CLIMATE & CLEAN AIR COALITION
TO REDUCE SHORT-LIVED CLIMATE POLLUTANTS

a UNEP convened initiative



Towards Gender-Transformative Action on Super Pollutants

Guidance for policymakers and civil society

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Suggested citation

Climate and Clean Air Coalition (2025). Towards Gender-Transformative Action on Super Pollutants. Paris. https://www.ccacoalition.org/resources/towards-gender-transformative-action-super-pollutants

Cover photos: Tatiana Munko/Adobe Stock

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OXFAM

Acknowledgments

This guidance document was prepared by Oxfam America under the overall oversight of the Climate and Clean Air Coalition (CCAC) Secretariat. The work was undertaken at the request of the CCAC Board to strengthen gender responsiveness, inform funding allocation, and provide practical guidance to partners and the wider community on advancing gender-responsive approaches.

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The CCAC Secretariat provided strategic direction and technical guidance throughout the process. The authors wish to acknowledge, in particular, the contributions of Dana Crawhall Duk (CCAC Secretariat) and of Nick Galasso, Ashfaq Khalfan, Andrew Bogrand, and Stephanie Smith (Oxfam America) for their dedicated support.

The authors also wish to thank those who reviewed the research terms of reference and/or final drafts and provided valuable feedback: Ava Bahrami, Gregory Kohler, Sandra Cavalieri, Donovan Storey, Scarlett Quinn-Savory, Amanda Curry-Brown, Juliette Laurent, Marko Baloloy, James Garvie, Francis Agbere, Laurel Pegorsch, Namalie Jayasinghe, and Richard Hato-Kuevor.

Gratitude is also extended to the experts who contributed their time and insights through interviews, which informed and enriched the development of this guidance.

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About the authors

This paper was commissioned by the Climate and Clean Air Coalition (CCAC) and developed by Oxfam America's staff.

The Climate and Clean Air Coalition is a United Nations Environment Programme-convened partnership of over 200 governments, intergovernmental organizations, and non-governmental organizations. The Coalition works to reduce powerful but short-lived climate pollutants (SLCPs) – methane, black carbon, hydrofluorocarbons (HFCs), and tropospheric ozone – that drive both climate change and air pollution. The CCAC serves as the secretariat of the Global Methane Pledge, a voluntary agreement of 158 states and the European Union to reduce global methane emissions 30 percent below 2020 levels by 2030. The CCAC Gender Strategy was launched at the CCAC Ministerial at COP27, committing to promoting gender equality throughout all operations and activities.[1]

Oxfam is a global organization that fights inequality to end poverty and injustice. Oxfam has a presence in over 70 countries and works with a network of over 2,000 partners around the world. For over 10 years, Oxfam has worked on super pollutants and inequality in the Global South, building on several decades of work in extractive industries and food systems, among other relevant sectors. Oxfam's super pollutants program includes the flagship report *Mitigating poverty and climate change: How reducing short-lived climate pollutants can support pro-poor, sustainable development.*[2] Gender justice is at the heart of all of our programs at Oxfam, where we partner with leaders and movements to end gender discrimination, elevate care work, and support people of all genders to strengthen their voice and leadership. Oxfam's research on gender and climate includes *A Guide to Gender Impact Assessment for the Extractive Industries and Caring in a changing climate: Centering care work in climate action.*[3][4]

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Foreword

Gender inequality poses a significant threat to efforts combating climate change. Failing to address these inequalities results in severe consequences, including food insecurity, heightened health risks, and increased gender-based violence. It also undermines the effectiveness of adaptive measures and mitigation strategies, particularly in reducing emissions from super pollutants like methane, black carbon, hydrofluorocarbons, and tropospheric ozone. The current literature and data on the relationship between gender and these super pollutants is alarmingly scant.



This is precisely why the CCAC's report, Towards Gender-Transformative Action on Super Pollutants, is indispensable. By relying on existing research and data, it makes a vital contribution by examining various areas such as agriculture, waste management, fossil fuels, cooling technologies, household energy, and transportation. The document maps the impacts, identifies successful initiatives, and provides key recommendations for moving forward in these six critical areas.

At Women in Informal Employment: Globalizing and Organizing (WIEGO), we seek to support the working poor, especially women, in the informal economy through stronger organisations, improved statistics and research, and appropriate policies, laws and regulations. Our focus on the informal economy is because the majority of workers in developing countries, more so the working poor, are engaged in the informal economy; a higher percentage of women workers (rather than men workers) are engaged in the informal economy; and there is marked gender gap in resources, opportunities, and earnings within the informal economy.

This guidance document underscores how women in general, and particularly those in the informal economy, are disproportionately affected by climate change. Additionally, it underscores the role women play in driving social innovations and catalysing change. This perspective is crucial in positioning women as key change agents rather than simply portraying them as victims.

Finally, this report emphasises that reducing emissions of super pollutants is like "pulling an emergency brake" on the current crisis. We are in a critical decade where we can significantly lessen the impacts of social and environmental collapse, but this can only be achieved by centering gender inequality, which serves as an impediment to just transitions.

I hope that policymakers and practitioners will widely use this guidance to promote gender equality while combating climate change in the years to come.

Dr. Sonia Maria Dias

WIEGO's Global Waste Specialist and Coordinator of the Circular Economy Thematic Chamber of Brazil's National Climate Change Forum

01 Framework

The purpose of this guidance document is to analyse gender considerations, challenges, and opportunities in the super pollutants field, in order to provide multilateral institutions, policymakers, and civil society with a shared foundation for discussion and action.

In the last several decades, there has been an important effort to address climate and gender inequality, with the development of diverse pieces of analysis paying attention to the gender-differentiated impacts of climate change. Scholars and practitioners have proposed moving from a gender-aware analysis and interventions to a gender-sensitive approach, to an even more transformative approach, that tackles the systemic causes of both gender inequality and climate change[5].

This guidance document seeks to follow this line of work by incorporating analysis and nuance on the relationship between super pollutants and their gender-differentiated impacts. The research conducted relies on existing literature and data on gender and super pollutants, which is still a new area of exploration with several limitations. This guidance document seeks to serve as a starting point that could guide future work at this nexus.

What do we mean by super pollutants?

