FINAL REPORT

INTERNATIONAL WORKSHOP:

How to Catalyze Clean Air Solutions to Achieve Climate and Health Goals in Latin America and the Caribbean

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Environmental Defense Fund

INTERGOVERNMENTAL NETWORK ON ATMOSPHERIC POLLUTION FOR LATIN AMERICA AND THE CARIBBEAN

ONU programa para el medio ambiente

INTERNATIONAL WORKSHOP

How to Catalyze Clean Air Solutions to Achieve Climate and Health Goals in Latin America and the Caribbean

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About the Co-Organizers

United Nations Environment Programme, Office for Latin America and the Caribbean
The United Nations Environment Programme (UNEP) is the leading organization within the United Nations system in the field of environment. The United Nations Environment Assembly, the world's highest decision-making body on the subject, adopted Resolution 1/7 "Strengthening the role of the United Nations Environment Programme in promoting air quality" and Resolution 3/8 "Prevention and reduction of air pollution to improve global air quality." UNEP is represented by the Office for Latin America and the Caribbean, which works to meet the needs of the region.

Intergovernmental Network on Air Pollution for Latin America and the Caribbean
The Intergovernmental Network on Air Pollution for Latin America and the Caribbean (Intergovernmental Network) was created in 2008 by the Forum of Ministers of Environment of the region. Composed of representatives of national governments, the Intergovernmental Network aims to: (i) promote the technical exchange of research and information, as well as capacity building in air quality management; (ii) harmonize legislation, standards, monitoring methods and data management procedures on air quality management at the national level, (iii) evaluate and propose policy options to reduce air pollution, and (iv) provide support for the development and implementation of a regional action plan aimed at reducing air pollution in the region.

Environmental Defense Fund
One of the world's leading international nonprofit organizations, Environmental Defense Fund (edf.org) creates transformational solutions to the most serious environmental problems. To do so, EDF links science, economics, law, and innovative private-sector partnerships. With more than 3 million members and offices in the United States, China, Mexico, Indonesia and the European Union, EDF's scientists, economists, attorneys and policy experts are working in 28 countries to turn our solutions into action.

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Members of the Intergovernmental Network on Atmospheric Pollution, academia, civil society organizations and all other attendees.[1]

[1] The workshop audience included specialists from the following organizations: U.S. Environmental Protection Agency, Inter-American Association of Sanitary and Environmental Engineering (AIDIS) Argentina, Aire Ciudadano, Yopal City Hall, Aburrá Valley Metropolitan Area, Inter-American Association for Environmental Defense (AIDA), World Bank, C40 Cities, Centre for Biosecurity Studies - University of the West Indies (Cave Hill), CESCCO of the Ministry of Natural Resources and Environment (Honduras), Clean Air Fund, Clean Air Institute, Climate and Clean Air Coalition Secretariat, Healthy and Referent Territory of Climate Change, Environmental Protection Department (Barbados), Foundation for Air Quality Research, A.C, Redspira, UNEP Colombia Office, Citizen Technical Table for Air Quality of Bogotá, Ministry of Environment of Panama, Ministry of Environment and Sustainable Development of Colombia, Ministry of Environment and Energy of Costa Rica, Ministry of Environment and Natural Resources of Guatemala, Ministry of Health of Costa Rica, Ministry of Environment (Peru), Organization for Economic Development Cooperation, United States Agency for International Development, Sacramento Metropolitan Air Quality Management District, West Virginia University Department of Mechanical and Aerospace Engineering, Bogotá District Secretariat of Environment, Guanajuato State Environmental Secretariat, Jalisco Environment and Territorial Development Secretariat, Mexico City Environment Secretariat, District Secretary of Public Health of Bogotá, Early Warning System of Medellín and the Aburrá Valley, Universidad del Norte (Barranquilla, Colombia), National University of Costa Rica, World Resources Institute -Mexico, Mexican Association of Transport and Mobility, Braskem Idesa, Environmental Commission of the Megalopolis, Regional Autonomous Corporation of Cundinamarca, Cardique, CORNARE, CORPOCHIVOR, CORPONARIÑO, Corporación Autónoma del Magdalena, Corporación del Valle del Cauca, DAGMA, DIGECA-MINAE, EPA Barranquilla Verde, Fundación Proyección Ecosocial, Gimpact, Health Effects Institute, Hill, IGAL, INECC, INVREATE, ITDP, MADES, New Mexico State University, Observatorio Ciudadano de la Calidad del Aire del Área Metropolitana de Monterrey, SEMARNAT, Sonoran Institute, TCEQ, Universidad de Lisboa, Universidad del Rosario, Universidad del Valle, Universidad Nacional de Colombia and Salesian Polytechnic University, among others.

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ABBREVIATIONS AND ACRONYMS

LAC	**Latin America and the Caribbean**
WB	**World Bank**
CAI	**Clean Air Institute**
EDF	**Environmental Defense Fund**
OECD	**Organization for Economic Cooperation and Development**
WHO	**World Health Organization**
OPS	**Pan American Health Organization**
Regional Action Plan	**Regional Action Plan on Air Pollution for Latin America and the Caribbean 2022-2026**
PM2.5	**Particulate matter with a diameter of less than 2.5 micrometers**
UNEP	**United Nations Environment Programme**
Intergovernmental Network	**Intergovernmental Air Pollution Network for Latin America and the Caribbean**
USAID	**U.S. Agency for International Development**

EXECUTIVE SUMMARY

On October 5-6, 2022, the Office for Latin America and the Caribbean (LAC) of the United Nations Environment Programme (UNEP) and the Environmental Defense Fund (EDF) hosted the international workshop "How to Catalyze Clean Air Solutions in Latin America and the Caribbean for the Achievement of Health and Climate Goals" in Bogotá, Colombia. The objectives of the event were twofold: a) to share recent developments and innovations that effectively address air pollution challenges; and b) to provide a platform for strengthening regional cooperation and accelerating high impact actions for abating air pollution throughout the region.

This workshop was the first joint activity under a new partnership between UNEP and EDF to improve air quality across LAC for advancing global health and climate goals. This alliance was established under the framework of the Regional Action Plan on Air Pollution for LAC 2022-2026 (Regional Action Plan) and the reactivation of the Intergovernmental Network on Air Pollution for LAC (Intergovernmental Network).

Participants exchanged first-hand experiences on how countries and cities in LAC and other parts of the world are incorporating innovative, integrated air quality management practices to catalyze clean air solutions. They also identified priorities for regional collaboration and opportunities to leverage financing and other support for clean air solutions with public health and climate benefits.

The fully hybrid event featured 72 in-person and 84 virtual participants from 15 countries, including experts from national and subnational governments, civil society organizations, universities, and international development organizations. UNEP and EDF deeply thank all the participating individuals and institutions for their valuable contributions toward the achievement of the objectives of the workshop.

This report summarizes the learnings and contributions made during the workshop and identifies elements to guide the development of cooperative priorities for the improvement of integrated air quality management in LAC within the framework of the Regional Action Plan.

Major Themes

The workshop included 5 sessions with the following encompassing themes:

I. The air pollution challenge and the role of regional cooperation

Air pollution is the most significant environmental risk to public health in LAC. In LAC megacities, close to 95% of the population lives in areas that exceed the PM2.5 standard set by WHO and 249,000 yearly premature deaths in the region are attributed to air pollution. The recently published WHO Air Quality Guidelines represent a vital opportunity to save millions of lives by establishing more stringent parameters, with intermediate goals to ensure progress. Member countries in LAC and elsewhere should work to update and enforce their health and air quality standards.

