Gender Issues in Mitigating the Impacts of Black Carbon

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What is Black Carbon (BC)?

- Dark particles in the atmosphere, emitted during incomplete combustion
- **Biggest sources:**
  - Traditional cook stoves
  - Brick kilns & other coal burning industries
  - Diesel vehicles
- **Impacts on:**
  - Respiratory health
  - Climate
  - Visibility

BC is called a “short-lived” climate forcer because it only stays in the atmosphere for a few weeks before getting washed out [Unlike greenhouse gases like carbon dioxide which remain in the atmosphere for decades to centuries]
BC a major component of dry-season haze that covers the Indo-Gangetic Plains & penetrates mountain valleys.
Yesterday in southern Bhutan:
Haze from the plains beyond Phuentsholing crossed the border without a visa, before rising up the slopes and over the ridge at Gedu...
...and up the Wang Chu Valley into Central Bhutan, reducing visibility...
Climate effects of black carbon

Black carbon absorbs sunlight, warming upper parts of haze layers. Air in contact with glaciers warmed, contributing to their melting and to reduced dry-season water availability in rivers.

RBC removes sunlight that would penetrate into lower valleys

=> Cooler day-time temperatures in valleys Affects agriculture, fog formation.
(1) Heating and cooling changes affect atmospheric stability & convection.
(2) BC particles affect cloud microphysics and precipitation formation.

=> Most likely effects: no change in annual rainfall but concentrated in fewer, more extreme events: increased floods and landslides?

BUT: still LARGE scientific uncertainties in:
- Understanding of processes
- Quantifying links between source regions and impacts

What fraction of the black carbon arriving on Mt. Chomolhari is from cooking fires in Bhutan? From cooking fires in the plains? From industries in Jamshedpur? From large cities?
Gender Issues 1 (Impacts)

Respiratory effects near sources of BC:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Affected Group</th>
</tr>
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<tbody>
<tr>
<td>Cooking fires</td>
<td>Predominantly women and children</td>
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Impacts of BC induced climate change:

- Due to predominantly male labor migration, **women** staying behind are more affected by changes in rainfall, water availability, disaster frequency.

Impacts of visibility reduction:

- Affects tourism income in places that depend on good views [possible gender issues]
- Affects aviation safety [gender neutral?]
Reducing black carbon emissions from cook stoves

- Many stove designs exist for cooking with biofuels with less black carbon emissions.
- Effectiveness depends on whether design takes into account user needs.
- Strong need to involve women users in design.

Reducing black carbon emissions from vehicles, brick kilns, and other industries

- Mostly issues of engineering, technology, and financing. Gender issues NOT prominent.
SIDA funded project at ICIMOD:
“Reducing the Impacts of Black Carbon and other Short-lived Climate forcers”

**Project components:**

- Advancing the science of black carbon and other SLCFs in the region
- Supporting regional policy development
- Testing and disseminating technologies and other mitigation measures.
  - Pilot studies on HOW to distribute improved cookstoves.
  - Student competition among interdisciplinary teams to design improved mitigation options (taking into account gender issues)
- Disseminating knowledge about black carbon sources, impacts and mitigation options
Science component:
Existing BC monitoring stations

- Kanpur 125 m
- Jomsom 2900 m
- Manora Peak 2000 m
- NCO-P 5079 m
- Nam Tso 4900 m
Major gaps in Central / Eastern Himalayan foothills
Proposed ICIMOD initiated monitoring stations

- Manora Peak: 2000 m
- Kanpur: 125 m
- Jomsom: 2900 m
- Ichhyakamana, Nepal: 1800 m
- NCO-P: 5079 m
- Nam Tso: 4720 m
- Gedu, Bhutan: ~2100 m
THANK YOU!
BC Emissions
- Power generation
- Industry
- Transportation
- Open fires
- Heating
- Cooking

Atmospheric Processes
- Pollutant transport
- Chemical transformation
- Wet and dry removal
- Radiative effects

Impacts
- Cryosphere
- Monsoon
- Atmos. stability
- Visibility
- Outdoor air quality
- Indoor air quality
- Economic impacts
- Water availability
- Agriculture
- Wellbeing
- Health

Policy Development
- Adoption of mitigation measures

Assessment of mitigation options
- Menu of tested mitigation options
- Study of barriers and constraints