Super pollutants are a grouping of atmospheric pollutants, including methane, black carbon, hydrofluorocarbons (HFCs), and tropospheric ozone, that have climate effects greater than carbon dioxide and can have other environmental and human health effects.[6] Super pollutants are responsible for around half of global warming to date. Super pollutant mitigation is key to simultaneously combatting climate change and air pollution. Cutting these emissions is like pulling an emergency brake.[7] Due to their short lifespan, mitigating super pollutants in the near term gives us a window to avoid dangerous climate tipping points.

For many sectors, solutions for super pollutant mitigation are already available and cost-effective. Super pollutants are also emissions from our everyday lives. These emissions come from where we live, work, and play; how we light, heat, and cool our homes; how we grow food and manage waste. Communities feel the local harmful impacts on air quality, human health, and ecosystem health – and, conversely, communities feel the positive benefits of local super pollutant reduction. Cutting super pollutants is an important opportunity to advance development and equality. Emissions of super pollutants and their precursors come from a range of sectors, including agriculture, cooling, fossil fuels, household energy, transport, and waste. These six sectors are priority sectors of the CCAC, with respective sector Hubs bringing together a community of practice and hence are also the focus of this paper.

What do we mean by gender-transformative action?

This guidance document draws on several tools to posit a framework for gender-transformative action on super pollutants.

The CCAC Gender Strategy recognizes gender inequality, discrimination, and social exclusion as critical conditions to women's experience of the climate crisis. The strategy outlines the importance of including gender considerations in the planning and implementation of climate change and air pollution mitigation measures in order to achieve more sustainable, equitable, and effective outcomes.[8]

The Gender Integration Continuum, a tool developed by the Interagency Gender Working Group and used throughout the international development community, presents four categories of gender integration from gender unaware to gender transformative, in order to understand the type of gender integration that can be achieved when implementing a particular program or project (See Box 1). In this guidance document, gender considerations not only acknowledge gender differences, vulnerabilities, or capacities but seek to develop guidance, through critical analysis and recommendations, to create systemic change and improvements in the super pollutants field.

Box 1: Gender Integration Continuum

- **Gender unaware:** There is limited consideration that people of different genders may have different roles, needs, vulnerabilities or capacities, or acknowledgement of preexisting power imbalances between people of different genders. Programs or projects are likely to be shaped by stereotyped and cisnormative assumptions that may exclude or disadvantage certain gender groups. Gender-unaware approaches are likely to perpetuate and exacerbate gender inequalities.

- **Gender aware:** There is acknowledgement that different genders (including gender minorities) are impacted differently or may have different roles, needs, vulnerabilities, or capacities. There is analysis and assessment of differential vulnerabilities, risks and capacities, and of the existence of gendered power imbalances, but without proactive systemic adaptation to change and improve.

- **Gender sensitive:** Programs or projects reflect awareness of differential impacts on and vulnerabilities of different genders (including gender minorities), and the existence of gendered power imbalances. Strategies, priorities, and activities are adapted to better meet the needs of marginalized gender groups.

- **Gender transformative:** Programs or projects reflect awareness of differential impacts on and vulnerabilities of different genders (including gender minorities), and the existence of gendered power imbalances. Objectives, strategies, priorities, and approaches are (re)designed to meet the needs of all people. There is consideration of harmful gender roles, norms and relations, acknowledgement of how gendered assumptions marginalize different genders, and proactive effort to reduce gender-based inequalities.

1. Source: Skakun, Z., Smyth, I. & Minne, V. (2021) Transforming gender inequalities: Practical guidance for achieving gender transformation in resilient development. Oxfam.transformation in resilient development. Oxfam.

Transformative Leadership for Women's Rights is an additional framing developed by Oxfam that recognizes the power of leadership to challenge existing gender inequalities and transform systems. It draws on Gender at Work's framework[9] that considers four quadrants of power: formal systemic (rules and policies), formal individual (resources), informal systemic (norms and exclusionary practices), and informal individual power (consciousness and capabilities). Looking at power in this way, beyond a narrow scope of rules and policies, can surface the types of power held by marginalized groups, as well as where there is still work to be done and how to develop robust policies and programs that together respond to each of these quadrants.

Applying these frameworks around gender-transformative action to the field of super pollutants can help elucidate the ways that women and gender diverse people may impacted by the emission of super pollutants as well as by mitigation efforts. These frameworks also help to identify opportunities for women's leadership to transform inequalities exacerbated by super pollutant impacts and gender-unaware climate action. It is important to note that women and gender diverse people may experience these inequalities differently given identities including race, ethnicity, class, sexuality, or disability.

In some of these six sectors, the gendered impacts of super pollutant emissions are widely documented. In other sectors, far less literature exists. Additionally, the risks and impacts of super pollutants are scattered across a wide range of research themes, including extractive industry governance and climate resilient agricultural practices, where super pollutants are relevant but not explicitly named. Moreover, while some literature describes or analyses gender-aware policies and programs, less literature goes as far as describing or analysing a gender-transformative approach.

To build a vision beyond these gaps in the literature, this guidance document uses the CCAC Gender Strategy, the Gender Integration Continuum, and Transformative Leadership for Women's Rights as complementary instruments. These resources can serve as a starting place for stakeholders, including policymakers and civil society, as they develop deeper and more contextualized understanding of the actions needed to address gender inequality and power dynamics in the particular work they lead.

02 Methodology

This guidance document is based on a literature review, including peer-reviewed research, non-governmental organization reports, and articles across six key source sectors of super pollutant emissions: agriculture, cooling, fossil fuels, household energy, transport, and waste. The literature selected was compiled using keyword searches of each super pollutant, sector, and related terms, narrowed to those published in the last ten years.

The literature was analysed for key findings and common themes, and evaluated in terms of relevance, robust gender analysis, and credibility of the source. Through this process, several categories of impact emerged, which guide our analysis in this report. These categories help us move beyond a narrow analysis of pollutants themselves, and into a broader analysis of the sectors from which they are emitted.

- **Exposure:** Are people of different genders exposed to these emissions and related harms differently, considering their gender roles, norms, and relations?
- **Vulnerability:** When exposed, do people of different genders experience different impacts due to biological, social, or economic susceptibility?[10]
- **Access to resources:** Do people of different genders have different access to resources that could help them avoid or mitigate these emissions and related harms?
- **Decision-making:** Do people of different genders have different levels of power when it comes to making decisions about these emissions and related harms in their home, workplace, community, or policy spaces?