According to UNEP's Global Report Actions on Air Quality, published in 2021, there has been progress in LAC regarding the establishment of national air quality standards and the adoption of incentives to reduce pollutants in key sectors. However, important challenges remain regarding air pollution in most of the region. Some of the issues that should be addressed through regional cooperation are limited air quality management strategies, deficient monitoring systems and emission inventories, outdated emission standards and poor enforcement, use of biomass for heating and cooking in the residential sector, and agricultural burning and wildfires.

In this context, UNEP and the Intergovernmental Network launched the Regional Action Plan to frame international cooperation efforts across LAC. Regarding air quality management, the Regional Action Plan prioritizes the following major areas to achieve its objectives:

- Strengthening of air quality monitoring capacities
- Mapping of emission sources
- Technical support to reduce emissions
- Improving communication with the public
- Mobilizing resources

UNEP has started the implementation of the Regional Action Plan and the Intergovernmental Network is now active.

II. Air quality management in LAC countries

Representatives from national environmental agencies showcased best practices and challenges to enhancing monitoring capabilities. For example, Colombia presented the process to build regulatory air monitoring networks across the country, initially supported by the World Bank (WB). They are incorporating new technologies to create hybrid networks alongside citizen scientists' programs. They stated that sustainable funding mechanisms are key for effective air quality monitoring.

Presenters highlighted the progress and challenges they are facing in their transition to renewable energies (Barbados), enhancement of vehicle emission standards and fleet electrification (Chile), and energy efficiency and technology replacement projects (Chile and Uruguay).

Participants agreed that a crucial part of mobilizing action is the strengthening of participatory governance of air quality by engaging key stakeholders. Increasing public perception of the health risks of poor air quality will allow more ambitious government interventions and public oversight.

III. Technological innovation

Technology is helping to improve our understanding of air pollution and health issues, as well as scaling solutions. Regulatory-grade monitoring networks are necessary, but there are other sources of information that can aid in air quality management, including satellite data, sensors, mobile monitors, and transportation and traffic data.

The speakers highlighted the importance of new technologies to analyze pollution sources, identify differentiated impacts on vulnerable communities, focus response actions and evaluate programs. Such innovations make it possible to diversify the sources of information for air quality management. New technologies and hyper-local monitoring are key to embedding environmental justice components in air quality policy.

IV. Local experiences, best practices, and challenges to incorporating technology and other innovations in air quality management

Presenters stressed the need to reconcile new technological tools with public policies and legal instruments to improve environmental governance (Lima, Peru). Building hyper-local monitoring can help focus air quality improvement projects to the most affected areas and vulnerable communities and enhance accountability with more robust program evaluation.

Best practices included the formation of citizen scientist networks and integrating participatory governance and open data into air quality programs (Bogotá and Aburra Valley Metropolitan Area). Sensor networks encourage citizen participation, air quality data collection and compliance with restrictions in case of high pollution events.

Participants stated that local actors stated that addressing air quality challenges requires a comprehensive whole-city approach, breaking the silos within administrative structures by incorporating transportation, urban planning and energy transition, among others. Effective urban planning allows cities to avoid incompatible land uses that generate tensions between residents and industry.

V. Resource mobilization for clean air and its links to climate and health in LAC

According to the Clean Air Fund, of the public funding resources allocated to climate mitigation globally, only about 2.2% goes directly to air quality management. Of those resources, only 2% go to the LAC region. With significant underfunding for both the air quality agenda and LAC, recognizing overlaps in air quality, climate change, health and biodiversity goals—and aligning funds toward clean air targets—could help achieve the level of investment required to reach the objectives of the Regional Action Plan. Ready-to-fund projects, along with a more robust demand for air quality investment by national governments, could increase resources from international and regional platforms.

Making the co-benefits of improving air quality more explicit would enhance fundraising efforts. Economic incentives for the private sector and collaboration with industry were highlighted, as were local and national financing mechanisms to build resiliency into clean air programs.

The shortage of resources contrasts sharply with the scale of the health crisis and economic losses caused by air pollution. The cost attributable to PM2.5 is 3.4% of GDP in LAC. This makes investments in improving air quality highly attractive in terms of cost-effectiveness. Such investments can lead to rapid public health improvement outcomes and are beneficial in terms of environmental justice by benefiting the communities and people most affected.

Priority Areas

During two deliberative and analytical breakout group sessions, attendees identified priority areas to advance the implementation of the Regional Action Plan and support the work of the Intergovernmental Network, including:

- **Scaling up clean air actions:** developing and effectively implementing high-impact plans, regulations, policies and projects to improve air quality and meet health and climate goals
- **Making the invisible visible:** improving monitoring and data analytics tools to measure impacts and catalyze actions to reduce air pollution
- **Raising public awareness, engagement and support:** outreach and information sharing to raise public awareness of the issue and drive behavioral change
- **Identifying opportunities to target emission reductions:** identifying and monitoring pollution sources with innovative tools
- **Making the benefits of clean air explicit:** assessing the utility of integrated air quality management for the achievement of health and climate goals

Participants noted the importance of increased funding to sustain air quality efforts, as well as raising public awareness of the health effects associated with air pollution.

They stressed the need for broad resource mobilization for air quality management, strengthening governance mechanisms and cross-sectoral connections, and revitalizing the Intergovernmental Network and its governance.

Next Steps

Based on the findings and recommendations of the workshop, UNEP and EDF have initiated the design of a capacity-building program aimed at improving enforcement and compliance for regional and national air quality regulations. To this end, a subsequent policy dialogue and training activity is planned to begin in 2023. It will focus on priority areas identified by participants, including strengthening air quality monitoring (including use of lower cost sensors), and using innovative approaches to achieve compliance for stationary source emission regulations.

FIGURE 1

Key messages from the workshop

1. **Air pollution is the most significant environmental risk to health in Latin America and the Caribbean**

2. **Access to clean, healthy air is a human right: environmental justice is one key axis of air quality management**

3. **Integrated air quality management should be interlinked with health, climate change, and biodiversity and sustainability goals at all scales**

4. **Participatory governance is fundamental to achieve the objectives of air quality management (with the involvement and commitment of governments, academia, civil society, and the private sector, with the support of international institutions)**

OPENING AND WELCOME REMARKS

The number of premature deaths from air quality issues in the region is increasing, mainly affecting vulnerable communities: it is a matter of environmental justice.

Juan Bello
Head of UNEP Colombia

We must seek solutions through the use of technologies, economic incentives, as well as innovative public policies and legal strategies.

Sarah Vogel
Senior Vice President, Healthy Communities, EDF

Technological innovation for the monitoring and follow-up of polluting emissions helps reduce information gaps and measurement of impacts, as well as the inclusion of the public to achieve joint work between civil society, the public sector and private sectors.

Juan José Castillo
Regional Air Quality and Health Advisor, Pan American Health Organization (PAHO)

Air quality monitoring and actions to reduce pollution have moved from a macro model to a micro perspective, with the use of hyper-local monitoring to identify differentiated impacts on people and communities.

Gonzalo Rosado
Chairman of the Steering Committee of the Intergovernmental Network,
Ministry of Environment of Peru

Strengthening strategic regional cooperation is essential to improving air quality and protecting human health.

Sandra Vilardy Quiroga
Deputy Minister of Environmental Policies and Standardization.
Ministry of Environment and Sustainable Development, Colombia

It is necessary to catalyze solutions with impacts on both health and climate and build systemic approaches to more efficiently address pollution problems.

