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Innovation

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The use of innovative tools and approaches to engage children and young people as agents of change on air pollution

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This guide will take you on a journey through Belize, China, Mongolia and Serbia

→ four countries using innovation to tackle air pollution challenges.

Serbia

Mongolia

China

Belize

The big picture
Using innovation to create better, more impactful air pollution projects

UNICEF teams around the world are harnessing innovation to strategically address air pollution through the use of new technologies and approaches that maximize impacts. Innovation improves results and should be integrated into programming and advocacy efforts whenever possible. UNICEF defines innovation as a new or significantly improved solution that contributes to progress for children and accelerates results for children or young people. It is about doing new things to solve problems and improve the lives of children around the world. It is about matching today's challenges with tomorrow's solutions.

Fostering innovation in programming is a key change strategy to achieve the ambitious targets of UNICEF's Strategic Plan 2022–2025.[1] Making more deliberate choices that align innovation with UNICEF's overall strategic goals can accelerate progress for children.

This guide was developed by UNICEF's Office of Innovation and UNICEF Climate, Energy, Environment and Disaster Risk Reduction (CEED). It showcases how innovation was successfully used in different child-centred clean air programmes in UNICEF country offices in Belize, China, Mongolia and Serbia. The goal is to inspire changemakers to incorporate innovation – including new technologies and approaches – into air pollution projects.

Practitioners can use this guide to:

→   **Explore innovative tools and techniques to gather air pollution data**

→   **Learn about programmes and initiatives that foster advocacy, meaningfully engage youth, reduce air pollution, create change and save lives**

This guide outlines six ways that innovation can improve air pollution programming:

1. Monitoring air pollution levels to set the stage for intervention
2. Assessing interventions to find approaches that increase impacts
3. Using new technologies and approaches to improve data collection
4. Harnessing data collection to meaningfully engage youth
5. Developing digital platforms to meaningfully engage youth
6. Empowering youth advocates to reach decision makers

UNICEF Strategic Plan 2022–2025

UNICEF delivers change by combining high-quality programmes at scale, harnessing innovation and collecting evidence, in partnership with governments, other United Nations organizations, civil society, the private sector, communities and children.

