

Unlocking Science: A pathway to mitigate Super Pollutants with strong co-benefits

Mitigation of Super Pollutants: Harnessing Multiple Co-benefits for Air Quality, Health, Climate, Cryosphere, and Economy

**Better Air Quality Conference (BAQ 2026)
12 March 2026, UNCC, Bangkok, Thailand**

**Dr. R. L. Verma
Science Manager - Super Pollutants
Clean Air Fund**

Super pollutants and their climate warming effects

Non-CO2 climate forcers that have **significant impacts on climate change...**

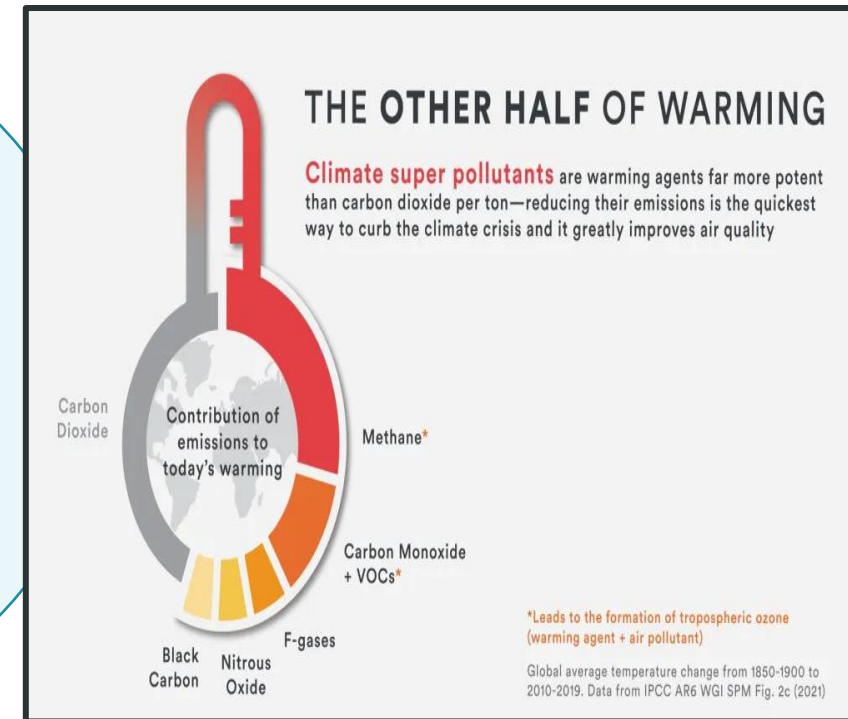
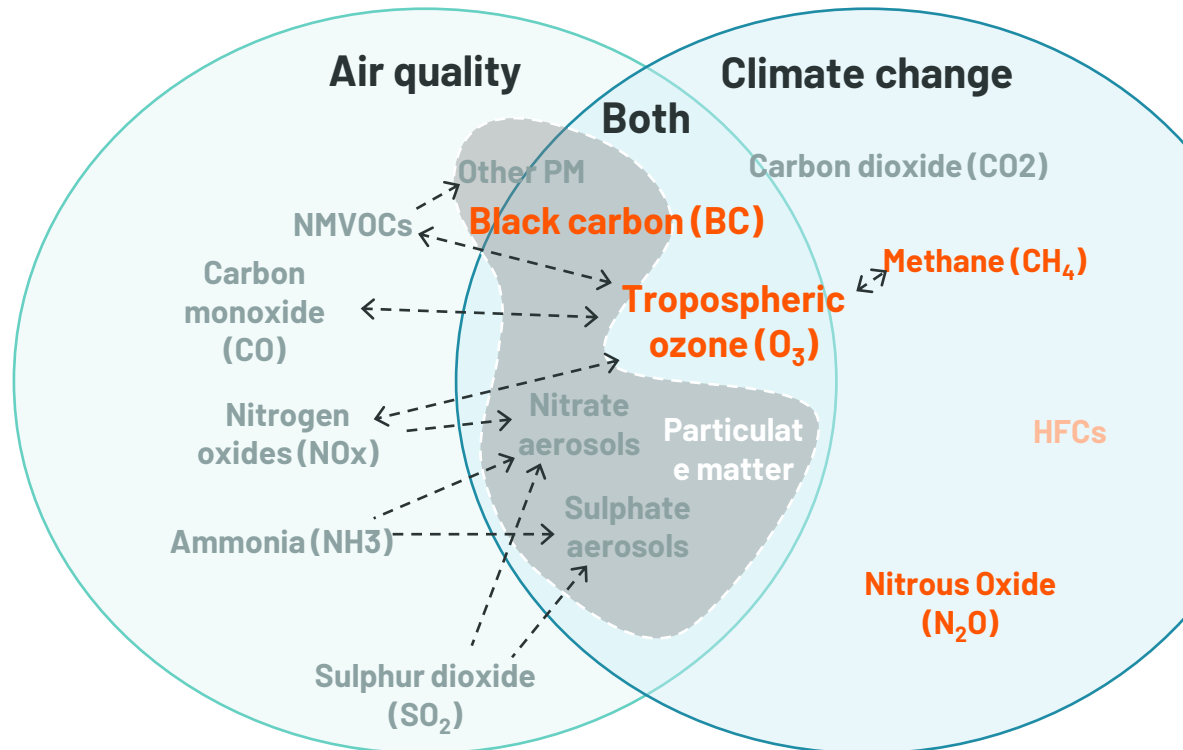
... and some of which also **affect public health and the environment as air pollutants**