The literature review was complemented by six semi-structured interviews[11] with key informants recommended by CCAC Secretariat staff. Four of these interviews were conducted virtually, and two were conducted via written response. Interviews were exploratory, on background, and included the following themes and questions:

- ***Mapping impacts:*** In your work, have you seen gender-differentiated experiences of super pollutants? In other words, have you seen super pollutants affect women, men, or gender minorities in different ways, in terms of vulnerability, exposure, access to resources, or decision-making?
- ***Surfacing successes, challenges, and recommendations:*** How does your organization work to address these impacts, and what have the results been?
- ***Understanding needs:*** What do you see as persistent knowledge or data gaps obscuring our understanding of gender and super pollutants? Are there areas of work you see as under-resourced?
- ***Visioning together:*** What would gender-transformative action on super pollutants look like to you?

This research followed Oxfam's peer review process, through which key internal and external stakeholders contributed to and informed the analysis in different stages of the research process. This research also follows Oxfam guidelines including the Inclusive Language Guide[12] and guidance on Integrating Gender in Research Planning.[13]

The research faced some limitations". The principal challenge is that literature is unevenly available across sectors that analyses gender-differentiated impacts or provides gender-disaggregated data. This gap in the literature on gender and super pollutants presents challenges to develop an intersectional gender analysis and is important to note as an area for future research. As stated, this guidance document acknowledges the importance of taking an intersectional approach to gender analysis, recognizing the need to understand gender discrimination and inequality in intersection with other systemic inequalities, and that not all groups of women and gender minorities experience the same struggles.

The literature is also extremely limited on the gender-differentiated impacts of these sectors when it comes to the experiences of gender minorities. In order to avoid exacerbating this literature gap, phrasing around gender minorities has been included in some places; however, more research is needed to understand this community's experiences and needs. The term gender minorities includes individuals whose gender identity or expression differs from the sex assigned to them at birth. This includes, but is not limited to, transgender, nonbinary, and genderqueer individuals. They may also include individuals with gender expressions that don't align with societal expectations for their assigned sex.

Finally, our research was limited in that we only reviewed English-language publications, excluding important perspectives from scholars and practitioners in other languages.

03 Findings



Agriculture

Super pollutant emissions from the agricultural sector include methane emissions from rice production and livestock, and black carbon emissions from open burning of crop residue. The agricultural sector employs more than 800 million people around the world[15], with smallholder farmers producing around 80 percent of the world's food. Women play a critical role in agricultural systems, including comprising, on average, almost half of the agricultural workforce in developing countries as high as two thirds of the agricultural workforce in South Asia.[16] As the world transitions to sustainable and equitable food systems, it is critical that climate solutions support the rights of women and smallholder farmers

Gendered considerations

In rice systems, women face structural inequalities in terms of access and decision-making despite their critical role in the sector. In some areas, women have taken increasing responsibility in farm labour as men migrate to cities to pursue urban-centred employment.[17] While roles in rice production vary, women tend to do more labour-intensive work, such as transplanting rice in comparison to men.[18] Women may have less access to training, markets, or financial resources, and less power in decision-making spaces like in community irrigation management.[19] Critically, women around the world are disadvantaged in access to land and agricultural inputs.[20] Women who are not recognized as landowners also may not benefit from a farm's participation in carbon markets.

With limited access to finance, loans, or safety nets, women may also be less willing to risk their livelihood by transitioning to a new technology that would mitigate super pollutant emissions.[21] There are notable opportunities for gender equality in transitioning to these new technologies. Alternate Wetting and Drying (AWD) is a water-saving irrigation technique where fields are intermittently dried rather than continuously flooded, which under the right circumstances can cut production costs for women smallholder farmers while reducing methane emissions.[22] Another approach, Direct-Seeded Rice (DSR), is a technique where seeds are sown directly into the field rather than by transplanting seedlings, which can reduce women's transplanting burden and time significantly.[23] Lastly, the System of Rice Intensification (SRI) uses techniques that can significantly reduce the workload and physical strain on women's transplanting and weeding.[24] A joint project by Oxfam America and the Vietnamese Government demonstrated a high adoption rate of SRI when introduced; SRI was taken up by over 1 million farmers, about 70% of whom were women.[25]

Women in livestock systems face similar impacts in terms of access and decision-making. Globally, men are more likely to own and manage larger ruminants with higher methane emissions, like cattle. Women are heavily involved in livestock production, including small ruminants and poultry,[26] but may have less access to training, land, markets, and financial resources.[27] A recent study by the International Livestock Research Institute (ILRI), "Building gender considerations into livestock breeding in low- and middle-income countries," outlines the multitude of gender considerations needed for key steps of a breeding program, including targeting, operationalization of the genetic improvement strategy, marketing and dissemination, and ensuring equitable benefits.[28] The Women's Empowerment in Livestock Index (WELI) is also a resource to help measure women's experiences in livestock, including in animal health, breeding, and feeding.[29]

When it comes to open burning of crop residue, pregnant people face particular harms to reproductive, maternal, and foetal health from exposure to particulate matter and combustion byproducts that may be released in crop burning.[30] Women are also more likely to be responsible for care for children or elderly family or community members who are sick due to exposure to this pollution, increasing women's unpaid care work. In many contexts, women have less power over land management decisions including the practice of open burning.[31] When alternatives are implemented, women may also be more likely to take on the additional labour of these initiatives, including composting or collecting biomass.[32]

Recommendations

- **Gather gender-disaggregated data** in order to better understand whether and how emissions are reduced, labour burdens shift, resource access improves, etc. in policies and programs that intend to address super pollutants and gender inequality.

- **Secure women's land rights,** which can raise women's access and power to adopt emissions-reducing practices, as women farmers with land rights may be more likely to adopt soil conservation and water retention techniques, and to access the financing to support them. Addressing systemic barriers to gender-equal land rights can increase women's control over land management decisions, economic stability, and influence in their communities.

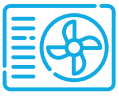
- **Promote women-led producer groups and cooperatives** to expand women's access to technology, training, finance, and bargaining power for emissions reduction efforts. These initiatives need to account for gender norms and relations in their design in order for uptake to be effective. Tools like Oxfam's Gender Action Learning System can serve as a useful change philosophy for this work.[33]

- **Implement technology and practice change**. For example, rice cultivation methods like the System of Rice Intensification (SRI), which can improve aspects of women farmers' labour as well as reduce methane emissions. These cultivation methods should be implemented with particular focus on capacity-building for women farmers who may be otherwise excluded from training and access to this technology. Supporting **residue-processing techniques like biochar** can reduce open burning while also improving cookstoves (see Household Energy section for more information on gender-differentiated impacts of cookstoves). Programs that provide targeted training to women and opportunities to bring biochar products to market can support women's uptake of this technology.

