take place, regardless of what is done. Ironically, the most severe impacts will be felt in the poorest nations in the tropics, which are least responsible for past emissions that have created the climate problem. The scientific community can play a key role in assisting policy-makers by conducting studies that identify vulnerabilities and outline concrete policy responses for enhancing resilience and adaptation among the poorest and most vulnerable.

The key is to develop science-based strategies that integrate adaptation and mitigation within an overall strategy for sustainable development. That would allow effective policies to reap benefits beyond those related to climate change. This is particularly true for resource-scarce developing countries that are the most vulnerable to climate change impacts. In brief, we need to take significant steps in the near term that not only help make poor communities 'climate-change resistant', but that also offer a blueprint for solving existing problems such as poverty, malnutrition, sickness and resource scarcity.

One proven methodology to effectively integrate multiple issues into sustainable



development strategy is the “sustainomics“ framework, which I first presented at the 1992 Rio Earth Summit. Its first principle is “making development more sustainable”, which encourages immediate action based on existing knowledge. Many of our present activities are obviously unsustainable, and simply correcting them gives us momentum. Effective measures include mitigating greenhouse gas emissions by planting trees or conserving energy with more efficient lighting. This approach also gives us a simple operational test for all our actions. That is, do they make development more (or less) sustainable?

The second principle of sustainomics requires us to give balanced consideration to the three main dimensions of sustainable development – economic, social and environmental. The economic dimension, of course, is very important, especially for the poor. But we also have to make development more sustainable. On the environmental side, we must minimize the depletion of natural resources and environmental pollution. The social aspect is more subtle. At the community level, it involves building social capital – the glue that binds communities together.

Third, sustainomics requires changes in our thought processes. The analysis must transcend conventional boundaries imposed by disciplines, values, space, time, stakeholder viewpoints, and lifecycles. Transdisciplinary analysis must include not only the natural sciences but also economics and the social sciences and many other disciplines. Unsustainable values such as greed need to be replaced by more moral and ethical considerations. Spatial analysis must range from the global to the local, while the time horizon must extend to decades or centuries. Participation of all stakeholders, including representatives from government, the private sector and civil society (through inclusion, empowerment and consultation) is important. Analysis needs to encompass the full lifecycle of products and processes.

The scientific community must continue to do good science. But, at the same time, it must improve its ability to defend its findings and engage the public in serious broad-ranging discussions on climate change risks and challenges.

The public is much more aware of climate change today than it was just a few years ago. But that hasn't erased doubts about the level and immediacy of the risks that climate change poses, particularly when compared to other pressing matters, notably the need for jobs and economic growth. Recent controversies over unflattering email messages exchanged by prominent climatologists have damaged the credibility of climate change research and placed climatologists on the defensive. The same is true concerning claims about rapid glacial retreats in the Himalayas, which were published in the IPCC's most recent reports and subsequently withdrawn.

Moreover, climate change sceptics and their political allies continue to challenge the conclusions of mainstream researchers. And, of late, the public seems more inclined to listen.

For all these reasons, it is important for mainstream climatologists to present a clear and forthright case to the public that cli-





mate change is real and that its impacts will be widespread and significant. It is equally important for scientists to explain the broad base of knowledge upon which their conclusions are drawn on and to present possible options for effectively addressing these challenges.

While the outcome in Copenhagen suggests that it may be difficult to achieve progress on the political front, civil society and business could play an important role in facilitating meaningful reforms. The truth is that we know a great deal about greenhouse

gas emissions, alternative energy use and more sustainable patterns of development. We also know there are many citizens, nongovernmental organizations and corporations that want to do the right thing. Indeed there are large markets for climate friendly products and services that have yet to be tapped.

Unfortunately, we have become stuck in a mindset that thinks it will be necessary to make huge investments to combat climate change. But it is possible to start small and build from there, based on what we already know. There are untold ways we can make our consumption and production patterns more sustainable through increased recycling, greater emphasis on energy efficiency and alternative energy use, and improved transportation. We can also pursue strategies that provide better price signals to help curb practices that adversely impact the climate and thereby pose long-term threats to environmental and societal well-being. As the campaign to curb cigarette smoking has shown (especially in the United States), it is also possible to change behaviour through public relations campaigns that emphasize the personal benefits that can be derived from taking the advice that is being offered.

All of this can be done without international protocols and treaties. The cumulative impact of these measures could be significant, not just in terms of cutting greenhouse gas emissions but also in creating a sense of forward motion that instils optimism and enthusiasm.

I am not suggesting that we should abandon efforts to achieve broad global agreements for curbing greenhouse gas emissions. But, given the outcome of the Copenhagen conference, it's clear to me that we should push forward with bottom-up strategies that complement conventional top-down solutions.

What would you say to scientists in the developing world? Are there changes that the scientists in the South should consider to become more effectively involved in climate change issues?

As I mentioned before, doing good science is the paramount consideration. That's true for researchers both in the developed and developing worlds. But, as I also indicated, the way forward may lie with addressing the climate-change issue at the local and regional levels. As a result, there is a great need for scientists from developing countries to focus on the immediate needs of their home countries. Science is a global enterprise, and scientists from the developing countries have too often measured their success by the level of recognition they receive from global scientific institutions (and, I might add, their colleagues in the North).



This is understandable given the history of science over the past 500 years. But such attitudes have also meant that, in the developing world, a significant gap has developed between professional excellence and societal needs. To address this gap, I would propose that developing countries emphasize the importance of doing science within the social context of their own countries. Efforts must be made to respect, recognize and reward research not just at the global level but also at the national, regional and local levels.

Despite the disappointing outcome at Copenhagen, do you think progress in combating climate change can be achieved?

I remain optimistic. That's what we all need to do. First of all, the alternative is unthinkable. Failure to address the challenges posed by climate change will have catastrophic consequences, and I am firmly convinced that we cannot – and therefore will not – let climate change wreak havoc on our societies. Second, I am very impressed by the younger generation both in developed and developing countries. They seem to understand – and support – the policies we need to enact more than the adults who are currently in charge. Perhaps they understand even more than their parents that their future is at stake. We can only hope that their youthful attitudes, energy and commitment will not be tarnished by age and disappointment. Third, it's important to keep in mind that over the past two years, governments have found USD5 trillion to stimulate a global economy so wracked by greed and mismanagement that it brought us to the brink of collapse. In contrast, the cost of addressing global climate change challenges would be far less, and would only have to be kept in place for several decades until we made a successful transition to a low-carbon future.

The point is, it would take a fraction of the world's wealth to turn back climate change and there could be worthy by-products, as well, in terms of improved energy efficiency, new technologies and secure, well-paying jobs. The money is there, the public support for reforms is there, especially among the youth, and the momentum to achieve meaningful reform, I believe, is there, despite what happened in Copenhagen. We need to re-adjust our sights from the rarified air of international diplomacy to the plain ground truth found in civil society and the private sector. The world would do well to capitalize on the confluence of forces now in place that are pushing for reform. That didn't happen in Copenhagen. But it doesn't mean it won't happen in the future. We have to encourage our leaders to follow the path that many of their people, including the young, are now focusing on. It's a campaign we all need to engage in, and one in which the scientific community has a key role to play. ■