...contributing to **half of climate warming effects**

↔
Atmospheric
chemical relationship

Super pollutants:

- Methane
- Black carbon
- Tropospheric ozone
- HFCs
- N₂O



Major effects of BC and Trop-O₃

BC



Regional climate and environment

0.07 °C warming (IPPC AR6), causing 39% of total glacier melting and 10% of glacier mass loss due to reduced precipitation in the Tibetan Plateau



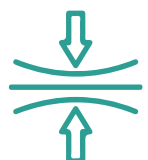
Climate tipping points

Strong links to Arctic amplification and sea ice loss



Health and social justice

Millions of premature deaths each year due to air pollution, with a growing body of black carbon-specific health evidence



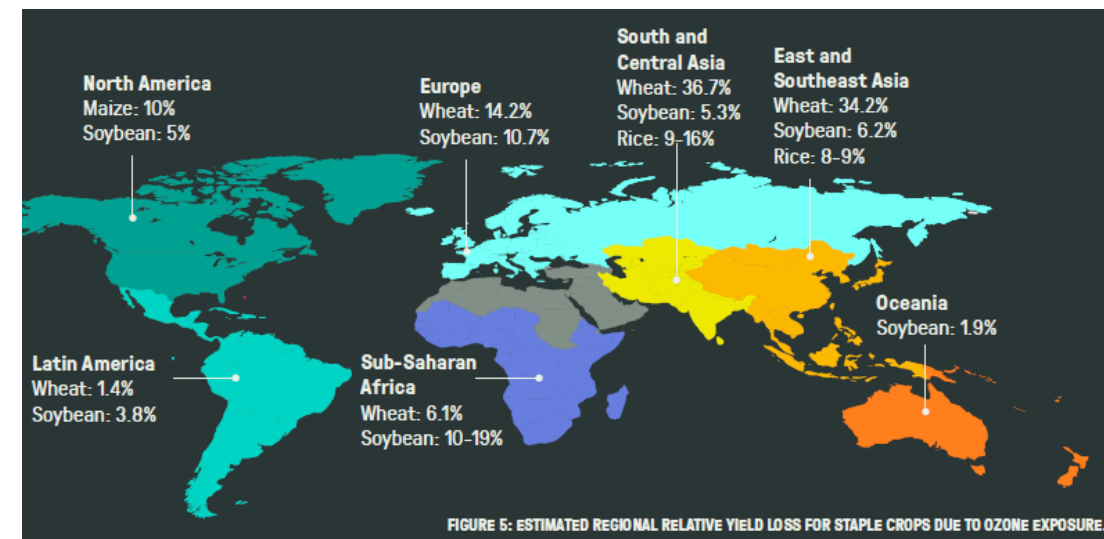
Resilience

black carbon can increase the risk of extreme rainfall events such as floods

Trop-O₃

Warming: 0.23 °C global warming to date
Economy: \$0.5 trillion economic loss yearly
Deaths: 500,000 premature deaths yearly
Agriculture: 26% global crop yields loss yearly
Ecology: 11% loss in forest productivity

