# Science-Policy Seminar

## Opportunity to Integrate Atmospheric Pollution Control and Climate Change Adaptation and Mitigation in Nepal

**AGENDA (DRAFT)** — 22 November 2012, Hotel Himalaya, Kathmandu, Nepal

**ORGANIZERS:** Ministry of Environment, Science and Technology (MoEST)-Nepal;
Institute for Advanced Sustainability Studies (IASS), Germany;
International Centre for Integrated Mountain Development (ICIMOD);
Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants (CCAC)

**PARTICIPANTS:** About 40 participants from the government agencies, development agencies, private sector, academia, political parties, media, NGOs etc.

| | |
|---|---|
| **9:00-9:40** | **OPENING SESSION:** *Chair*- Mr. Keshav Bhattarai, *Secretary, MoEST; Chief Guest*- Dr. Keshav Man Shakya, *Minister, MoEST, Nepal* |
| | **WELCOME ADDRESS**<br>• PD Dr. Mark Lawrence, *Scientific Director, IASS - 5 min.*<br>• Dr. David Molden, *Director General, ICIMOD –5 min.*<br>• **Overview of Science and Regional Impacts of Short-Lived Climate Pollutants** – *30 min.*<br>*Dr. Johan C. I. Kuylenstierna, Director: Stockholm Environment Institute (SEI)-York, UK;* |
| **9:40-9:50** | **INAUGURAL ADDRESS**<br>• Chief Guest Hon. Dr. Keshav Man Shakya, *Minister, MoEST, Nepal – 10 min.* |
| **9:50-10:00** | **CHAIRPERSON'S REMARKS -** Mr. Keshav Bhattarai, *Secretary, MoEST – 10 min.* |
| **10:00-10:15** | **Tea/Coffee Break** |
| **10:15-11:00** | **NATIONAL PERSPECTIVE** |
| 25 min | • **Programs and Policies on Air Pollution, Climate Change, and Renewable Energy that Address Short-Lived Climate Pollutants**<br>*Joint Secretary, MoEST, Nepal or Assistant Director, AEPC* |
| 20 min | • **Air quality and Climate Co-benefits of Various Low-Carbon Pathways in Nepal**<br>Prof. Ram M. Shrestha, *Professor Emeritus, Asian Institute of Technology (AIT), Thailand* |
| **11.00-12:15** | **ONGOING INITIATIVES** |
| 10 min | • **Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants**<br>Dr. Johan C. I. Kuylenstierna, *SEI-York, Member: Scientific Advisory Panel of CCAC* |
| 25 min | • **Reducing of Impacts of Black Carbon and SLCPs in the Greater Himalayas**<br>Dr. Arnico K. Panday, *Lead Atmospheric Scientist, ICIMOD, Nepal* |
| 20 min | • **Sustainable Atmosphere for the Kathmandu Valley (SusKat)**<br>Dr. Maheswar Rupakheti, *Group Leader- SusKat, IASS, Germany* |
| 10 min | • **Oxidation Capacity Influenced by Monsoon Outflow (OMO)**<br>Dr. Hartwig Harder, *Max Planck Institute for Chemistry (MPIC), Mainz, Germany* |
| 10 min | • **Experience from the Great Himalayan Trail- Climate Smart Celebrity Trek**<br>Mr. Dawa Steven Sherpa, *Climate Himalaya Initiative, Nepal* |
| | • **Questions and Clarifications** |
| **12:15-13:30** | **PANEL DISCUSSION AND THE WAY FORWARD** |
| **Panel:** | 1. Mr. Keshav Bhattarai, *Secretary, MoEST, Nepal*<br>2. Prof. Dr. Govind Pokharel, *Executive Director, AEPC, Nepal*<br>3. Mr. Ganesh Shah, *Former Minister for MoEST, Nepal*<br>*4.* Prof. Ram M. Shrestha, *Emeritus Professor, AIT, Thailand*<br>5. Dr. Madhav Karki, *Deputy Director General, ICIMOD, Nepal*<br>*6.* Dr. Johan C. I. Kuylenstierna, *Director: SEI-York, UK;*<br>**Moderator:** Dr. Mark Lawrence, *Scientific Director, IASS, Germany*<br>**Rapporteur:** Dr. Maheswar Rupakheti (*IASS*), and Dr. Arnico K. Panday (*ICIMOD*)<br>**Key Points for Discussion:** Science and impact studies, opportunities and barriers to ramping up current good practices, coordination among key stakeholders, the way forward etc. |
| **13:30-14:30** | **Lunch** |