- **Ensure women's benefit-sharing in carbon markets.** As carbon markets for rice expand, it is important that women smallholder farmers receive fair and tangible rewards for participating in sustainable rice practices that reduce emissions. Low-barrier digital Measurement, Reporting, and Verification (MRV) systems can support women with accessible data and verifiable results, enabling their inclusion in climate-smart economies.

- **Enable access to residue management equipment** through subsidizing, providing, or sharing equipment within women-led cooperatives. In some cases, this equipment may need to be redesigned to meet women's ergonomic needs.

- **Invest in awareness-raising campaigns** that include engaging men, community leaders, and mixed-gender dialogues in shifting norms around agricultural practices.



Cooling

Hydrofluorocarbons (HFCs) emissions primarily come from refrigeration and air conditioning used in residential, transport, and industrial settings, as well as industrial chemicals used for aerosols and fire extinguishers. As climate change intensifies and economies grow, energy demand including for air conditioning and refrigeration is rapidly increasing, accelerating HFC emissions.

Gendered considerations

The lack of access to cooling itself creates exposure and vulnerability concerns in the cooling sector. Women and gender minorities may have less access to air-conditioned environments as they disproportionately work in informal sectors, in the field, or at home, particularly in low-income countries.[34] Exposure to extreme heat, exacerbated by lack of air conditioning, can reduce productivity, increase fatigue, and raise risks during pregnancy, such as heat stress, dehydration, preterm birth, and negative birth outcomes.[35]

In terms of access to resources, reliance on inefficient or outdated appliances with HFCs both contribute to emissions and may increase household energy bills. Rising energy costs strain household budgets, with ripple effects on other household costs like food, education, and healthcare, with potential gendered impacts; however, energy-efficient appliances may be financially inaccessible or not available in some communities.[36] The ability to keep produce at safe temperatures can also reduce household food waste and relieve women's care work spent collecting fuel or traveling to markets – allowing households to keep perishable food at cool temperatures and avoiding food wastage.[37]

The cooling workforce further underscores differences in power and decision-making. Women and gender minorities are underrepresented in the cooling workforce, which includes technicians, maintenance workers, and engineers. The refrigeration industry employs over 15 million people globally; however, women make up just 6 percent of employees in this field.[38] Without addressing gender discrimination and investing in targeted training programs, the transition to sustainable cooling risks reproducing existing gender gaps in the field, excluding women and gender minorities from economic opportunities. Initiatives like UNEP OzonAction and UN Women's " Women in Cooling: A Worldwide Survey"[39] as well as the Green Cooling Initiative's " Females for Future: Women in the Cooling Sector"[40] provide role modeling of women leaders in the cooling sector, as well as important analysis of challenges and experiences faced by women, which can be one tool toward change in the workforce.

Recommendations

- **Gather gender-disaggregated data** on access to cooling, ownership, and workforce participation, in order to support more robust policies and programs.
- **Promote women and gender minorities' leadership in the cooling workforce,** by expanding training programs for women and gender minorities, providing childcare support, anti-discrimination policies, and targeted recruitment for women and gender minorities in technical and leadership roles.
- **Design gender-targeted appliance subsidy or rebate programs,** providing financial support for low-carbon refrigerators, air conditioners, and fans, accompanied by outreach to support uptake of new technology.
- **Support community-level access to cooling,** including community cooling centres and heatwave preparedness measures that consider women and gender minorities' roles and environments.



Fossil fuels

The fossil fuel industry – oil, gas, and coal – is the second-largest contributing sector to methane emissions.[41] Methane is released, sometimes by design and other times by accident, through the extraction, processing, and transportation of these fossil fuels. The process of gas flaring releases significant amounts of black carbon alongside methane. Coal-fired power plants are also significant emitters of black carbon.

Gendered considerations

Organizations working in communities affected by resource extraction, such as Oxfam and Publish What You Pay, and extractive industry researchers have identified significant gender-differentiated impacts of oil, gas, and coal extraction.

In terms of exposure and vulnerability, pollution from oil, gas and coal projects can lead to chronic illness in the surrounding community, particularly for children and elderly people, increasing women's unpaid care work.[42] Women who are exposed to pollution from contamination due to oil spills and flaring may have adverse maternal outcomes, specifically higher incidences of premature rupture of membrane, caesarean section, and postpartum haemorrhage compared to women in areas with low exposure to this pollution.[43] Moreover, pollution caused by these projects can also deplete and contaminate food and water resources, leading to an increased workload for women responsible for providing these resources for the family or community. The undermining of women's livelihoods can result in their becoming more economically dependent on men.[44, 45]

In addition to exposure to sector-based pollution, there are also gender-differentiated health impacts because of the nature of the sector's workforce. Extractive projects often bring a transient male workforce. Research in numerous countries shows that this can lead to sexual exploitation of women and gender minorities, violence against women and gender minorities, and an increase in sexually-transmitted diseases.[46]

In terms of resources and decision-making, researchers have found that companies that use land—which is most often legally controlled by men—for extractive projects often negotiate access rights, compensation or benefit-sharing agreements with male stakeholders, which can perpetuate or undermine existing power dynamics and disadvantage women.[47] In compensation or benefit-sharing arrangements, the payment often goes to male heads of households, denying women access to and control over the financial benefits of mining. This exacerbates existing inequalities and women's dependence on men.[48] If an extractive industry project forces people off land they use, this can lead to the loss of women's land-based livelihoods. Additionally, when men become employed in mining activities, it often withdraws their labour for their traditional subsistence livelihoods, which can increase women's work burden. This can also cause women to become economically dependent on men's formal wages and the subsistence work of women becoming undervalued.[49]

In addition to working to understand the impacts that the oil, gas, and mining sector has on women and gender minorities in extraction-affected areas, researchers have also examined the workforce composition of the sector. Despite women comprising more than 40 percent of the global workforce,[50] the numbers of women working in the extractives sector lag far behind. Women only constitute 22 percent of the oil and gas workforce (a figure that has remained unchanged since BCG began tracking it in 2017)[51] and an estimated 8 to 17 percent of the global mining workforce.[52]