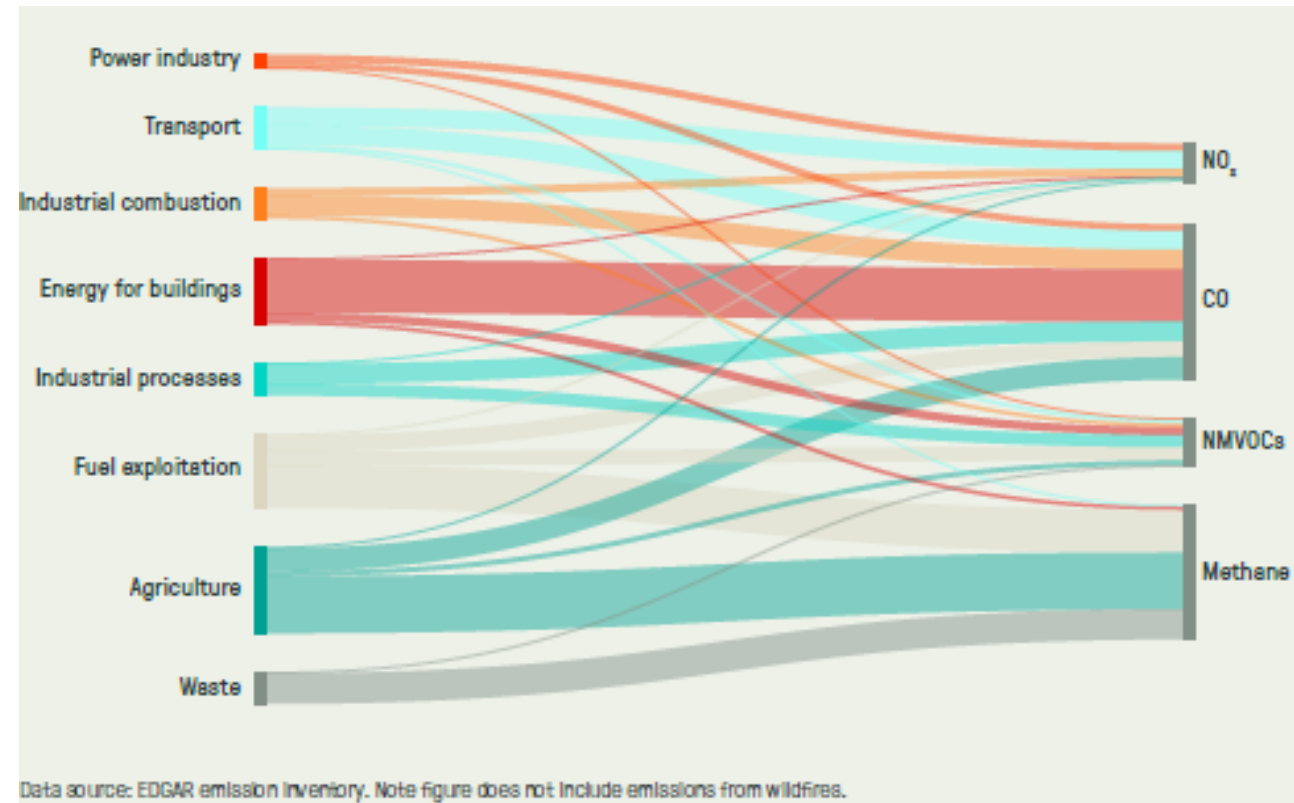
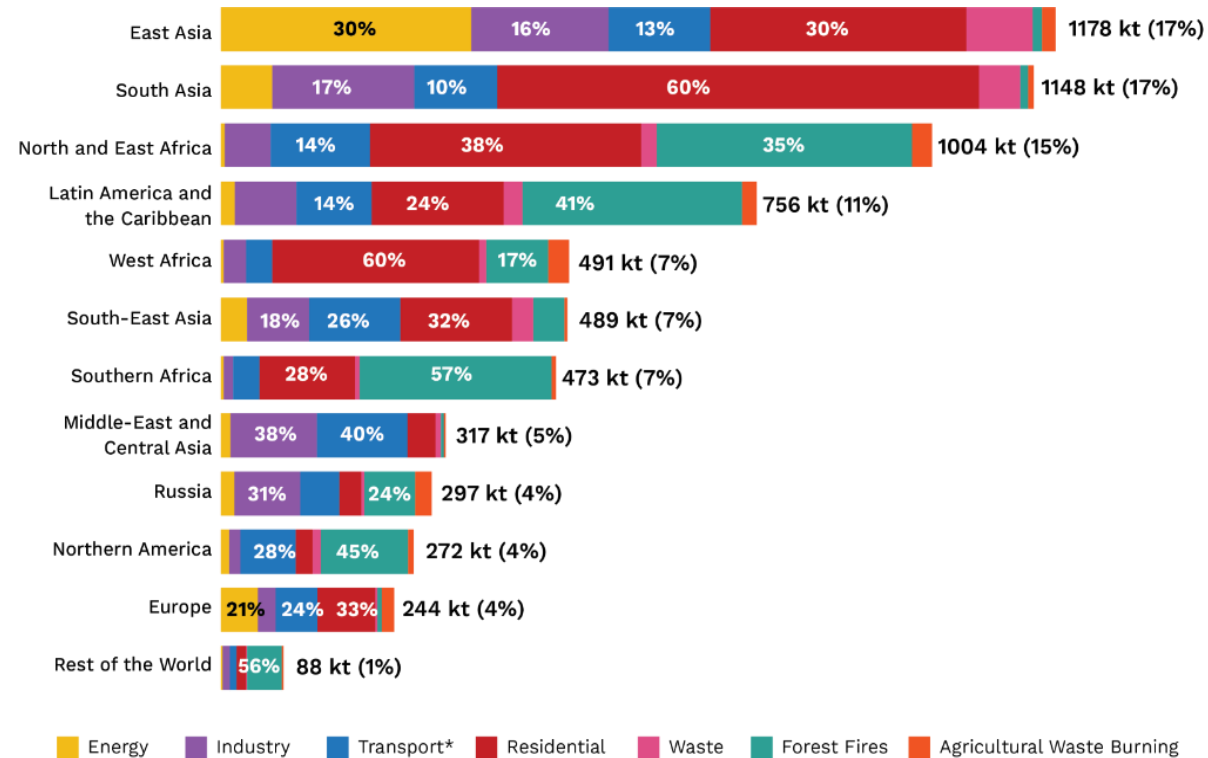
Global crop yield loss due to surface ozone exposure



