and has left our agriculture to the whims of the globally warming climate and the evolving potency of pathogens. At this exigent, the future of our food security should not only rely on post-apocalyptic seed banks at Svalbard, but also on the identification and propagation of wild edible plant species used by the ethnic people.

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India's second Biennial Update Report: five key takeaways

Shanal Pradhan and Gautam Goswami

India submitted its second Biennial Update Report (BUR II) to the UNFCCC on 31 December 2018, which builds upon the information presented in the Second National Communication (SNC). Being a non-Annex I party to the Convention, India like many other developing nations has to fulfil its reporting obligation of furnishing BURs every two years to intimate its climate mitigation efforts. Biennial reporting is aimed at highlighting trends in the national greenhouse gas inventory, mitigation actions, need for climate-friendly technologies, finance, capacity-building and lastly existing domestic Monitoring, Reporting and Verification (MRV) mechanisms. The comprehensiveness and depth of information present in BUR II, have increased considerably in comparison to its earlier version (BUR I). This paper suggests points relevant for improvizing on key aspects related to energy demands, MRV and the technology transfer process.

India submitted its first Biennial Update Report (BUR I) to the United Nations Framework Convention on Climate Change (UNFCCC) in 2016, a year ahead of China and again presented BUR II earlier than China. A major point to be accentuated here is that China in its first BUR had published national CO_2 emission inventories only for 1994, 2005 and 2012. This clearly thwarts the efforts and concept of embedding transparency in reporting, even when the country is responsible for 27.6% of the global CO_2 emissions. It also consumes more coal than the rest of the world combined[1]. In comparison, India has shown considerable poise in revealing emissions year-on-year basis right from 2000 to 2010 in its BUR I. Hence, it will be interesting to watch the emission discourse arising from China in its second BUR. Meanwhile, some clear-cut messages derived from India's BUR II need to be taken into cognizance.

Energy sector still remains the main culprit

The energy sector still remains the major emitter in the country, in fact, BUR II shows an increase to 73% from the 2010 emission of 71%. Whereas for agriculture, the greenhouse gas (GHG) emissions reduces from 18.3% in 2010 to 16% in 2014. Majority of the emissions are from electricity generation by use of fossil fuels, especially non-coking coal. Thus, a gradual upscale of clean coal technologies such as supercritical and ultra-supercritical technologies can help in cleansing the system along with renewable deployment. The energy and industry sectors are serious contenders that challenge the country's attempt to reduce emissions as they mostly contribute to CO_2 and HFCs, both GHGs which apparently remain in the atmosphere for longer periods. The methane rise from the industry sector as reported in BUR II is significant, at 0.178 Mt as compared to 0.023 Mt in 2010 (ref. 2).

Information lacking on finance required for technology uptake

One of the major prerequisites of BUR guidelines calls for facilitating or presenting information on finance,

technology and capacity building support needed and received by the country. Though information on the technology sought after is given in BUR II, it fails to give estimates for the amount of finance required to implement such technologies identified in the document. It mentions the overall finance required to achieve our Nationally Determined Contribution (NDC) targets by 2030, which is around USD 3.1 trillion[2]. However, the report refrains from giving estimates for finance required for technology adoption or uptake. As the report conspicuously mentions that since the first BUR, no funds have been received, presenting a detailed finance requirement would have possibly led to securing more multilateral funds from the developed economies.

A chief concern for the country that emerged from BUR II was the decrease in Global Environment Facility (GEF) funding that reduced by almost 50% from the sixth to the seventh cycle. Primarily, two assumptions can be drawn for this drastic reduction of funds. The withdrawal of USA from the Paris Agreement has left a huge void in the climate finance pool and created an atmosphere of uncertainty among the developed countries. This could have been one of the implications facing climate finance donors. Likewise, the quality of the project proposals presented could have been another deterring force. To address any such inadequacy, project proposals should, therefore, be streamlined according to the mandate of the funding body or have clear-cut agendas for realizing the country's climate goals.

Developed nations have taken a pledge to fill the coffers of climate finance, but as they merely constitute of only pledges, the real contribution is yet to be converted to agreements. Only when developed nations work towards legally binding agreements, a substantial and continuous amount of funds will be guaranteed.

