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Water security, climate change and COP26

Water security and climate change are only two of the major problems humankind is facing at present, and they will continue to be so for decades to come. However, important as they are, there are many other critical problems the world will have to confront for the rest of the 21st century. Most of these problems are now known, but there may be some black swan incidents, such as Covid-19, which are unexpected and may occur in the coming decades. If so, these could make the global situations even more complex than anticipated at present.

An important global issue for many decades has been the steady increase in the global population. The current global population of some 7.95 billion is expected to rise to 9.7 billion by 2050 and to 11 billion by 2100 (UN Population Division, 2019a). Additionally, in 2020, 56.15% of the global population lived in urban areas. This is estimated to increase to 68% by 2050, and to 85% by 2100 (UN Population Division, 2019b). It will mean that, increasingly, larger percentages of the global population will be concentrated in and around urban areas. This will undoubtedly put growing and serious strains on reliable and affordable supplies of food, energy, water and all other natural resources, as well as on the environment. In addition, ready availability of public health and all other forms of social services, including housing, education and transportation, for the rest of this century, will continue to be important challenges which all countries will have to face.

Furthermore, all over the world, national governments and international organizations are likely to be under considerable pressure to alleviate poverty, increase the standard of living of the poor and the underprivileged, and provide improved environments for all to live in. Provision of many other social services, ranging from employment generation to improve connectivity and steady improvements in skills of the population, will be high up in the political agendas of nearly all nations.

All major issues facing the world are now interrelated and interconnected. The dynamics of the human future will be ultimately determined not by one, but by two or more of these global issues, irrespective of how important, complex or pervasive any individual issue may be. This, because of the net results of interactions and impacts of multitude of them. For example, increasing population and demands for steadily improving standard of living and quality of life will require more and more food, energy, water and other resources, unless there are significant changes in improving the efficiencies of how they are produced, distributed and used. Augmenting and ensuring food and energy supplies will necessitate sustainable and more efficient water management during their production, distribution and use phases, as well as overall demands. Equally, many of these activities may contribute to more greenhouse gas emissions into the atmosphere, unless special policy measures are taken and effectively implemented. Such developments could further aggravate global warming and may result in unanticipated extreme events through a multitude of pathways, some known but others unknown. These may

then contribute to the generation of a host of additional second-order problems which could have further impacts on existing food production and supply systems, energy generation, distribution and use patterns, as well as water management practices and processes.

Common requirements in all the practical responses to all major problems confronting the world must include greater national and global investments, significant advances in research and development efforts that could result in development of more effective and cost-efficient technologies, improvements in human and institutional capacities, intensified global cooperation, and more effective national policies which have to be implemented. These will require major mindset changes of all stakeholders, including policymakers and the general public (Biswas & Tortajada, 2022). This is not happening at present, at least to the extent necessary.

Climate change

Climate change is already having serious economic, social and political impacts on the world. However, they are not affecting all countries equally. Figure 1 shows estimated economic losses due to climate-related disasters, as a percentage of gross domestic product (GDP), for countries at different economic levels, during the period 1998–2007. It shows economic losses as percentages of GDPs were much higher for low- compared with high-income countries, by a factor of 4.5. This means low-income countries not only suffered much higher and widespread losses, but also are highly likely to face even higher and more widespread losses since they have access to fewer funds, have somewhat limited management and administrative expertise, lower capacity to adapt and less access

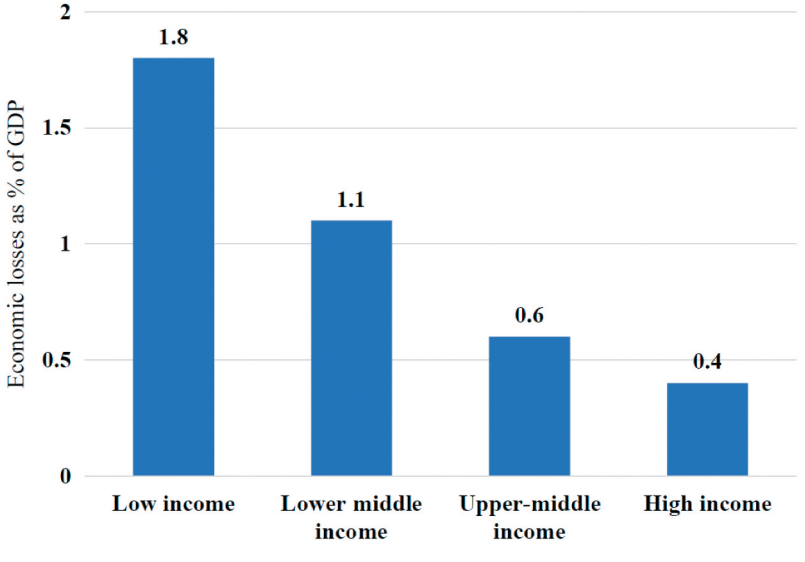

Figure 1. Economic losses due climate-related disasters as a percentage of gross domestic product (GDP), 1998–2007. Source: Adapted from Wallemacq and House (2018).

to new technologies, not to mention inadequate institutional capacities. These constraints are unlikely to change markedly during the next two to three decades in most developing countries.

COP26 and water

There is no question that climate change is now firmly in the world's political, economic, social, environmental and corporate agendas. This can be noted by the fact that all countries of the world made national commitments to reduce greenhouse gases during the COP26 meeting, in Glasgow, UK, in November 2021. For the most part, they pledged to be carbon neutral between 2050 and 2070. An important aspect of COP26 was that many nations and private sector companies pledged that their greenhouse gas emissions would peak between 2030 and 2035, and then continue to decline until they reach carbon neutrality between 2050 and 2070.