Emissions...

BC

Trop-O₃: Relative contributions of precursors



Emission estimates provided evidence-based information for interventions to reduce emissions of BC and Trop-O₃ precursors

CAF's contribution in generating evidence and solutions

CLEAN
AIR
FUND

Launched in 2024 multi-million USD
Programme on Black Carbon

Launched in 2024 (at COP29)

CLEAN AIR FUND CSTEP BERKELEY AIR MONITORING GROUP

THE CASE FOR ACTION ON BLACK CARBON

Avoiding climate tip
resilience and delive

CLEAN AIR FUND

TACKLING BLACK CARBON: HOW TO UNLOCK FAST CLIMATE AND CLEAN AIR BENEFITS

March 2025

The cover features logos for the Clean Air Fund, CSTEP, and the Berkeley Air Monitoring Group. The main title is in large orange letters. Below it, a smaller subtitle reads 'Avoiding climate tip resilience and delive'. A photograph of a person carrying a large bundle of sticks on their head is partially visible on the left. The bottom section has a blue background with white text.

BENEFITS OF INTEGRATING BLACK CARBON INTO ENHANCED NDCS

Averting near-term warming, supporting adaptation and promoting climate-resilient development

The cover has a dark background with white text. It features a photograph of a person carrying a large bundle of sticks on their head.

THE CASE FOR ACTION ON TROPOSPHERIC OZONE

Integrated action to mitigate climate change, deliver clean air and support food security

CLEAN AIR FUND CA TFP CLEAN AIR TASK FORCE Clean Air Institute

The cover has a blue background with white text. It features a photograph of a city skyline with a hazy atmosphere. Logos for the Clean Air Fund, CA TFP, and Clean Air Institute are at the bottom.

June 2025 CLEAN AIR FUND

ACCELERATING ACTION ON TROPOSPHERIC OZONE

A Strategic Roadmap for 2025-2030

The cover has a blue background with white text. It features a photograph of a city skyline with a hazy atmosphere. The Clean Air Fund logo is in the top right corner.

2026....
Mobilizing
Resources

CAF's contribution in generating evidence and solutions

Our current focus on black carbon science

1. Reduce **uncertainties** in climate impacts
2. Improve **emissions estimations**
3. Advance understanding on **regional climate impacts** develop policy pathways
4. Build evidence base on **health impacts**.
5. Build **consensus** and strengthen engagement with scientific community and policymakers on climate and health impacts and policies

More than 30 projects on black carbon around the globe



- Action
- Advocacy
- Communication
- Events
- Science

Asia specific key projects

No	Pillar	Key outcomes
1.	Science	Role of BC in climate system and regional emission estimation
2.	Science	BC impacts on extreme climate events and estimation of societal costs of BC impacts
3.	Science	Estimation of impacts of regional BC emissions on the Himalayas including glaciers melting
4.	Science	Estimation of the impacts of BC on cloud formation and monsoon rain
5.	Advocacy	Ministerial level announcement at COP30 (including Sri Lanka) on BC
6.	Advocacy	BC or Air quality in NDCs
7.	Communication	Black Carbon Hub

Thank you for your kind attention

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Some key reports

1. **Accelerating Action on Tropospheric Ozone: A Strategic Roadmap for 2025-2030;** <https://www.cleanairfund.org/resource/accelerating-action-on-tropospheric-ozone/>
2. **The State of Global Air Quality Funding 2025;** <https://www.cleanairfund.org/resource/air-quality-funding-2025/>
3. **Tackling Black Carbon: How to Unlock Fast Climate and Clean Air Benefits;** <https://www.cleanairfund.org/resource/tackling-black-carbon-report/>
4. **The Case for Action on Tropospheric Ozone;** <https://www.cleanairfund.org/resource/action-on-tropospheric-ozone/>
5. **Benefits of Integrating Black Carbon into Enhanced NDCs;** <https://www.cleanairfund.org/resource/black-carbon-ndcs/>
6. **The Case for Action on Black Carbon;** <https://www.cleanairfund.org/resource/black-carbon/>