As of 2020, 60 countries including Nigeria, Morocco, Tunisia, Sierra Leone, and Argentina, have laws in place that prohibit women's employment in mining.[53] Many other countries have only repealed or amended such laws very recently (for example, Colombia lifted its ban in 2015/16, Mongolia lifted its ban in 2008, Ghana lifted its ban in 2003, Indonesia lifted its ban in 2003, and Kenya lifted its ban in 2007).[54]

Instead of working in more lucrative mining jobs, women support the sector through more informal work that is less likely to be unionized, is often more dangerous, and is less financially lucrative. Technical mine site jobs such as engineer, geologist, and analyst are higher paying than clerical or administrative jobs in the sector, but women are overwhelmingly employed in lower-paid functions. For example, in Canada—which boasts one of the highest rates of women's participation in the extractive sector worldwide—only five percent of mine-site workers are women.[55] Similar trends have been found in Chile, Mongolia, and Peru, for example, where women are overwhelmingly employed in lower-paid administrative and support functions for the mining sector rather than higher-paying roles.[56]

While women hold a larger share of jobs in the oil and gas industry as compared to mining, the pattern of women's exclusion from financially lucrative and more powerful positions is true across the broader sector. In the oil and gas industry, in 2023, entry-level women were only hired for 10 percent of operations and technical roles.[57] At the executive level, only 5 percent of women were in operations or technical roles.[58] The small number of women in the sector are far more likely to be put into lower-paid administrative roles.

A 2021 report by the Natural Resources Governance Institute analyses gender provisions in the laws, policies, regulations, and guidelines governing 12 resource rich countries.[59] Across the 12 countries, researchers found 30 directly-related documents that both govern the oil, gas, or mining sector and mention "women" or "gender," and 32 indirectly-related documents (which include other documents, such as labour codes, that apply to the sector and govern women's participation in it). This report uses the UNDP's Gender Results Effectiveness Scale[60] to classify these provisions as gender-negative, gender-blind, gender-targeted, gender-responsive, or gender-transformative.

Results of this analysis found seven documents that were gender negative, one that was gender blind, 11 that were gender targeted, nine that were gender responsive, and two that were gender transformative. Examples of gender-negative provisions include a provision in Argentina's 1924 Law No. 11.317, Morocco's 2003 Labor Code, and Sierra Leone's 1960 Employers and Employed Law, which prohibit women from working in quarries or underground, which has contributed to wage discrimination and keeping women out of lucrative jobs. Several examples of gender-targeted laws called for quotas of women (usually significantly less than half) to be included on various boards governing the sector. Colombia and Canada both boast documents that have the potential to be gender transformative. These documents call for significant disaggregation of data, eliminate barriers to women's employment in the sector, support sensitivity and inclusion training for frontline workers, and set targets and intermediary benchmarks for women's employment and leadership.

To achieve progress towards gender equality, governments and companies can set quantitative goals, intermediate benchmarks and deadlines for those goals, and measure baseline numbers and progress against them. In 2023, the Extractive Industries Transparency Initiative (EITI) made great strides in increasing the gender-disaggregated data that is available in the oil, gas, and mining sector by including several new provisions in their 2023 Standard. Data on the gender breakdown of workers in companies by job function can help those within and outside companies to push for training and recruitment programs that bring more women into companies and mentoring and promotion programs to see that they reach higher ranks. Conducting and disclosing environmental, social, and gender impact assessments can help communities understand what the impacts of extractive projects will be and work to ameliorate negative impacts. We have already seen ways that communities are using revenue and contract data to push for gender responsive budgeting. In Ghana, for example, Friends of the Nation and Oxfam are pushing assemblies to earmark 30 percent of the country's Minerals Development Fund for women's economic empowerment and girl-child education.[61, 62]

Recommendations

- **Companies should be aware of power asymmetries in the communities in which they work.** They should take account of these power asymmetries in providing compensation for land to ensure that they don't exacerbate gender inequalities. Companies and governments should assess gender-differentiated impacts of their projects on traditional livelihoods and the ways that pollution and changing labour dynamics affect food and water resources.

- **Environmental, social, and gender impact assessments** should consider the gender-differentiated ways that pollution from extractive activities can lead to chronic illness and create plans to study and address this.

- **Companies and governments should study the impacts of a transient male workforce,** including how it may lead to gender-based violence, sexual exploitation and the spread of sexually transmitted diseases, and create programming to address and prevent this.

- **Extractive companies and host country governments should set goals for women and gender minorities' participation in the extractive sector.** These goals should be ambitious and time-bound with intermediary benchmarks. They should disaggregate employment data by gender and level, aiming to move women and gender minorities into upper-level positions.

- **Any restrictions on women's participation in the extractive workforce should be removed by law.** Training and mentorship programs should be created to account for women's historical exclusion from high-level positions in the sector.

- **In their national laws, policies, regulations, and guidelines, countries should require and enable the participation of women and gender minorities.** They should make ambitious commitments for participation in the sector, aiming to shift the culture from the way that decisions are currently made to realigning economic power. In developing these documents, governments should require the input of women and gender minorities.



Household energy

The household energy sector is responsible for roughly half of anthropogenic global black carbon emissions.[63] These emissions come from cooking, heating, and lighting homes using open fires, kerosene, biomass (wood, animal dung, and crop waste), and coal. Around 2.5 billion people use cooking technologies that expose them to harmful Household Air Pollution.[64]

Gendered considerations

In terms of exposure, women, particularly in low-income and rural areas, tend to be the primary cooks in their household and may spend several hours a day near open fires or inefficient stoves. This prolonged exposure to fine particulate matter and black carbon significantly increases risk of chronic respiratory illness and cardiovascular disease. Many cooking fuels also present safety risks, including burns and explosions. Accidental ingestion of kerosene is the leading cause of childhood poisoning around the world.[66]

Some groups are particularly vulnerable to the impacts of Household Air Pollution. Pregnant people exposed to this pollution face heightened risks of complications such as low birth weight, stillbirth, preterm delivery, and adverse foetal development outcomes.[67] Additionally, women are often caregivers for children and elderly people in the family or community, who are particularly vulnerable to indoor air pollution. This care work compounds the burden women carry from poor air quality.