Sergio Sánchez
Senior Director of Policy,
Global Clean Air Initiative, EDF

Local and regional representatives of the Intergovernmental Network and host organizations initiated the workshop with opening remarks. The inaugural messages emphasized air pollution as the greatest environmental risk to public health worldwide and in the LAC region, with major impacts on vulnerable communities.
The speakers highlighted that:

- Air quality managers need to involve citizens in their efforts to analyze and improve air quality
- Integrating air quality management with the health, climate change, biodiversity and sustainability objectives is critical to strengthening the awareness and funding commitment toward better air quality
- New technologies and tools strengthen comprehensive air quality management systems
- We should work towards reconciling new technological tools with public policies and legal instruments to improve environmental governance
- Strengthening regional cooperation through the Intergovernmental Network and the Regional Action Plan is key to identifying best practices, enhancing local efforts, and mobilizing resources

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SESSION 1.

Setting the stage: Trends, actions and regional cooperation to improve air quality, reduce climate pollution and ensure a healthier future for all

The first session, moderated by Juan José Castillo, PAHO Regional Advisor on Air Quality and Health, included as speakers Luisa Fernanda González, Regional Expert on Air Quality at UNEP Colombia; Jordi Pon, Regional Coordinator of the UNEP Chemicals and Waste program; and Horacio Rojas, Director of Public Health at the National Institute of Public Health of Mexico. (To view workshop presentations, please click on the names of the speakers.)

Participants provided an overview of policies, programs and actions to improve air quality in LAC, the Regional Action Plan, the air pollution burden in the region, and the benefits of advancing WHO air quality standards.

"The human and economic cost of air pollution has been extensively studied and demonstrated.

—

Juan José Castillo,
Pan-American Health Organization (PAHO)

Policies, programs and actions to improve air quality in LAC

The Global Report on Actions on Air Quality, published by UNEP in 2021, stated that there have been advances in the establishment of national air quality standards in LAC, despite the fact that a third of the countries in the region have not legally adopted such standards. The region has been successful in adopting incentives to reduce pollutants from industry, transport, waste management and agriculture. However, areas of opportunity remain for several countries to advance in the establishment of air quality management strategies and programs, in the installation, expansion and continuous operation of air quality monitoring networks, in setting vehicle emission standards, in elimination of open waste burning, in development of clean energy for the residential sector, and in adoption of sustainable agricultural practices.

Regional Action Plan

In this context and consistent with the directive of the XXII Forum of Ministers of the Environment, the Regional Action Plan established objectives and a strategic framework for the period 2022-2026. The primary objectives of the Regional Action Plan are to establish a cooperative framework for strengthening integrated air quality management at both the national and subnational levels, and to facilitate and promote actions to reduce air pollution, protect health and the environment, mitigate climate change, and advance related goals of the 2030 Agenda for Sustainable Development. To this end, it is essential to incorporate technological advances that increase knowledge and awareness about air quality concentrations and pollution sources and their effects on health, as a basis for improving air quality management.

The Regional Action Plan promotes the improvement of regulatory frameworks and the development of national and subnational action plans for integrated air quality management. The formulation and implementation of such plans requires participatory and inclusive processes that address interrelated climate, health and air quality priorities, and that facilitate the participation of key actors, including governments, the public and

private sectors, and civil society and academia, with the support of national and international partnerships.

International cooperation can help identify best practices and effective actions for air quality management in a regional context and within resource constraints. For example, since monitoring coverage in cities with more than 500,000 inhabitants in LAC is insufficient, the lack of data may lead to an underestimation of health impacts. Monitoring systems must be improved, both in coverage and in the quality control of the data obtained. Improving data availability for LAC would better the understanding of the magnitude of air pollution effects on health and strengthen fundraising by conveying the urgency of the problem.

Among the regional priorities identified are the strengthening of air quality monitoring capacities, the identification and quantification of emission sources, technical support for the development of plans, policies and actions to reduce emissions, improving communication with the public, and mobilizing resources to achieve cities' and countries' air quality objectives.

Air pollution burden in the region and benefits of advancing WHO air quality standards

Access to clean and healthy air is a universal human right, yet 99% of the world's population breathes air that exceeds WHO air quality limits. Air pollution poses the greatest environmental health risk worldwide. It causes 7 million premature deaths per year. More than 90% of air pollution-related deaths occur in low- and middle-income countries, including in LAC. As air pollution disproportionately affects low-income countries and communities, it is necessary to reduce health gaps for vulnerable groups in the region.

With a high degree of urbanization and the growth of megacities in the region, a large percentage of the LAC population breathes polluted air by living in areas where air quality levels exceed the exposure thresholds outlined in WHO guidelines. Consequently, it is necessary to strategically incorporate the health sector in integrated air quality management and increase awareness among doctors about the interrelationship between air quality and health, including through training and participatory mechanisms.

Air quality actions should be based on science and the best available information regarding the health impacts of pollution. Health effects are frequently re-estimated to indicate greater risks than previously described. For this reason, the WHO proposed stricter standards in the Air Quality Guidelines published in 2021. It proposed a system of intermediate targets for countries to achieve, while gradually moving towards more ambitious public health goals. In this context, the countries of the region need to review and update national norms and standards in order to incorporate the recommendations of the WHO Guidelines, as well as update their risk communication programs.

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SESSION 2.

Overview of air quality management and public health priorities, policies and recent developments in Latin America and the Caribbean

The second session was moderated by Natalia Restrepo, Participatory Public Policy Specialist at Clean Air Institute. Speakers included María del Carmen Cabeza from the Ministry of Environment and Sustainable Development of Colombia; Pablo Fernández of the National Directorate of Environment of Uruguay; Lianda Chapman of the Barbados Department of Environmental Protection, and Rocío Toro, Chief of the Air Quality Division of the Ministry of Environment of Chile.

The panel focused on the experiences of Colombia, Uruguay, Barbados and Chile in addressing the problems of air quality, health and the environment. The panelists presented overviews of the air quality management frameworks in their countries, including regulatory systems, air quality monitoring, mitigation programs and policies, health risk communications and other elements.

Among the regional best practices identified are:

Colombia has 23 air quality monitoring systems consisting of 210 monitoring stations (a mix of automatic, manual and mixed). The resulting information has generated a culture of citizen participation in the management of air quality and a demand for actions to improve it. The integrated air quality management system has been reflected in the development of technical and regulatory instruments that made possible the adoption of air quality standards with a horizon of 2030. It has also led to the creation of an air quality strategy that, among other things, establishes emission reduction actions for different sectors and allows for periodic pollutant emission inventories. This experience shows the importance of mobilizing resources: the initial installation of the surveillance systems was financed with a World Bank loan and has continued with international cooperation resources.

Uruguay has carried out an extensive campaign to raise awareness among the population that uses wood as heating fuel in stoves. The objectives are to reduce emissions of particulate matter from wood stoves and improve energy efficiency.

Chile, as part of its Clean and Efficient Transport Strategy, has established emission control standards for light and medium vehicles, buses and trucks, off-road machinery and heavy vehicles. It also established minimum energy efficiency performance standards for light motor vehicles and has embarked on an ambitious electromobility strategy in public transport, with the aim of having a 100% electric fleet by 2040. In addition, to respond to the high levels of pollution from the use of firewood, the country implemented the Sustainable Heating Strategy. This strategy involved approving a thermal insulation standard for new homes, providing thermal refurbishment subsidies for existing homes, establishing a replacement plan for heaters and exploring district heating schemes in the medium term.