## BACKGROUND

Air pollution is a major environmental and health concern in many parts of the world. In South Asia, it is linked to over a million premature deaths and a substantial amount of crop loss every year. It is also linked to disruptions in monsoon circulation and rainfall, melting of Himalayan snow packs and glaciers, strong atmospheric heating, and thus the regional climate change. Small particles (aerosols) including black carbon, ozone, and methane are toxic air pollutants as well as strong climate forcing agents. However, they live only for a short period in the atmosphere - a few days to about a decade - and hence they are called short-lived climate-forcing pollutants (SLCP). Some hydrofluorocarbons (HFCs) are also SLCP. New analyses show that fast and widespread implementation of already available measures, so-called "no regret high pay off measures", addressing SLCPs would cost-effectively save human lives, increase agricultural productivity, reduce atmospheric warming, reduce melting of ice and snow, and also help address other socio-economic and developmental challenges associated with these pollutants. The benefits of SLCP mitigation are greatest in and near areas where SLCP emissions are reduced, such as the Himalayan regions where the average rate of warming is higher than the global mean warming, with substantial benefits that also extend to the rest of the world through reduced long-range transport of pollutants, as well as through reduced climate and economical impacts. It should be noted here that SLCP mitigation measures should be implemented simultaneously with the long-term climate protection measures, which require deep and rapid cuts in carbon dioxide emissions at a global scale. Carbon dioxide, in contrast to SLCPs, is a long-lived species with atmospheric lifetime of a century or more.

A powerful case that science has now built on SLCPs, suggesting an urgent need to mitigate emissions of short-lived climate pollutants, has received a greater attention at national, regional and global level, and prompted actions aiming at reducing SLCP emissions. A new partnership called the Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants (CCAC, www.unep.org/ccac) was launched on 16 Feb 2012, the first global initiative to treat these pollutants together, as a collective challenge, and to support fast action that will make a difference on several fronts at once: protecting public health, improving food and energy security, and mitigating near-term climate change climate. Since its launch last February with only six countries and UNEP, now 27 countries and leading international organizations have joined voluntarily the growing global Coalition.

The mitigation measure that are aimed at reducing SLCP emissions, which largely include general air pollution control measures, are most effective if they are country and/or region specific and integrated with existing policies to address air pollution, climate change, and other socio-economic and developmental concerns. In other words, the transfer and replication of policies and practices always requires a careful examination of the local context (e.g., physical, economical, social, political realities, current policy and practices), and if needed, introduction of innovative approaches that fits well with local requirements and hence ensure full sustainability of the interventions. The two new initiatives in the region "Reducing impacts of black carbon and other short-lived climate forcing agents" led by ICIMOD focusing on eight ICIMOD member countries in South Asia, and "Sustainable Atmosphere for the Kathmandu Valley (SusKat)" led by IASS focusing on Nepal are aimed at creating much needed country/region-specific scientific knowledge base that can be used to create such enabling local context for promoting fast action on SLCP mitigation.

Nepal is one of the countries that are extremely vulnerable to the effects of climate change but are least prepared to deal with them. In addition, it is also affected by increasing local as well as regional air pollution. Nepal is in the midst of growth process, so are other South Asian countries, which is likely to worsen the already notorious air pollution problems if the current policies and practices are not steered towards supporting widespread and early implementation of solutions that are firmly grounded in science and yet based on local specifics.