Despite these statements, very few, if any, commitments indicated how they will ensure that their carbon emissions will peak within the next one to two decades and how they will achieve net zero between 2050 and 2070. There were also no indications of how much the measures will cost, if financial support will be available, what technologies they may use or if they will have to be developed to reach their goals.

A cynic may raise the point that the politicians who made the pledges, for the most part, are highly unlikely to be in office in 10 years' time, or even earlier, and thus they will not be responsible to ensure the commitments will be met in time. It will be their successors who will be responsible to ensure carbon emissions peak in the 2030s, and whether they have sufficient funding, technological prowess and strong political will to push through the policies necessary. This is because as nations approach peak emissions and net zero, there will be many in all societies who will be winners and equally a large number who will lose in one way or another. Those who will lose are likely to oppose the policies that may be beneficial to society as a whole, but detrimental to them. In democratic societies, losers are likely to vote against the politicians and the parties who may be championing policies that may have adverse impacts on their lives. Accordingly, policymakers have to ensure they can effectively compensate the losers for their perceived loss, an issue on which the discussions have not yet began.

The same stands for the corporate leaders who made commitments to achieve net zero during COP26. The average tenure of a chief executive officer (CEO) of a major corporation was eight years in 2016. The tenure lengths have progressively declined to 6.9 years, by 2019, and that the trend is for a progressively shorter tenure. In order to achieve net zero, private companies will have to spend considerable funds on mitigation measures and higher research and development costs. Thus, in many instances, this may mean less return for their shareholders who may become unhappy with their performances and may agitate for new CEOs. Thus, CEOs have to communicate significantly better to their shareholders the rationale as to why they would receive jam tomorrow, and not today. There are very few CEOs who can do this effectively.

In our view, in the final analysis, in order to achieve net zero, there has to be cost-effective technology available for carbon capture and sequestration. Equally, there has to be a market for the use of sequestrated carbon. None of this is now possible, either because technology is not available or is not cost-effective. Over 80% of carbon capture

efforts globally, up to 2020, have failed since either the technology did not work as expected or was too expensive to operate. An additional problem has been that there does not seem to be any economic use of the carbon captured. However, on the positive side, an enormous amount of research and development (R&D) work is now coming onstream because of steadily increasing funding, and significantly more funding is likely to be forthcoming in the coming years. Realistically, we should be witnessing good progress in these areas, especially by 2030 and beyond.

Financing net zero

An important issue in earlier COP discussions has been the financial help needed for developing countries to reach net zero within reasonable timeframes. During COP15, in Copenhagen, Denmark, in December 2009, 34 developed countries were listed in Annex 1 (United Nations, 2022), collectively agreeing that, by 2020, they will provide US$100 billion per year to non-Annex 1-developing countries so that they can play their parts in climate change mitigation. This pledge was reiterated at COP16, in Cancun, Mexico. During COP21, in Paris, France, it was agreed that US$100 billion per year would be provided to developing countries up to 2025. While the actual financing figure for 2020 will not be available till 2022, it is universally believed that this threshold was not reached in 2020. The latest figure available is for 2019, when approximately US$79.6 billion was disbursed for climate finance.

Much of the climate finance that has been provided is for mitigation rather than adaptation. In 2019, around 79% of climate finance came from public funds provided by national governments. This financial support came primarily in the form of loans. In 2019, US$44.5 billion was provided as loans, which represented about 71% of public climate finance.

The grant part of financing remained comparatively stable during the period 2016–19, between US$12.0 billion and US$12.8 billion. It increased to US$16.7 billion in 2019. This was not enough from the viewpoints of the developing countries.

In July 2021, the Vulnerable 20 (V20) group, which included some of the most exposed countries to impacts of climate change (www.v-20.org), pointed out that the loans are simply adding to their financial burdens which they will have considerable difficulty to repay. They thus requested for more grants to be provided, as opposed to loans, and also additional funds for climate adaptation and more private sector investment.

It should be noted that even though the US$100 billion climate fund has not materialized yet, and is unlikely to be available before 2024, this support to developing countries needs to be increased significantly after 2025, if the world is to make much headway in terms of mitigation and adaptation to climate change. The International Energy Agency (2021) estimates that annual global investment in clean energy has to more than trebled to US$4 trillion by 2030 if global warming is to be restricted to 1.5°C above pre-industrial levels. Thus, availability of funding is, and should be a major concern.

This current issue of the journal has several topical, interesting and wide-ranging papers in terms of case studies. These include addressing aquifer overexploitation with desalinated seawater in Spain (Calatrava et al., 2021); flood protection by embarkments in India (Marchand et al., 2021); the influence of farm size and crop type on drilling in farms during droughts (Reisman & Macaulay, 2021); multicriteria analysis of high risks dams

facing obsolescence in the United States (Nagel & Ptak, 2021); developing a socio-psychological model explaining farmers' income diversifications in response to groundwater scarcity in Iran (Hashemi et al., 2021); whether direct delivery of electricity subsidy will help Punjabi farmers to conserve groundwater (Kumar et al., 2021); Thayer Scudder's four stage framework for water dispossession and appropriation for the Kariba Dam (Matanzima, 2021); to what extent President Joe Biden's infrastructure plan may address needs of water system in the United States (Grigg, 2021); and how to run a water utility in a pandemic (Ng, 2021). All these are excellent case studies from different countries from which many lessons can be learnt as to what works and does not work and why.

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