Barbados. The country's National Energy Policy and its Electric Light and Power Act incentivize energy transition towards renewables by liberalizing the power sector and allowing independent producers of clean energy to interconnect to the electric grid. As this shows, effective governance requires comprehensive strategies that encompass all the different aspects of air quality management.

FIGURE 2

Advertising campaign of the program Mejor Leña al Fuego

Air quality management includes a wide range of elements, including the generation and revision of standards, air quality monitoring systems, the incorporation of new technologies, communication to the public on air quality and health, the implementation of exceptional states and management of critical events, clean transport strategies and fuel improvements, industrial control, and strengthening of technical and scientific knowledge.

Additionally, air quality systems require budgetary sufficiency to ensure their proper and continuous operation. Resources from specific taxes or fees and the creation of environmental funds have proven to be resilient financial schemes. It is necessary to make use of innovative financing mechanisms - international, national and local - to achieve environmental objectives and strengthen management systems. There is a disparity at the regional level, both in regulatory progress and in budgetary sufficiency for sustaining air quality monitoring systems. In Barbados, for example, there is no air quality-specific legislation and environmental authorities must rely on planning and health processes to include environmental requirements. Barbados also has no regulatory air quality monitoring equipment, and is currently deploying a sensor-based network and undergoing passive sampling.

The availability of air quality data and increasing scientific evidence regarding health impacts creates more public awareness of the problem, generating support for policies to improve air quality. This has been buoyed by the implementation of participatory tools such as lower-cost community air monitoring. As an example, 51% of Colombians perceive air pollution as the main environmental problem. Citizen participation and demand has been key to successful mitigation and control measures.

Incorporating current WHO guidelines into national air quality standards is a complex issue because the requirements they now have in place are less stringent and based on the

previous WHO standards, which in turn often have not yet been met. However, it was recognized that progress is possible toward gradually stricter intermediate targets that are consistent with the new WHO guidelines.

One of the most important elements of air quality management in the region is to continue establishing incentives and regulations that encourage electromobility and promote energy transition in both public and private transportation fleets. This illustrates the interconnection with mitigation of climate change.

The sources of emissions vary across the region, so each jurisdiction must establish mitigation or emission reduction strategies based on the data available from emission inventories at each locality. Industrial sectors and the use of wood burning for heat are preeminent sources in some regions. In the case of pollution due to the use of wood burning in Chile, sustainable heating strategies that include programs to increase thermal insulation of homes, replacement of heaters and public awareness are highly relevant.

There are areas of opportunity to establish public-private partnerships for air quality monitoring. The development of integrated emission inventories that incorporate criteria pollutants, short-lived climate pollutants and greenhouse gases, together with the incorporation of new technologies for air quality management and decision-making, continues to be a challenge and opportunity.

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SESSION 3.

How technological innovation is helping to improve understanding of air pollution and health issues and scale solutions

The third session was moderated by Sarah Vogel, Senior Vice President, Healthy Communities at EDF. Speakers included Gayle Hagler and Rob Pinder from the U.S. Environmental Protection Agency; Alberto Ayala, Executive Director and Air Pollution Control Officer of the Sacramento Metropolitan Air Quality Management District; Maia Draper, Senior Air Quality Policy Manager at EDF; and Beatriz Cárdenas, Director of Air Quality of the World Resources Institute.

The panelists discussed the diverse applications and sources of air quality data and the information obtained both from conventional practices and from emerging technologies and applications. They reviewed how these sources can strengthen air quality management, analyzing both their potential and challenges.

Some air quality objectives and management processes continue to require conventional monitoring practices, i.e. reference-grade methods. Such is the case when determining compliance with national air quality standards and when measuring criteria and hazardous air pollutants to study long-term trends. Regulatory-grade monitoring networks are necessary, but there are other sources of information that can supplement air quality management, including satellite data, transport and traffic data, fixed lower-cost sensors, and mobile monitors.

There are emerging applications for which new technologies and data-related innovations provide a better understanding of air quality impacts. These include measuring a spatial or temporal subset of pollutant concentrations to evaluate air quality models and inform air quality management, performing high-density measurements to understand spatial variation of pollution and its impacts, identifying and monitoring point or area sources with high levels of pollution, and using this information for educational purposes to raise public awareness of air quality.

New monitoring methods and the diversity of information sources present an opportunity to:

- Increase citizen participation in air quality measurement and foster government collaborations with communities and academia
- Improve the understanding of local emission sources, analyze their health impacts and evaluate the effectiveness of programs to improve air quality
- Prioritize actions and focus efforts in a context of limited resources, and work to resolve issues of disparity in health impacts and environmental justice

However, there are challenges and considerations for using new monitoring methods and technologies:

- Large volumes of data that require high levels of technical expertise and processing capacity
- Disparity in the quality and type of information available
- Mixed results regarding the long-term operation of sensors

Because of shifting economic development patterns, societal change, and the lag between regulations and technological advancements, a clear legal framework is required to successfully manage air quality. Expectations, authorities, responsibilities and consequences need to be clearly defined to improve the chances of success.

The identification of emission sources and technology-based control measures is essential, along with regulatory instruments and requirements applicable to emitters and a balanced governance scheme of incentives and subsidies. Public policy and tools for managing air quality are mutually reinforcing (Figure 3).

FIGURE 3

Innovative air quality management technology and public policy are mutually reinforcing.

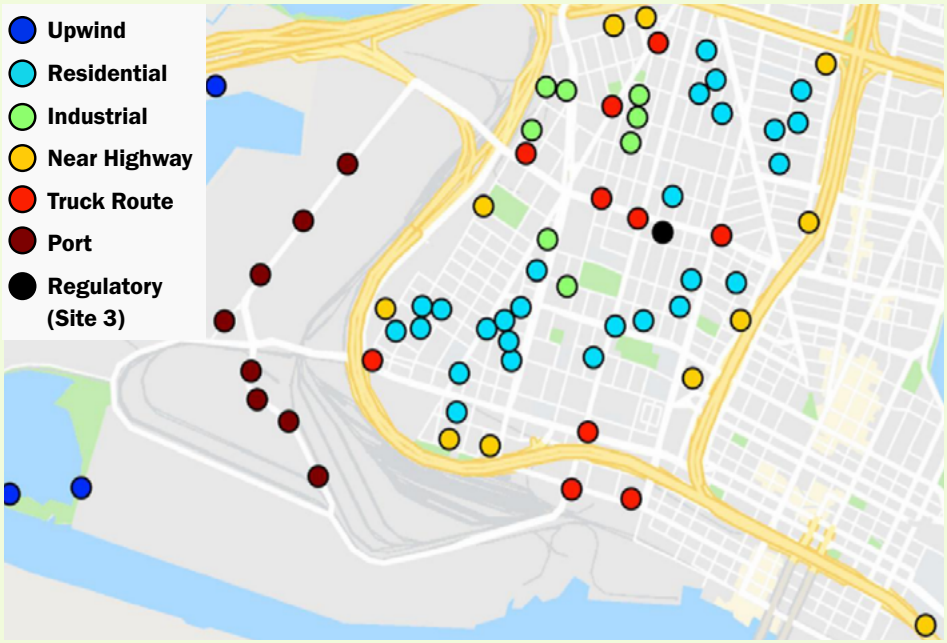
Source: Illustration based on the findings of Session 5.

