Dealing with climate change

Kirk R. Smith, Professor of Global Environmental Health, University of California, Berkeley, USA and Director, Collaborative Clean Air Policy Centre, Delhi, has been working on environmental and health issues in developing countries, particularly those related to health-damaging and climate-changing air pollution. BE’s Ellora De spoke to him regarding the impact of climate change.

Q. India has a large coastline. How will rising sea levels impact India?
A. Future impacts can be expected to act mostly through enhancement of current vulnerabilities which involve salt water intrusion, storm surges, erosion, and loss of dry land. Vulnerabilities, however, are highly variable by particular conditions along the sea coast, including population density.

Q. The change in climate due to global warming has a huge impact on the yield of food crops. How should a country like India cope with such a problem?
A. Food shortage is mostly a matter of poverty, but climate change combined with enhanced weather variability is likely to lead to greater variation in supplies. India needs to enhance food security for the poor, which will assist in normal times and provide more resilience for the future. As part of this, sophisticated understanding of the impacts of weather variability on crop productivity is needed, and policy should be directed to enhance food security in this context.

Q. According to the Environmental Outlook, 2019, of the UN, health is the one most affected issue due to climate change. How should an overpopulated developing country like India face this challenge?
A. The most certain impact of climate change is heat, in all its forms – longer hot spells, hotter nights, higher averages, etc. There are two main health impacts, those on the public, which are mediated by physiological, behavioural, and structural adaptation. As areas in the north become more like the south in terms of heat, changes in these factors can reduce health impacts, but the question is how much and how fast. The other effect is more pervasive, that on outdoor workers. I use the term pervasive, because it is a trade-off between health and productivity. As heat and humidity rise, it becomes more and more risky to conduct heavy work in hot seasons and about 60% of workers in India work outdoors, mainly in construction and farming. An increasing number of months will become unsafe, but if work practices do not change, health impacts can rise substantially.

Q. In face of rising temperatures, what should be the priority for India?
A. From the health side, enhancement of basic public health protection in terms of food security, good water and sanitation, effective warning systems, basic insurance against weather events, disaster response, and primary health care should be the top priorities. From the health protection point of view, the key is a trade-off between health and productivity. As heat and humidity rise, it becomes more and more risky to conduct heavy work in hot seasons and about 60% of workers in India work outdoors, mainly in construction and farming. An increasing number of months will become unsafe, but if work practices do not change, health impacts can rise substantially.

Technologies to resist pollution in agriculture and mining

Agriculture and mining are two important sectors of the Indian economy. While generating huge employment and being important for the economy’s growth, these two sectors are also highly polluting in nature. Chemical agricultural products like pesticides and fertilisers contribute heavily to soil and water pollution. Excessive excavating for mining, resultant bio-diversity loss, suspended solids and sediments flowing into water sources due to mining also contribute to pollution. Scientific and technological innovations are being undertaken to mitigate these challenges.

Technologies to resist pollution in agriculture

Precision Agriculture Techniques (PAT)

By this process, farmers can plant more seeds in places where they are most likely to thrive. They can use precise amounts of water and other resources to grow crops. Precision agricultural practices enabled by high-tech equipment reduce agricultural inputs through the usage of site-specific applications, which can result in lower greenhouse gas emissions.

Technologies to resist pollution in mining

Total carbon dioxide and other pollutant emissions vary depending on the type of mine, industry and the design and nature of the mining process. To respond to the challenge of climate change, mining companies need to not only reduce greenhouse gas emissions but must also restore the bio-diversity of the area. A 3D display technology of a mine is an easy way to do this for geologists, the drill and blast team, mine planners and supervisors of the mining companies.

Suranjjan Sinha, Professor, Department of Mining Engineering, Indian Institute of Engineering Science and Technology, Shibpur, informed BE, “Vibration, noise, land degradation and erosion are the main factors behind pollution for the mining sector. The first thing the mining companies should do is to reclaim the land and fill it up to return it to the pre-mining situation. Waste materials of the mining process are also used to fill up the land to prevent erosion. And to restore the ground level water, regular water infusion to the ground is needed. These steps can also retrieve the bio-diversity of the mining area.”

Suspended Particulate Matter (SPM) and Reparable Particulate Matter (RPM) are some of the main air pollutants in coal fields. Roadside fixed sprinklers and mobile water sprinklers should be installed for dust suppression in mining areas. The application of Negative Pressure Secondary Dust Removal (NPSDR) system is a necessity in coal mines as it helps to reduce the inflow of air pollutants into the air. NPSDR technology and ultrasonic dust suppression is being extensively used in mines to pull in dusty air by generating a negative pressure field which is formed within the device.

Sinha added, “Another issue for the mining sector is noise pollution. Green-cover or row planting around the mining areas can prevent noise pollution and also help to check the level of air pollution. Regular monitoring of the contamination level for soil or air pollution is mandatory as per government norms in the buffer zone and the core mining zone.”