## OBJECTIVE OF THE EVENT

The main objective of the Seminar is

- To raise awareness of key stakeholders (representatives from government agencies, development organizations, private sector, academia, political parties, media etc. in Nepal) about the latest scientific knowledge and ongoing policy and pilot actions, that can help mitigate increasing threat of harmful air pollutants including short lived carbon forcers (SCCFs) in Nepal.
- To share potential benefits of no-regret actions and their multiple benefits and the policy measures necessary

It is expected that such a science-policy dialogue will lead to the creation of an opportunity for Nepal to leverage experiences, expertise, technical and financial support from scientific communities and development agencies, and likely from partners of CCAC if Nepal becomes a member, to develop strategies and pursue concerted action to address emissions of SLCPs and the socio-economic and environmental challenges associated with these pollutants in Nepal.

## MORE BACKGROUND INFORMATION

**Greenhouse gas:** A greenhouse gas (GHG) is a gas in an atmosphere that traps the thermal radiation outgoing from the earth and warms the planet. This process is the fundamental cause of the greenhouse effect. The primary GHGs in the Earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide, and ozone.

**Short-Lived Climate Pollutants:** SLCPs are agents that have relatively short lifetime in the atmosphere - a few days to about a decade, compared to a century or more atmospheric lifetime of carbon dioxide, a dominant greenhouse gas. The main SLCPs are black carbon, methane, tropospheric ozone and some HFCs. HFCs are man-made chemicals that are used primarily as refrigerants. Ozone and black carbon are toxic to human health. Ozone is also toxic to plants. These SLCPs are strong global warming agents. They account for 30 to 40% of global warming. The impacts of SLPs are typically greatest in and near areas where emissions are high.

**Black Carbon:** BC is a major component of soot. It is produced by incomplete combustion of fossil fuel and biomass. It is emitted from various sources including diesel cars and trucks, residential stoves, forest fires, agricultural open burning, and some industrial facilities. On 12 June 2012, International Agency for Research on Cancer (IARC), a part of WHO, classified diesel engine exhaust, of which soot is a main component, as "carcinogenic to humans", based on the evidence that it is linked to an increased risk of lung cancer. BC has a warming impact on climate 460-1500 times stronger than carbon dioxide. Globally it is estimated to be 2$^{nd}$ most important warming agent after carbon dioxide. BC deposition on snow and ice, for instance in the Arctic and the Himalayas, accelerates melting.

**Ozone:** Ozone is not directly emitted but formed by sunlight-driven reactions between other agents, called ozone precursors, in particular methane but also carbon monoxide, non-methane volatile organic compounds and nitrogen oxides. Ozone is a harmful pollutant that has detrimental impacts on human health and plants and is responsible for important reduction in crop yields. It is also a greenhouse gas.

**Methane:** Methane is produced through natural processes (i.e. the decomposition of plant and animal waste), as well as from man-made sources, including coal mines, natural gas and oil systems, and landfills. Methane directly influences the climate system as it is a greenhouse gas that is over 20 times more potent than carbon dioxide. It also has indirect impacts on human health and ecosystems, in particular through its role as a precursor of tropospheric ozone.

**HFCs:** HFCs are man-made greenhouse gases used in air conditioning, refrigeration, solvents, foam blowing agents, and aerosols. Though they represent a small fraction of the current total greenhouse gases (less than 1%), their warming impact is particularly strong and, if left unchecked, HFCs could account for nearly 20% of climate pollution by 2050.