Access to resources is a constraint in the household energy sector. In many rural areas, women and girls may spend hours each day collecting firewood or other biomass fuels, which limits their time for education, income-generating activities, or rest. This responsibility also comes with safety risks, as traveling long distances in isolated areas can expose them to physical injuries or gender-based violence.[68] In many communities, alternatives are difficult to come by. Cleaner cooking fuels may have a higher upfront cost and may lack a market in the area. Women who lack access to finance or credit may be particularly constrained in their ability to transition to cleaner cooking technology, without subsidy or support.

In some ways, the kitchen is a site of power. Women's labour in cooking is a significant contribution to the functioning of households and the cultivation of community.[69] Yet, this unpaid labour tends to be undervalued, and women may have limited decision-making power over their own household's energy choices.[70] However, there is growing evidence that shifting to clean cooking technology can also shift norms around care work and power, by facilitating men's increased participation in cooking activities.[71] Despite their role as users, women are also currently underrepresented in the clean cooking market as entrepreneurs or sellers of this technology.[72] As a result of these power and decision dynamics, women's needs and preferences may be overlooked in energy transition programs.

Recommendations

- **Gather gender-disaggregated data,** to better understand the gendered impacts of household energy decisions, targeted programs, and national policies.
- **Promote equitable access to clean cooking solutions,** particularly in low-income and rural households, where the impact of Household Air Pollution is significant.
- **Improve financing for clean cooking technologies,** including targeted subsidies, credit, or group lending models to enable women to transition to new cooking technologies that may have a higher upfront cost.
- **Support women-led energy cooperatives** that design and deliver renewable energy solutions including clean cooking technology. These models build collective ownership, supporting green jobs for women and investing in longer-term shifts in power.
- **Invest in awareness-raising campaigns** that include engaging men, community leaders, and mixed-gender dialogues in shifting norms around cooking and cookstove technologies.



Transport

Super pollutant emissions from the transport sector include black carbon, along with other toxic pollutants. Transport comprises over 23 percent of global black carbon emissions.[73] Concentrations of black carbon from transport, including from trucks, buses, and other diesel cars, are typically highest in urban areas.[74]

With increasing urbanization, transport demands are predicted to increase nearly 50 percent by 2030,. Urban buses account for approximately 25 percent of the black carbon emitted by the transport sector. Initiatives like the Soot-Free Urban Bus Fleet project, coupled with clean fuels and soot-free engine technologies, can play a critical role in tackling emissions.[75]

Gendered considerations

From the existing research, we found gender-differentiated health impacts related to gender- and age-specific vulnerabilities and exposures to black carbon and other toxic pollutants from transport. We also see gender-differentiated concerns in terms of access to resources and decision-making related to transport and mobility choices.

Exposure to traffic-related air pollution (TRAP) – which includes residing in high-traffic areas or in close proximity to major roads – is associated with the development of hypertensive disorders of pregnancy.[76] For example, the Clean Air Catalyst program – responding to the suggestion by Women and Community Health Promoters in Kenya about links between air pollution and negative reproductive health issues – found that the literature indicates strong evidence of a link between air pollution and negative birth outcomes, such as higher risk of premature births. There is also emerging evidence of links with higher risks for other reproductive health issues, such as difficulty conceiving.[77]

More broadly, access to transport systems and decision-making about mobility choices are not gender neutral. Gender is a more robust determinant of transport mode choice than age or income in many cities regardless of their level of development.[78] In many contexts, there is a gender difference in use of public transport modes, with women more likely to use public transport than men.[79] In Europe, women also make 80 percent of travel decisions.[80] Both women and men face gender-differentiated transport and mobility barriers, which in turn impact access to services, such as health and education, and employment opportunities. However, gender is largely not considered in transport policy and planning; and even where the differences between men and women's travel patterns are disaggregated, studies do not consider gender minorities, or gender at the intersections with other considerations such as age, class, sexuality, or disability.[81]

A key gender-differentiated transport and mobility issue is safety and security, with women and gender minorities more concerned about their safety. For example, women and gender minorities may not feel safe traveling at night or may be concerned about overcrowded public transport increasing the risk of sexual harassment. These concerns affect the travel choices they make. Some studies show that having more women drivers can increase the number of women using public transportation options.[83]

There are also gender-differentiated non-transport mobility considerations, which impact how women make transport decisions. The nature of women's travel is often shaped by care responsibilities,[84] with women more likely to work part-time, have lower employment rates, be responsible for unpaid care work, and engage in trip-chains, linking more than one purpose and destination in a trip.[85]

There are several examples of guidance and toolkits for advancing gender equality in the transport sector. For example, the Get IT Gender Equality Toolkit In Transport for transport professionals,[86] is an open access online platform which provides ideas and case studies for transport professionals to support the design and evaluation of progress towards more gender inclusive transport systems. The International Transport Forum's Gender Analysis Toolkit for Transport Policies,[87] provides a checklist, questionnaires, and indicators that government, private sector and international organizations can use to guide gender analysis in transport policies. In addition, coalitions and multi-stakeholder initiatives can galvanize investment and action, for example, the Women in Transport (WiT) network which seeks to empower women as leaders and employees in the transport sector.[88]

Recommendations

The literature indicates that it is important to address gender equality, transport access and choice, and climate and environment as complementary policy areas, guiding action towards comprehensive solutions for sustainable cities and more environmentally friendly transport systems.[89]

- **Use gender-differentiated statistics and analysis to improve understanding of gender differences in transport decisions,** including reasons for making journeys, journey frequency, and distance travelled.

- **Enhance women's participation and leadership in the transport workforce.**[90] Diverse teams supported by work culture where it is safe for women to speak about their transport experiences can contribute to inclusive design and implementation of transport systems. Employers will need to put in place structures and policies to attract diverse employees, which can include parental leave policies, equal pay and appropriate workplace facilities.

- **Identify synergies between policy goals to efficiently transition to a zero-carbon transport system.**[91] Limited awareness of the intersections across the gender, transport, and climate change policy nexus should be addressed to unlock potential synergies. For example, improving the safety and access to public transport and micromobility services can improve gender equality and support reductions in transport emissions.

- **Develop a transport-gender equality narrative** that articulates the challenges and opportunities within existing social, environmental, and economic realities, to leverage momentum towards action.[92]

- **Establish evaluation, monitoring and reporting systems for countries and companies,** including gender-disaggregated and gender-relevant indicators to ensure gender is addressed in de-carbonizing transport systems.[93]



Waste

Super pollutant emissions from the waste sector include methane from the breakdown of organic waste in landfills and informal dumps, as well as black carbon alongside other harmful toxins released by the open burning of waste. Waste is the third largest anthropogenic source of methane and is projected to grow by up to 18 percent from 2020 levels by 2030.[94] Solutions in this sector present a powerful opportunity to move toward a more sustainable, circular economy[95], better feed our communities by preventing and diverting food waste, and improve our health.