Some of the innovative uses of new technologies and regulations for air quality management presented by the panelists are:

- High-density monitoring using lower-cost sensors: One way to use lower-cost sensors is to establish high-density monitoring schemes to study the spatial distribution of pollution and the impact of emissions, as shown in the example of Figure 4 below. Stationary and mobile sensors studies are important for targeted actions.

FIGURE 4

Network of 100 black carbon sensors in West Oakland, California



- **Emissions reporting and technology requirements in California:** The state of California recently updated its regulations so that all air-regulated businesses report emissions annually. This will provide the information needed to accelerate the use of control technologies, update the emissions inventory, and increase transparency regarding emissions and air quality. However, implementation has been an arduous task for small and medium-sized business owners who were not familiar with these requirements and who have limitations in human and technical resources.

4

SESSION 4.

Experiences, best practices and challenges for the incorporation of technology and other innovations in integrated air quality management in LAC

> **Air quality is a problem of the city and its people.**
>
> —
>
> **Carolina Urrutia,**
> Secretary of Environment,
> Bogotá, Colombia

The fourth session was moderated by Luisa Fernanda González of UNEP. The panelists included Carolina Urrutia, Secretary of Environment of the City of Bogotá, Colombia; Ana Zuleima Orrego, Air Quality Specialist of the Aburrá Valley Metropolitan Area in Medellín, Colombia; George Alexis Castelar Ulfe, Air Quality Specialist from Lima, Peru, and Sandra Denisse Herrera Flores, Undersecretary of Environmental Management, Climate Change and Energy Sustainability of Guanajuato, Mexico.

The presenters each provided context on how their states and cities are incorporating new technologies and participatory governance into their air quality management design. They also explained how air quality needs to be a transversal priority that incorporates multiple institutions beyond environmental ministries. The technologies and innovations that can help improve air quality involve multiple governance responsibilities, from land use and transportation planning to public engagement.

Air quality is a challenge at the city level that should not be the sole responsibility of environmental agencies. It is a shared institutional responsibility that must also include the areas of health, public infrastructure, and transport and mobility, among others. Air quality management should be an integrated system, based on scientific evidence, and open to public participation. Methods outside of traditional air quality management, including street paving and increasing green spaces, vegetation and urban forests, are effective strategies to decrease levels of particulate matter in urban areas and on their periphery. Effective urban planning allows cities to avoid incompatible land uses that generate tension between residents and industry.

The processes needed to establish the institutions, technical infrastructure and human resources to strengthen air quality management are gradual and iterative. Many of today's air monitoring projects in the region were initiated decades ago and are led by officials with extensive experience and resiliency. However, including a wider set of stakeholders can build momentum and increase public awareness on the improvement of air quality.

Even in the case of cities like Bogotá or the Aburrá Valley that have robust monitoring networks, collaborative sensor-based networks provide important benefits to air quality management. They allow us to understand air quality in specific environments, identify and establish air quality zones for management, promote air quality awareness and citizen science, and evaluate the impacts of policies. Zoning or identifying territories for air quality management implies the possibility of setting differentiated goals and actions focused on development plans. Air quality disparities have been observed, where drier and more marginalized areas often have higher levels of pollutants and particulate matter.

For the effective management of emission or air pollution events, citizens and industry alike should be confident that the response is based in scientific information and that they can trust the authorities to implement an appropriate and firm response. It was highlighted that

the preparation and periodic updating of emission inventories is key to focusing efforts and improvement actions.

Among the best practices identified are:

- **Low emission zones or urban areas for better air (known as ZUMA for their acronym in Spanish):** These seek to improve air quality in areas with high levels of pollution and socioeconomic vulnerability, through actions that reduce polluting emissions and impact on health. They are being successfully tested in both Colombia and Peru. It was recommended to explore their usefulness for addressing pollution problems in urban centers regionwide.
- **Network of citizen scientists in the Aburrá Valley:** As part of Medellín's participatory air quality management strategies, a network of 400 active citizen scientists has been formed in the Aburrá Valley. More than 350 particulate matter sensors and 180 noise sensors have been installed. 260 sensors are located in citizen scientists' homes, offices, schools and other locations. 90 air quality sensors have been installed on frequently used public and private bicycles.
- **Sustainable brick production center, Guanajuato, Mexico:** In an effort to collaborate with families and traditional brick producers in the area of Salamanca, Guanajuato, the government facilitated the creation of a production center that uses more efficient technologies in the brick firing process, considerably reducing emissions from this industry.
- **Sensor network in the municipality of Lima:** Peru's national legislation incorporates sensor networks as an alternative to regulatory monitors for planning and other objectives, although not for regulatory purposes. The Municipality of Lima has in the last 4 years developed a management model using low-cost sensors. It includes a network of 41 sensors which generate real-time data for public use. A manual and guidelines were developed to evaluate the field performance of sensors, and monthly and annual bulletins are published. The data is available to the public through the Metropolitan Environmental Information system (SMIA for its acronym in Spanish).

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SESSION 5.

How to mobilize resources and other support for clean air and its links to climate and health in Latin America and the Caribbean

The fifth session was moderated by Sergio Sánchez, Senior Policy Director, Global Clean Air with EDF. The panelists included Ernesto Sánchez-Triana, Global Leader for Pollution Management and Circular Economy at the World Bank, Tom Grylls, Portfolio Manager for the Clean Air Fund, Andrea Bizberg, Climate Action Planning Technical Advisor for Latin America at C40 Cities, Rodolfo Lacy, Director of Climate Action and Environment for Latin America at the OECD, and Katherine Swanson from USAID.

A recent study by the Clean Air Fund shows that of the public funding resources allocated to climate mitigation globally, only about 2.2% goes directly to air quality management. Of these resources, only 2% go to the LAC region, with funding being concentrated in 8 recipient countries within the region. In the case of bilateral funding organizations, the percentage of resources allocated to air quality is less than 5%, and of that percentage only 1% is for projects in LAC.

The shortage of funds contrasts sharply with the scale of the health crisis caused by air pollution. The World Bank estimates that the global cost of mortality and morbidity attributed to air pollution amounts to USD $8.1 trillion, equivalent to 6.1% of global GDP. This amount is almost double the GDP generated in 2018 by all Latin American countries combined.

At the regional level, the cost attributable to PM2.5 respirable particulate matter is 3.4% of GDP, with variations between countries from 3% to 8%. Despite this situation, resources for projects dedicated to air quality are well below what is available for other agendas and priorities.

The discrepancy between the magnitude of the problem and the resources devoted to solving it is due to several factors, including:

- Lack of awareness of the scale of the air quality problem facing the region
- Competition for scarce funding resources among multiple priorities and agendas
- Lack of an international diplomatic or policy agenda focused on air quality
- Lack of a dedicated programmatic category for air quality in funding institutions
- Complexity of the problem, with many interrelated factors that sometimes require behavioral changes
- Complexity of reporting the results of funding, making the "return on investment" less clear to funders who prefer success which can be easily measured and evaluated

However, despite these obstacles, the reality is that investments for improving air quality are highly attractive in terms of cost-effectiveness. They can lead to rapid public health improvement outcomes and are beneficial in terms of environmental justice by helping the communities and people most affected. Key strategies for leveraging resources and resource mobilization are:

- Linking air quality issues with climate action, biodiversity, and health
- Making the co-benefits of improving air quality explicit
- Showcasing short-lived climate pollutants as an example of the interrelationship of air quality with the climate change agenda
- Working with funding institutions to cultivate a specific category for air quality

At the national and subnational levels, there have been successful examples of both taxes and subsidies to fund air quality management. These includes fees or taxes dedicated for environmental funds or air quality systems, including maintenance of monitoring systems.

