National Action Plan for SLCP mitigation in Nepal

A. Introduction

Short-lived climate pollutants (SLCPs) are those climate enforcers that have relatively short atmospheric lifetimes but are major contributors to the anthropogenic global greenhouse effect after carbon dioxide (CO_2). SLCPs also have various detrimental impacts on human health, agriculture, and ecosystems. National level action plans for controlling SLCPs have been emphasized as different countries have a unique mix of emission sources and varying socio-economic and cultural conditions (UNEP, 2011).

Atmospheric lifetimes of SLCPs and long-lived greenhouse gas CO_2

Pollutant		Lifetime
Carbon dioxide		Decades to centuries; about 20% will persist for many millennia
SLCPs	Black carbon	3– 8 days
	Methane	12 years
	Ozone	4–18 days
	HFCs	15 years (average mix)

Source: (UNEP, 2011a; EESI, 2013)

Because of its proximity to one of the largest imperiled sources of fresh water in the world, the Himalayan glacier system, South Asia is especially vulnerable to the impacts of black carbon (BC) including other SLCPs from the standpoints of climate, health, food security, and livelihoods.

As this is a very recent issue, Nepal does not yet have policies that specifically address SLCPs in place. However, there are several other policies, programmes and plans related to air quality management, climate change, energy efficiency, etc that support or provide co-benefits for the mitigation of SLCPs.

The primary objective of the current study is to prepare a pursuable, effective strategic action plan to mitigate emissions of priority SLCPs in the country and their precursors from different sectors, and to reduce their negative impacts on public health, food security, and climate change.

B. Methodology

The Climate and Clean Air Coalition (CCAC) developed a definite work plan was developed for a study based on the SLCP National Planning Guidance Document. The activities undertaken were:

- Baseline assessment of emission sources and status, including institutional and legal frameworks, and current initiatives related to SLCP strategies
- Stakeholder consultations (governmental and non-governmental)
- Training on Long-range energy alternatives planning system with an integrated benefits calculator (LEAP-IBC)[1] – jointly conducted by the Stockholm Environment Institute (SEI), York, and the International Centre for Integrated Mountain Development (ICIMOD) in November 2016 at the ICIMOD complex in Kathmandu

[1] LEAP-IBC is a tool kit developed by SEI and US-EPA for CCAC. LEAP allows users to build SLCP-relevant emissions models and implement SLCP control strategies, while IBC links the emissions from LEAP to the GEOS-Chem Adjoint global chemical transport model to estimate concentrations of particle pollution and ozone and then estimates benefits for health, crops, and climate.

- Development of baseline scenarios and quantification of benefits of implementing measures using LEAP-IBC
- Development of sectoral SLCP mitigation plans

Stakeholder assessment of pathways, plans, and priorities will be done through mass presentation and discussion with stakeholders.

C. Status of SLCPs in Nepal

The current status of SLCP emissions in Nepal is derived from the LEAP modeling framework. The study period is from 2010 to 2050. The demographic and economic as well as energy and non-energy activity data were taken from a statistical database available from government documents and other regional and international sources.

SLCPs and particulate matter (tonnes) from different sectors in 2015 (calculation, 2016)

(Tons)	Black carbon	Methane	Particulates PM2.5
Agricultural	575	57	32
Commercial	871	3,380	4,599
Industrial	1,607	363	4252
Industrial Process Emissions	1	-	163
Livestock Management	-	607,965	-
Rice Cultivation	-	126,633	-
Open Burning	4,662	41,418	64,732
Residential	25,428	120,046	145,716
Transport	6,608	265	7,145
Waste Management	73	129,983	1,103
Total	**39,825**	**1,030,111**	**227,741**

D. Mitigation Measures and Impacts

The study encompasses major mitigation strategies based on UNEP/WMO (2011), Sharma (2014), USAID (2010), USEPA (USEPA, 2012), draft report of low carbon economic development strategy (MOPE, 2014), discussions with stakeholders, and other relevant sources. The major mitigation measures for SLCPs are usually readily available technologies and methods. They are:

- Promotion of clean cooking and lighting technology
- Increased access to electricity
- Efficiency and technology improvement in residential as well as industrial sectors
- Transformation of traditional brick production into new clean and efficient production technologies
- Promotion of mass transport including electric vehicles
- Improvement in livestock management and agricultural activities
- Control open fire (forest and agricultural residues)
- Waste management, including waste to energy

Reduction potential in policy scenario with respect to the reference scenario

Scenarios >	2030 (thousand metric tonnes)			2050		
	Reference	Policy	Reduction	Reference	Policy	Reduction
PM2.5	247	72	72%	344	47	86%
Black carbon	48	8	82%	8	74	89%
Methane	1,874	579	69%	4,126	5,045	78%
Greenhouse gases	153	51	67%	351	86	76%

Impact of mitigation measures on policy scenario*

	2030	2050
PM2.5 Concentration	19 µg/m^3 (82%)	33 µg/m^3 (82%)
Avoided Loss of Lives	11,500 people (77%)	34,400 people (80%)
Avoided Crop Yield Loss	218,000 tons (81%)	1,700,000 tons (93%)

**due to national emissions, ie, excludes impact of transboundary effect*
(##%) denotes reduction with reference to reference scenario

E. Policy Recommendations

- Separate section "SLCP and Air Quality Management Section" to be formed under the Environment Management Division at the Ministry of Population and Environment to formulate, implement, and monitor policies related to air pollution and SLCPs emissions
- Regional and global cooperation for addressing the issue at a broader level, including transboundary effects and knowledge sharing
- Detailed and continuous study of emissions at point sources
- Monitoring and evaluation—to measure the progress of strategies/action plan and to provide feedback for further action

F. Refrences

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