Gendered considerations

Informal waste workers, who are disproportionately poor women in urban settings,[96] may be particularly exposed to air pollution and other safety concerns, contributing to greater health risks, including respiratory problems and skin diseases, due to poor protective equipment and lack of access to healthcare.[97, 98, 99, 100] As men more commonly work in formal or large-scale waste management facilities where methane concentrations may be higher, men's exposure to explosions or accidents from landfill gas build-up may be more common.[101]

When it comes to resources, women and gender minorities may not have as much access to training, credit, or technologies needed to benefit from methane mitigation innovations. Informal waste work may also be disrupted by methane capture projects that restrict access to landfills without adequate consultation with informal workers, impacting women's livelihoods.[102]

In terms of power and decision-making, the gendered impacts are mixed. Women and gender minorities face barriers to employment in the formal waste sector, where they might access higher income, greater protections, and great decision-making on issues of waste management and governance.[103] Women's roles in the waste sector are growing, and structures like the International Solid Waste Association's Women in Waste[104] can fill network, research, and advocacy gaps to support this transition. At the same time, informal waste pickers play a key role, contributing to the economy as well as to human and environmental health, driving innovative and sustainable waste practices, and in some contexts providing the only system of solid waste management. The organization Women in Informal Employment: Globalizing and Organizing (WIEGO) has developed projects on gender and waste with detailed theoretical considerations on gender, empowerment and waste, as well as tools and resources.[105]

In terms of open burning of waste, similar to the open burning of crop residue, pregnant people face particular harms to reproductive, maternal, and foetal health from this exposure.[106] Women are more likely to be responsible for care for children or elderly family or community members who are exposed to this pollution, increasing women's unpaid care work.

Recommendations

- **Gather gender-disaggregated data** on the gendered dimension of waste sector work, in order to better inform policies and emissions mitigation programs.

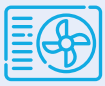
- **Strengthen protections for informal waste workers,** including legal protections, access to healthcare, safety equipment, and protections against harassment or eviction from waste sites. Strengthen women-led informal waste cooperatives through capacity-building and access to finance.

- **Recognize the contributions of informal waste workers,** particularly women and gender minorities, through inclusive policies and synergies with city waste planning processes.

- **Strengthen opportunities for gender equitable employment in the formal waste sector,** by expanding training programs for women and gender minorities, providing childcare support, anti-discrimination policies, and targeted recruitment for women and gender minorities in technical and leadership roles.

- **Invest in alternatives to open burning,** like composting, ensuring that awareness-raising and behaviour change campaigns understand the gendered considerations and impacts of open burning.

Gender Inequality and the Super Pollutant Risk Cycle

	Gender discrimination and inequality considerations		Heightened impacts and risks from super pollutants
Agriculture 	• Unequal land ownership and access agricultural inputs • Less access to training, markets, and financial resources	↻	• Exposure to crop burning smoke and pesticides • Respiratory and reproductive health risks from open burning • Increased economic vulnerability from crop losses
Cooling 	• Less access to air-conditioned environments • Economic exclusion and under-representation in cooling workforce	↻	• Exposure to extreme heat • Reduced productivity, increased fatigue, heat stress, dehydration, pregnancy risk
Fossil fuels 	• Limited access to high-income jobs • Poor labour, protections & health benefits • Limited land ownership and decision-making power • Increased risk of sexual violence and exploitation	↻	• Harm to reproductive, maternal, and foetal health from emissions • Higher exposure to workplace pollutants with fewer protections • Reduced ability to afford medical care or relocation
Household energy 	• Higher share of unpaid domestic labour • Limited access to resources including alternative cooking fuels • Underrepresentation in clean cooking markets as entrepreneurs or sellers of technology	↻	• Increased exposure to open fires or inefficient stoves • Harm to reproductive, maternal, and foetal health • Increased risk of chronic respiratory illness and cardiovascular disease • Increased risk of exposure to burns and explosions
Transport 	• Increased risks to safety on public transportation including sexual harassment • Lack of adequate affordable transport impacting employment and education • Increased reliance on public transportation	↻	• Harm to reproductive, maternal, and foetal health from traffic-related air pollution
Waste 	• High rates of informal and unprotected work • Limited access to safe, high-income jobs • Limited access to training, credit, technologies	↻	• Men face increased risk to landfill methane gas build-up explosions and accidents • Respiratory and reproductive health risks from open burning

04 Conclusion

The purpose of this guidance document is to conduct an analysis of the gender-differentiated impacts of super pollutants--a grouping of atmospheric pollutants that have climate effects greater than carbon dioxide and can have environmental and human health effects—and related sectors. This analysis seeks to inform the Gender Strategy of the CCAC in an effort to understand the gender-related challenges and opportunities in the field of super pollutants.

To this end, this document analyses the gender-related exposure, vulnerability, resources, and decision-making capacity in six priority sectors related to super pollutant emissions: agriculture, cooling, fossil fuels, household energy, transport, and waste. The analysis, informed by the literature and semi-structured interviews, leads us to conclude that gendered considerations exist across all sectors analysed and often involve negative impacts for women or gender minorities.

Existing gender discrimination and inequalities have a circular effect on the potential impacts that women and gender minorities face when engaging in super pollutant sectors. For example, the literature for the sectors included in this document demonstrate that inequalities, like the lack of labour protections, health benefits, land ownership, access to high income generating jobs, quality transport services, access to training, financial resources, and formal employment for women not only increased women's exposure to air pollution and other harms, but at the same time provide women with fewer resources to mitigate these risks.

In the six sectors included in this paper, pregnant people are perhaps among the groups facing greatest risks and harm from exposure to super pollutants and related air pollution on reproductive, maternal, and foetal health. More specifically, the literature indicates the existence of harm to reproductive, maternal, and foetal health from oil, gas, and coal emissions in the fossil fuel sector, exposure to burning in the agricultural and waste sectors, poor air quality in the transport sector, and exposure to extreme heat and less access to cooling technology in women's homes and workplaces that could lead to fatigue and high risk during pregnancy.