It is important for industrial and banking sectors to apply sustainability and ESG practices in LAC, including any subsidiaries. Integrated air quality management ultimately requires a profound transition to cleaner energies. Eliminating fossil fuel subsidies and internalizing the costs generated by polluting industries would require another type of economic incentive reform, and may incorporate emission pricing similar to proposed prices on carbon.

Among the resources identified during the panel are:

- **Clean Air Fund (CAF):** The philanthropic organization aims to direct funding from different sources and agendas, including health and climate change, toward effective air quality management. CAF supports the generation of technical information to estimate and promote the benefits of air quality interventions.
- **C40 Clean Air Accelerator:** The accelerator includes 48 cities seeking to accelerate air quality management outcomes. They do so by implementing new policies, strengthening enforcement capabilities and prioritizing resources, while engaging with diverse institutions and stakeholders to accomplish ambitious reductions in air pollution.
  Participating cities annually report on activities that have specific technical support from C40. In LAC, 4 cities are members: 1) Mexico City is supporting the implementation of the Valley of Mexico metropolitan program to improve air quality (Proaire) by working on the evaluation of the replacement program for heavy-duty vehicles and through public awareness and communication campaigns 2) Bogotá, Columbia has installed 210 air sensors and is developing a Low Emission Zone. 3) Lima, Perú is also evaluating Low Emission Zones. 4) Rio de Janeiro, Brazil is carrying out an environmental health campaign using lower-cost sensors.

WORKING GROUPS

On the second day of the workshop, breakout group sessions were facilitated by Margot Aguilar Rivero and the Talleres de Solaris team.

The objective of the first breakout group was for participants to rank priorities based on eleven actions for air quality management identified in the Regional Action Plan (see Table 1), which constituted the focus of regional cooperation for the entire workshop. The Regional Action Plan includes other measures which were outside the scope of this breakout group, such as reducing emissions in urban transport sectors, electricity generation, industry, solid waste and waste burning, household heating and cooking, and agriculture.

TABLE 1

Air quality management actions of the Regional Action Plan

Action	Overview
1.	Development of integrated regulatory frameworks and policies, as well as the adoption and progressive updating of air quality standards in accordance with the WHO [...]
2.	Development of strategies, frameworks, roadmaps, strategies or action plans at the national and subnational levels to improve air quality [...]
3.	Establishment of guidelines for the development of local Action Plans to address air pollution episodes [...]
4.	Strengthening continuous monitoring of air quality with reference monitors for regulatory purposes and exploring technological alternatives to increase the spatial and temporal coverage of monitoring [...]
5.	Improvement of the quality control and assurance processes (QA / QC) of air quality monitoring at the local and national level, for the generation of reliable data that facilitate decision-making in terms of air quality management.
6.	Strengthening of technical and scientific knowledge of the air quality problem and its effects on health and the environment [and] advancing in research and promoting scientific collaboration for the execution of monitoring campaigns [...]
7.	Promote the use of open data for the public dissemination of information on air quality, developing platforms for the integration, processing, and dissemination of data in real time.
8.	Develop, update, and include as a systematic practice the development of emissions inventories to prioritize sources, guide the development of emission control policies, regulations, and standards for various sectors [...]
9.	Develop a methodology for the periodic regional estimation of emissions.
10.	Strengthen technical capacities in the use of numerical models as a forecasting tool and for the diagnosis of control strategies by evaluating scenarios.
11.	Strengthen technical capacities to estimate health benefits of reducing emissions of polluting gases and particles, and collateral benefits such as the reduction of GHG emissions and short-lived climate pollutants [...]

Source: Regional Air Quality Action Plan 2022-2025.

In the second breakout group, the objective was to identify key elements for the creation of a roadmap for implementing priority activities listed in the Regional Action Plan. To outline the road map, groups responded to the following guiding questions: What do you want to achieve in four years? What are the indispensable activities to achieve what you want? Who is responsible for the implementation of the activities? What resources are available and what are required? What are the challenges that must be faced to achieve what is wanted? And, what institutions could contribute to the success of these activities?

Based on the materials collected in the discussions of the working groups, Table 2 summarizes the findings of this discussion, organized into related activities or priority areas.

TABLE 2

Identifying a Road Map for Implementing Regional Action Plan Priorities

Priority Area	Alignment with Actions (Table 1)	Possible Achievements by 2025	Suggested Regional Cooperation Actions
Scaling up clean air actions: developing and effectively implementing high-impact plans, regulations, policies and projects to improve air quality and meet health and climate goals	Actions 1, 2 and 3	• Comprehensive air quality management plans are adopted in the region, with health, environment and climate change objectives and integrating key actors. • Member countries have strengthened key aspects of regulatory frameworks to reduce air pollution in specific air quality basins. • A growing number of countries have explicitly incorporated into their NDC's actions to reduce air pollution and align with global health and climate change goals.	• Strengthen capacities for the development of comprehensive air quality management plans, regulatory frameworks and public policies, at the national and subnational levels. • Develop or strengthen, as the case may be, guidelines and regulations for responding to emission events, such as fires.
Making the invisible visible: improving air quality monitoring systems to enable actions to reduce air pollution and its impacts	Actions 4 and 5	• The percentage of countries and cities in the region that have continuous monitoring networks has increased, including innovative technologies and analytical tools to expand their coverage and density. • Cooperation and exchange of experiences among the technicians responsible for managing monitoring networks has been strengthened. • Air monitoring authorities have established processes for quality control and assurance, including possible regional audits or certifications.	• Upgrade local air quality monitoring systems, incorporating innovative technologies and analytical tools and improving monitoring with reference grade instruments. • Develop capacities for the design of mixed, complementary, and hyperlocal networks. • Mobilize resources for the improvement and expansion of data availability and quality, including equipment and technological innovation, data analytics, operations and maintenance, data management and processing, quality control and quality assurance. • Expand the list of pollutants monitored in the region, including Short-lived Climate Pollutants.
Raising public awareness, engagement and support: using information and outreach to put the issue on the public agenda and drive behavior change	Actions 2 and 7	• Air quality monitoring systems have open data tools such as websites, platforms, maps and applications for users to access information in an agile and personalized way. • Those responsible for monitoring in the region have explored developing a platform that facilitates on a regional scale the dissemination of both real time and historical air quality information, and that provides access to computer and technical support. • Access to timely and reliable information is being used to facilitate participatory air quality management and behavior change, strengthening trust in programs and increasing their effectiveness.	• Identify and implement the actions necessary for the use of open data in disseminating information on air quality to the public throughout the region, including the promotion of agreements and the dissemination of best practices. • Support the exploration of platforms and requirements to integrate, process and disseminate data in real time on a regional scale. • Identify alternatives and best practices for participatory air quality management, with the participation of key actors. • Promote citizen science programs and awareness among the population on the interpretation and scope of air quality data.