Agriculture sector: the elephant in the room

Agriculture forms a prominent part of the Indian economy supporting around 54.6% of the country's workforce[3]. Yet the sector, which is highly climate-sensitive, is not given much attention when it comes to mitigation. Does this lack of complacency arise due to the fact that the share of gross value-added contribution has been drastically declining over the years? Further, as India progresses more towards an industry-focused and services-based economy, cities have primarily taken centre stage as hotspots for climate action. Although this sector saw a 2% decrease in emissions since the last report, much remains to be accomplished as the sector is the major emitter of methane (74%) and nitrous oxide gases (26%)[2]. A significant portion of methane comes from enteric emissions (livestock) and rice cultivation practices. Reducing emissions from the agriculture sector is attainable yet difficult to achieve because of the fragmented nature of the emission source/sinks, which are a challenge to contain. Although technologies are present for adaptation in the agriculture sector, finance is still required for larger uptake of technologies.

Forestry remains a topic of contention

The forestry sector has always been a contentious topic. From the previous BURs, it is evident that the forest sink has remained the same for the last four years. This raises apprehensions about the possibility of achieving the target of an additional 2.5–3 bt of CO_2 equivalent by 2030. Moreover, the target seems a bit too ambitious and a more accurate calculation could have led to a realistic target. For instance, forest cover assessments by the Indian State of Forest Report (ISFR) 2017, reveal that around 166.66 mt of carbon sink is to be added per year in order to meet the 2.5 bt targets by 2030 (ref. 4). This is an unattainable feat considering that the increase in carbon sink has only been 19 mt/yr since 2015, when the NDCs were announced. At this growth rate, a deficit of 147.66 mt in carbon sink is added every year[5]. Hence, India has undertaken a leap of faith with the announcement of an aggressive target, but our actions on ground fall short of meeting the country's NDC targets.

Greenhouse gas inventory

In comparison to BUR I, BUR II gives a more comprehensive round-up of the GHG inventory chapter through wider coverage of all source or sink categories from major emitting sectors of energy, IPPU, transport, agriculture and waste. Explanation of key category analysis and uncertainty range for emissions are new features included in the report. Most importantly, BUR II includes comparison between reference and sectoral approach for estimating GHG trends, which was not present in the earlier version. However, efforts still need to be directed towards important gaps prevailing in the current inventory system. Majority of these gaps emerging from BUR II can be categorized into three broad areas. The first is improvizing on data availability, granularity and their reliability, especially from industrial and agricultural sectors. Second, enhance tiers of reporting using key category analysis. Third, there is a requirement of support on both finance and capacity building for refining and upgrading the GHG reporting process in the country.

Conclusion

India is among the few large developing countries to provide full-fledged, open access and rather transparent data on GHG emissions. This is a major feat for a country that emits only 1.8 t of CO_2 per capita than the world average of 4.2 t (ref. 6). Nonetheless, in order to remain a forerunner among the low carbon economies with rapid growth in GDP will require various checks and balances to drive emissions down. As economic growth will tend to increase in the coming future, so will the rise in demand for energy. In fact, the share of industry in energy consumption is around 60%. Further, an energy forecast study has predicted that fossil fuels like coal will continue to meet around 83% of the energy demand in 2040 compared to 93% in 2016. While renewables are deemed to overtake gas and oil as the second largest source of energy in 2020, they will still constitute only 13% of the energy share by 2040 (ref. 7). Therefore, reducing energy demand is the key and India must focus on tipping the balance in favour of cleaner fuels in its energy mix. This transition could be achieved through a combination of measures that include proper utilization of natural resources, bringing reforms in social preferences. Since the industry is a major energy consumer, measures of optimizing energy efficiency technologies are required. A greater push is needed from policymakers in enforcing stricter

compliance from industries. Another critical constraint ahead of the country is an absence of a proper domestic mechanism for conducting Monitoring, Reporting and Verification (MRV) of national GHG emissions. Independent peer-reviewed mechanisms like the GHG Platform India provide national estimates for all the mitigation sectors on an open domain. However, the absence of a national MRV system for emissions is a huge void. In fact, lack of coordinated institutional arrangements for MRV of GHGs urges us to rethink strongly about decentralizing such efforts. In conclusion, the underpinning factor for radicalizing the way we produce and use energy other than reducing demand is harnessing potential technologies. At present, technology transfer is mandated by the National Intellectual Property Rights (IPR) Policy which has been drafted in general for all technologies. However, if the country wants to leverage on the scale and scope at which climate technologies are transferred, it is preferable to have a distinct clear-cut policy specifically for these technologies to enter into the Indian system with ease. The National IPR Policy needs to be fine-tuned in order to incorporate and create an enabling environment for fast-tracking the transfer and development of climate technologies.

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