Considering that women are often primarily responsible for care work, they also potentially face an increase in these responsibilities when family or community members are affected due to their exposure to super pollutants and related air pollution. In the fossil fuel sector, the literature also indicates potential risks of gender-based violence, sexual exploitation, and sexually transmitted diseases for women and gender minorities who live in close proximity to fossil fuel facilities that have high levels of transient workforce.

Women and gender minorities' low access to different kinds of resources (labour, land, water, financial resources, improved technologies) as a starting point can exacerbate women and gender minorities' later access to resources in the context of supper pollutants. For example, the loss of resources like land and water or livelihoods due to pollution or labour transitions exacerbate women and gender minorities' already limited access in the fossil fuel and agricultural sectors. Furthermore, the high participation of women in the waste sector

as informal workers reproduce the informality of their access to health systems, credit, and technologies due to the lack of formal insurance and formal credit given the nature of their employment. Their location as informal workers limits their access to training, mitigation innovation projects, and improved technologies. Moreover, women's livelihoods are negatively impacted by mitigation projects that limit waste labour. Similarly, in the household energy sector and cooling sector the high prices of clean cooking and energy-efficient technologies could be unaffordable for women and low-income families.

In all of the sectors included in this document, the literature points out the existence of a gender-differentiated involvement in decision making spaces such as agreements and mitigation related projects by gender that put women and gender minorities at a disadvantage. For example, the evidence indicates higher involvement of male stakeholders, including landowners and labourers in negotiations spaces that will define the terms of new labour opportunities, technological innovations, and mitigation processes related to super pollutants. The decisions made in these spaces potentially affect women and gender minorities in significant ways, including land and waste management, livelihoods, care work, transport, or household energy. This cycle perpetuates the marginalisation of women's voices and reinforces the weight of gender inequality in their lives.

05 Recommendations

This paper has identified gender-differentiated impacts of exposure and vulnerability to super pollutants and related air pollutants in these sectors, and in access to resources and decision-making to mitigate those impacts and to reshape the sectors to address both super pollutant emissions and gender inequality. Super pollutants often disproportionately impact women – who face barriers to full participation in sector solutions. Efforts to reduce super pollutant emissions must be designed with equity in mind. Addressing the gendered dimensions of this work is essential not only for justice, but for the effectiveness and resilience of climate solutions.

Moving from how the six sectors tend to be organized today, which produces these impacts, the paper provides insights into opportunities for reshaping the sectors based on deeper analysis of gendered considerations and greater participation of women, in particular from low-income and marginalized groups. It also provides insights into how to reshape the sectors through investment and implementation that transforms each sector. Taken together, these point to recommendations which policymakers and civil society can apply towards promoting gender-sensitive and gender-transformative change, alongside sector-specific recommendations included in the Findings section of this paper.



Funding for gender-transformative action

According to the OECD, only 2.4% of climate-related development assistance currently prioritizes gender equality.[107] Governments and philanthropic organizations working on super pollutants should ensure dedicated funding exists for work that will explicitly promote gender equality and the empowerment of women across sectors, as well as strengthen gender considerations across all policies and programmes. Donors should support local women's and feminist organizations when possible, and address barriers to accessing this funding.



Gender-disaggregated data

Robust gender- and sex-disaggregated information on exposure, vulnerability, access to mitigation resources, and decision-making is critical to understanding how super pollutants affect different genders in order to design more effective, equitable policies. Without this information, decision-makers risk overlooking the needs and contributions of women, gender minorities, and other marginalized groups. Disaggregated data also helps set clear and measurable goals and intermediary benchmarks for those goals. Researchers, governments, and companies should use emerging international best practices for inclusive data collection, [108] including data on intersecting identities such as race, ethnicity, class, sexuality, or disability.



Gender targets in super pollutants policies

In the current groundswell of national policies and frameworks addressing super pollutants, including Nationally Determined Contributions, national Methane Action Plans, and clean air strategies, explicit gender targets are meaningful. This supports the move from ambition to action, setting goals for women and gender minorities' participation, leadership, or access to training and funding.



Gender and power analysis in program design

Gender impact assessments or participatory methods are critical to understanding gender and power dynamics in a particular context and sector, anticipating unintended harms of proposed plans, and designing programs to proactively reduce gender inequalities. Wherever possible, this kind of analysis should be mandatory and robust in order for a program to move forward.



Access to emissions mitigation resources

Given the systemic barriers women and gender minorities may face accessing mitigation technology, training, or finance, policies and programs need targeted measures. Technology subsidies and training programs can improve gendered power dynamics while ushering in a just energy transition. These programs should also address childcare needs and timing to ensure that women and gender minorities are able to participate.



Transformative Leadership for Women's Rights

Women's organizations, cooperatives, associations, and grassroots networks can be spaces of collective power and transformation. Oxfam's TLWR framework emphasizes creating an enabling environment for women's leadership by emphasizing human rights and feminist principles in order to shift cultural norms that can perpetuate gender inequality.



Gender-transformative Monitoring, Evaluation, Accountability, and Learning (MEAL)

Structured reflection strengthens the quality of action on super pollutants. Gender-transformative and feminist MEAL frameworks support participatory processes and measuring qualitative, non-linear, and complex change.[109] This is a critical step as the super pollutants field practices and expands its capacity for gender-transformative action.



Narrative shift

The deep work of challenging power dynamics is critical for lasting change. Gender-transformative action on super pollutants must look beyond checkboxes and policies, by investing in public engagement, storytelling, and advocacy in partnership with grassroots organizations in order to build a world where gender equality is valued and prioritized at all levels.

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About the CCAC:

The Climate and Clean Air Coalition is a partnership of over 200 governments, intergovernmental organizations, and non-governmental organizations. The Coalition works to reduce powerful but short-lived climate pollutants (SLCPs) – methane, black carbon, hydrofluorocarbons (HFCs), and tropospheric ozone – that drive both climate change and air pollution.

Co-Chaired by the United Kingdom and Brazil, the Coalition aims to connect ambitious agenda setting with targeted mitigation action within countries and sectors. Robust science and analysis underpin all efforts, and bolstered by the CCAC Trust Fund, the Coalition has given rise to high-level political commitment, in-country support, and a range of tools that help make the case for action and support implementation.

CLIMATE & CLEAN AIR COALITION
TO REDUCE SHORT-LIVED CLIMATE POLLUTANTS

a UNEP convened initiative