Priority Area	Alignment with Actions (Table 1)	Possible Achievements by 2025	Suggested Regional Cooperation Actions
Identifying opportunities and accelerating improvement routes: identifying and monitoring pollution sources with innovative tools	Actions 8 and 9	• Through regional training actions, exchange of experiences, technology transfers and sharing of analysis tools, responsible authorities and civil society have the necessary elements to identify sources of pollution. • The percentage of countries and cities in the region that have up-to-date inventories and capabilities for emissions modeling has gone up. • Air quality regulators use innovative technologies to increase the impact of their work in a context of limited resources.	• Strengthen capacities and tools for the analysis and characterization of emissions. • Strengthen capacities for the preparation and periodic updating of inventories and emission factors. • Improve and diversify analysis tools to understand the spatial and temporal distribution of sources and impacts of air pollution. • Strengthen capacities and tools for inspecting, reviewing and monitoring the performance of industries and other sources of pollution.
Making explicit the benefits of clean air: assessing the benefits of integrated air quality management for the achievement of health and climate goals	Actions 6 and 11	• LAC countries and cities have sufficient information and tools to evaluate the health and climate change benefits of air quality improvement policies and actions. • Those responsible for air quality improvement make use of the estimated benefits of air quality management in climate and health when communicating with the public, designing public policies and requesting funding. • Additional resources are mobilized for air quality management in LAC based on evidence of climate and health benefits.	• Improve access to the knowledge base, skills, methodologies and tools needed to evaluate and incorporate into public policies the effects of air pollution on health and the environment. • Facilitate access to tools, analysis models and best practices to help member countries estimate the health impacts of air pollution in their localities.

In addition to the topics mentioned above, other regional cooperation actions considered of high importance by the breakout groups were:

- A broad mobilization of funding resources for air quality management, which requires identifying and developing sources of financing and strengthening technical capacities for access to international resources and project formulation.
- The strengthening and exchange of best practices regarding air quality governance, especially to address interlinked issues and objectives such as social and environmental justice, gender equity, urban and rural contexts, and complexities such biomass burning.
- The revitalization of the Intergovernmental Network and the linkage of the Regional Action Plan with sustainable development goals. The importance of developing management and internal monitoring tools and defining indicators was also highlighted. The creation of a regional network of experts and technicians to exchange information and facilitate technical assistance actions was proposed.

Key barriers

The participants identified resource allocation at all scales as one of the major barriers to integrated air quality management, including the allocations at both the subnational and national levels. Coupled with the scarcity of resources, there is a lack of preeminence of the issue of air quality in the public agenda.

In administrative operations, system administrators face insufficient budgets, staff turnover, high costs of equipment and consumables, and barriers to access to new technologies, such as limited funding for analysis and modeling tools and expertise. The desirability of developing activities to strengthen technical capacities and promote technology transfer processes was identified.

With respect to air monitoring networks, the participants considered technical and financial sustainability to be an important challenge for ensuring adequate equipment, operation, maintenance, and quality assurance and control, as well as for the timely and reliable processing and disclosure of information. Regarding the harmonization of innovative monitoring technologies with reference monitoring systems, it was considered necessary to move toward their standardization, in part to dispel mistrust about alternative methods. They also noted the importance of overcoming the disparity in monitoring capacities between countries and cities and the lack of dialogue between health and environment sectors.

Participants reiterated the need to strengthen communication between key actors, improve transparency through the publication of reliable and timely air quality data, establish and implement risk management mechanisms (such as plans for critical air pollution events), develop training tools for the dissemination of information, and encourage citizen participation and the strengthening of a culture in favor of air quality throughout the region. They highlighted the importance of moving toward an inclusive and participatory management of air quality, aware that to achieve meaningful solutions, alliances must be extended beyond traditional actors in environmental areas.

Final comments

Participants stressed the importance of regional cooperation, and of the platform provided by the Regional Action Plan and the Intergovernmental Network, for achieving substantive progress and implementing concrete actions to reduce air pollution in the region, strengthening technical capacities, positioning the air quality agenda, and mobilizing resources to benefit the health of vulnerable populations in LAC, in turn generating benefits in terms of climate change.

Network members and workshop participants reaffirmed their commitment to continue participating in the regional cooperation efforts of the Intergovernmental Network and to redouble efforts in their respective areas and competencies to advance the objectives of the Regional Action Plan.

The need to vitalize the Intergovernmental Network as a platform for cooperation and policy dialogue, for awareness-raising in the region and, in general, for mutual technical assistance was stressed.

UNEP, EDF and workshop participants are key partners in an alliance for improving air quality and advancing global health and climate goals in LAC and other parts of the world.

REFERENCES AND RECOMMENDED RESOURCES

UNEP and Intergovernmental Network materials

1. Regional Action Plan
   https://drive.google.com/file/d/1VnRRrBxE0FRpBMmyMSZumNEVNmi_G5U0/view
2. Resource Mobilization Strategy of the Regional Air Quality Action Plan 2022-2025 for Latin America and the Caribbean
   https://drive.google.com/file/d/1Y0npLPlUzpchgv0-8D7WuduY7bvg0hWC/view
3. Air quality actions: a global overview of policies and programs to reduce air pollution
   https://www.unep.org/es/resources/informe/acciones-sobre-la-calidad-del-aire-un-resumen-global-de-politicas-y-programas
4. UNEP Webinars on Air Quality and Health in Latin America and the Caribbean:
   https://www.unep.org/es/events/online-event/seminarios-web-sobre-calidad-del-aire-y-salud-en-america-latina-y-el-caribe
5. Training actions and exchange of information on UNEP's integrated air quality management
   https://www.unep.org/es/events/online-event/acciones-de-capacitacion-e-intercambio-de-informacion-sobre-la-gestion-integral
6. Comprehensive assessment of air pollution legislation
   https://wedocs.unep.org/bitstream/handle/20.500.11822/36692/GAAPL_ES_SP.pdf
7. Actions to Improve Air Quality. Regional Report for Latin America and the Caribbean
   https://drive.google.com/file/d/1D1EImLajkJePqHlqhZ53qxGUOYWHYQQ5/view

Air Quality Best Practices and Resources

https://drive.google.com/file/d/1D1EImLajkJePqHlqhZ53qxGUOYWHYQQ5/view

8. Better Wood to the Fire. Manual for the responsible use of firewood
   https://www.ambiente.gub.uy/oan/documentos/DCA_Manual_Mejor_le%C3%B1a_al_fuego_2021.pdf
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    https://pubs.acs.org/doi/10.1021/acs.est.9b00282
11. Citizen Scientists in the Aburrá Valley
    https://www.metropol.gov.co/ambiental/siata/Paginas/ciudadanos-cientificos.aspx
12. Low Cost Sensor Monitoring in Lima, Peru
    https://www.gob.pe/institucion/munilima/noticias/548571-monitoreo-de-la-calidad-del-aire-sensores-de-bajo-costo-pasaran-evaluaciones-gratuitas-de-desempeno
13. Secretariat of Sustainable Economic Development of Guanajuato, Mexico
    https://sde.guanajuato.gob.mx/sdes/
14. Clean Air Fund
    https://www.cleanairfund.org/air-quality-funding-2022/
15. World Bank, What you need to know about climate change and air pollution
    https://www.bancomundial.org/es/news/feature/2022/09/01/what-you-need-to-know-about-climate-change-and-air-pollution

16. C40 Clean Air Accelerators
https://www.c40.org/accelerators/clean-air-cities/
17. EDF (2022) Childhood Asthma Maps
https://globalcleanair.org/traffic-pollution-harms-childrens-lungs/
18. Health and Air Quality in more than 13,000 cities
https://urbanairquality.online/

ANNEX 1

Workshop Agenda and Presentations

International Workshop
How To Catalyze Clean Air Solutions In Latin America And The Caribbean To Achieve Health And Climate Goals

5-6 October 2022
Location: GHL Hotel Capital, Bogota, Colombia
Calle 25 B # 69 A -50

Background

The Latin America and the Caribbean (LAC) Office of the United Nations Environment Program (UNEP) and Environmental Defense Fund (EDF) launched on September 7th, 2022 a new partnership to build collaborative clean air solutions in LAC countries over the next four years. This collaboration aims to leapfrog current barriers to advancing clean air in the region and is framed by the Regional Action Plan on Air Quality 2022-2025 (the Regional Action Plan) recently developed within the framework of the Intergovernmental Network on Atmospheric Pollution for Latin America and the Caribbean and the UNEP LAC Office.