**Impacts of SLCPs:** A recent global study led by Drew Shindell of NASA, which incorporates today's science and technology, suggests that fast and widespread implementation (globally) of a small number of already available measures to reduce BC and methane emissions has the potential to save close to 2.5 million lives and avoid an estimated 50 million tones crop losses a year in 2030 and beyond, to reduce rapid melting of ice and snow in the Arctic and in mountain regions like Himalayas, to reduce disruptions to monsoon rainfall patterns, and to strongly reduce global mean warming in near-term, i.e., about 0.5ºC by 2050. Simultaneous actions on addressing short-lived climate pollutants and long-term climate protection, which requires deep and rapid cuts in carbon dioxide emissions at a global scale, will substantially reduce the risks of crossing the 2°C threshold by the end of 21$^{st}$ century. Air pollution levels in Nepal are quite high, potentially having substantial impacts. The above mentioned study suggests that such measures would save about 25,000 lives a year from (outdoor) air pollution and avoid nearly 3% crop loss (wheat, maize, rice and soy) a year, enough to feed about 500,000 people for a year, in Nepal in 2030 and beyond. Such measures will also reduce indoor air pollution substantially, which is a major health concern in Nepal. In addition, this will result in decrease in regional atmospheric warming by 5.3 W/m$^2$ and reduce surface temperature by 0.3°C by 2050 in Nepal. Furthermore, a reduced rate of changes in regional rainfall patterns and slowdown of snow and ice melting in the Himalayas from reduced warming will bring in additional benefits to Nepal.

## REFERENCE


1. UNEP and WMO (2011). Integrated Assessment of Black Carbon and Tropospheric Ozone: Summary for Decision Makers, UNEP.
2. Shindell, D. et al. (2012). Simultaneously Mitigating Near-Term Climate Change and Improving Human Health and Food Security. Science, Vol. 335:183-189, DOI: 10.1126/science.1210026.
3. CCAC (2012). Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants (CCAC). www.unep.org/ccac

**POTENTIAL PARTICIPANTS:**

| | |
|---|---|
| *Government:* 10-12 | 1. Ministry of Environment Science and Technology (MoEST)<br>2. National Planning Commission (NPC)<br>3. Ministry of Population and Health<br>4. Ministry of Energy<br>5. Ministry of Tourism and Civil Aviation<br>6. Ministry of Local Development<br>7. Ministry of Urban Development<br>8. Ministry of Education<br>9. Ministry of Forest & Soil Conservation, Env. Div.<br>10. Alternative Energy Promotion Center (AEPC)<br>11. Kathmandu Metropolitan City<br>12. Lalitpur Sub-Metropolitan City<br>13. Nepal Health Research Council (NHRC)<br>14. Nepal Agricultural Research Council (NARC)<br>15. Nepal Academy of Science and Technology (NAST) |
| *Dev. Agencies:* 5-8 | 16. UNDP<br>17. DFID<br>18. SNV<br>19. DANIDA<br>20. SDC<br>21. GIZ<br>22. UN Habitat |
| **Private Sector:** 4-5 | 23. FNCCI<br>24. Automobile Association of Nepal (AAN)<br>25. NADA<br>26. Brick Manufacturers' Association |
| **Political Parties:** 4-5 participants | 27. NC<br>28. CPN UML<br>29. UCPN-M<br>30. SLMM<br>31. Free Students Union of TU, Central Campus, Kirtipur |
| **Academia/Research:** *4*-5 | 32. TU Central Department of Physics,<br>33. TU CD Environment<br>34. TU Institute of Engineering, Pulchok<br>35. KU Science Dean<br>36. NUTA<br>37. SHIKSHAK (a teachers' magazine) |
| **Media:** 4-5 | 38. Kantipur TV/ NTV<br>39. Kantipur daily/Kathmandu Post daily<br>40. Gorkhapatra/The Rising Nepal<br>41. Republica/Nagarik daily<br>42. Himal Khabar |
| **NGOs/NGIs:** 4-5 | 43. ISET, Nepal<br>44. HIMCCA<br>45. Climate Himalaya Initiative<br>46. WWF<br>47. IUCN<br>48. Clean Energy Nepal<br>49. Center for Rural technology<br>50. Clean Air Network Nepal (CANN)<br>51. MaHa Sansar |
| **Organizers and International Experts:** 10-12 | 52. SEI<br>53. MPIC<br>54. IASS<br>55. ICIMOD |