Air pollution is the leading environmental risk for early death, responsible for nearly seven million premature deaths each year around the world from heart attacks, strokes, diabetes and respiratory diseases. More than five hundred million people living in Latin America and the Caribbean breathe air that exceeds the World Health Organization's guidelines for pollutants like nitrogen dioxide, fine particle pollution and ground-level ozone.

In this context, UNEP and EDF, along with the Intergovernmental Network on Atmospheric Pollution for Latin America and the Caribbean, co-host this international workshop to move forward the implementation of the Regional Action Plan and facilitate dialogue between national and subnational governments, civil society, grassroots, and private sector organizations, as well as international agencies, non-profit organizations and philanthropic organizations and academia. This event will be held on October 5-6 in Bogotá, Colombia. The hybrid format of this workshop will enable the participation of around 60 presential participants and it will be streamed live online for reaching a broader audience. Participants include representatives from national and sub-national authorities in charge of the air quality agenda in LAC countries, in addition to other key partners from the region and elsewhere.

Workshop Objective

The overall objective of this workshop is to support the implementation of the Regional Action Plan on Air Quality 2022-2025, especially the adoption of air quality management practices and tools – policies, programs, and technological innovations -- that contribute to understanding and awareness of air pollution levels, sources, health impacts and links to climate, as well as to catalyze solutions across Latin America and the Caribbean.

Specific objectives include:

- Provide a platform for dialogue that can build collaborative efforts and strengthen regional cooperation across countries and cities in Latin America and the Caribbean;
- Co-create a road map that identifies local priorities, resources needed, timelines, and potential partners; and
- Identify opportunities to leverage necessary funding to enable and deliver high-impact solutions to maximize benefits to public health and climate.

Agenda

Hour	Day 1
8:00 – 8:30	Registration and coffee
8:30 – 9:00	Opening remarks • Juan Bello, Head of UNEP Colombia • Sarah Vogel, Senior Vice President, Healthy Communities, EDF • Guillermo Gonzales. Advisor, Health Surveillance, Disease Prevention and Control, PAHO/WHO Country Office in Colombia • Gonzalo Rosado, President of the Steering Committee of the Regional Intergovernmental Network on Air Pollution for Latin America and the Caribbean, Ministry of Environment, Peru, and • Sandra Vilardy Quiroga - Deputy Minister of Environmental Policies and Standardization. Ministry of Environment and Sustainable Development, Colombia
9:00 – 9:10	Workshop summary and expected outcomes • Sergio Sanchez, EDF
9:10 – 10:30	**Session 1.** Setting the stage: Trends, actions and regional cooperation to improve air quality, reduce climate pollution and ensure a healthier future for all Moderator: Juan José Castillo, Regional Advisor on Air Quality and Health, PAHO • Presentations followed by a question and answer session. • Horacio Riojas, Director of Environmental Health, National Institute of Public Health, Mexico: The burden of air pollution in Latin America and the Caribbean and the benefits of advancing the WHO AQ guidelines. • Luisa Fernanda González, Regional Air Quality Expert, PNUMA: Actions on Air Quality: A Summary of Policies and Programs to Reduce Air Pollution in the LAC region. • Jordi Pon, Regional Coordinator of the Chemicals and Pollution Program, UNEP: The Regional Air Quality Action Plan 2022-2025 for the LAC region.
10:30-10:45	Coffee break and an informative exchange of experiences among participants
10:45-12:30	**Session 2.** Overview of air quality management and public health priorities, policies and recent developments in Latin America and the Caribbean Moderator: Natalia Restrepo, Participatory Public Policy Specialist, Clean Air Institute • Presentations followed by questions and answers. o María del Carmen Cabeza, Ministry of Environment and Sustainable Development, Colombia o Pablo Fernández, National Directorate of the Environment, Uruguay o Lianda Chapman, Department of Environmental Protection, Barbados o Rocío Toro, Head of Air Quality Division, Ministry of Environment, Chile
12:30- 14:00	Lunch
14:00- 15:30	**Session 3.** How technological innovation is helping to improve understanding of air pollution and health issues and scale solutions Moderator: Sarah Vogel, Senior Vice President, Healthy Communities, EDF • Presentations followed by a question and answer session. o Gayle Hagler and Rob Pinder, U.S. Environmental Protection Agency (U.S. EPA) o Alberto Ayala, Executive Director and Air Pollution Control Officer, Sacramento Metropolitan Air Quality Management District o Maia Draper, Air Pollution Policy Manager, Environmental Health, Environmental Defense Fund o Beatriz Cárdenas, Director of Air Quality, WRI Mexico

Hour	Day 1
15:30- 15:40	Coffee break
15:40- 17:20	**Session 4.** Experiences, best practices and challenges for the incorporation of technology and other innovations in integrated air quality management in LAC Moderator: Luisa Fernanda González, UNEP • Presentations followed by questions and answers. o Carolina Urrutia, Secretary of Environment, City of Bogotá, Colombia o Ana Zuleima Orrego, Air Quality Specialist, Aburrá Valley Metropolitan Area, Medellín, Colombia o George Alexis Castelar Ulve, Air Quality Specialist, Lima, Peru o Sandra Denisse Herrera Flores, Guanajuato, Undersecretary of Environmental Management, Climate Change and Energy Sustainability, Mexico
17:20– 17:35	Closing of Day 1 • Audience Comments • Announcements

Hour	Day 2
8:30 – 9:00	Summary of Day 1
9:00 – 10:30	**Session 5.** How to mobilize resources and other support for clean air and its links to climate and health in Latin America and the Caribbean Moderator: Sergio Sánchez, Senior Policy Director, Global Clean Air Initiative, EDF Facilitated panel discussion followed by questions and answers. • Ernesto Sánchez-Triana, Global Leader for Pollution Management and Circular Economy, World Bank • Tom Grylls, Portfolio Manager, Clean Air Fund • Andrea Bizberg, Technical Advisor, Climate Action Planning, Latin America, C40 Cities • Rodolfo Lacy, Director of Climate Action and Environment for Latin America, OECD • Katherine Swanson, Environment Officer, Bureau for Development, Democracy, and Innovation, USAID
10:30 – 10:45	Coffee break
10:45 – 12:00	**Session 6.** Working sessions on key activities to improve air quality monitoring and management, including the use of technology and analytical innovations and support for policy development, in the context of the Regional Action Plan. • Facilitated discussion in working groups.
12:00-13:30	Lunch
10:45-12:30	**Session 7.** Working sessions to propose a roadmap to implement key activities of the Regional Action Plan 2022-2025 to incorporate technological and analytical innovations to improve air quality management systems and improve health responses, as well as integrated policies and strategies. Discussions should include recommendations for leveraging the necessary funding and other resources to enable and deliver high-impact clean air solutions, and effective implementation. • Facilitated discussion in working groups.
15:30-16:45	Coffee break and exchange of experiences
16:45-17:00	**Session 8.** Socialization of the roadmap, identification of partners and agreements
17:00-18:00	Next steps and closure