Problems ⚠

Limited access
to data on how air pollution
impacts children

Lack of meaningful
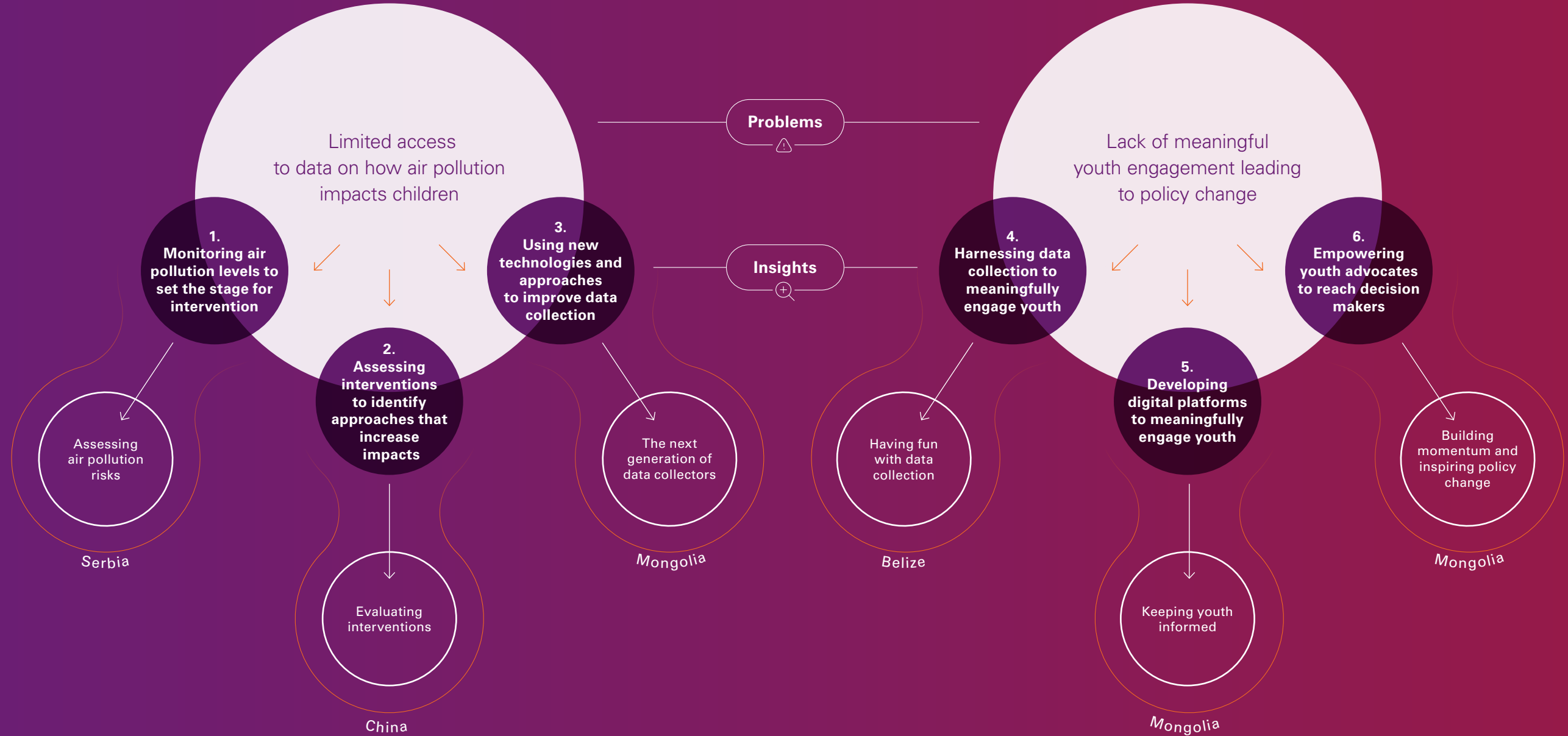youth engagement leading
to policy change

Insights ⊕

1.
Monitoring air pollution levels to set the stage for intervention

2.
Assessing interventions to identify approaches that increase impacts

3.
Using new technologies and approaches to improve data collection

4.
Harnessing data collection to meaningfully engage youth

5.
Developing digital platforms to meaningfully engage youth

6.
Empowering youth advocates to reach decision makers

Assessing
air pollution
risks

Evaluating
interventions

The next
generation of
data collectors

Having fun
with data
collection

Keeping youth
informed

Building
momentum and
inspiring policy
change

Serbia

China

Mongolia

Belize

Mongolia

Mongolia

Click on the diagram above to explore the guide

Key approaches
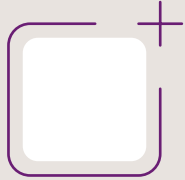
Product innovation

Applying the latest advancements and equipment

Product innovation has the power to create transformational change.

New products, such as low-cost air quality monitors or predictive machine learning models, can be applied to air pollution initiatives to generate data, improve systems and streamline implementation. As the pool of available tools continues to grow, air pollution programmes can harness these innovative products – everything from low-cost sensors to high-quality indoor filters – to improve their impact.

Experimentation

Testing new solutions to existing problems

Experimentation can be used to find and test new, innovative air pollution interventions

The experimentation process is particularly important when deploying innovative technologies, which can present unforeseen implementation challenges. For example, teachers may require special training before they can successfully deliver an online lesson plan. Children may need help logging results from in-school air quality monitors. Experiments can help uncover these issues, reducing barriers and ensuring that air pollution interventions reach their targets.

Digital tools

Harnessing software and social media

Online educational tools can reach millions of people.

Social media can spread messages and information across the globe. Digital systems have the power to interpret data quickly and efficiently. When applied to air pollution interventions, these digital tools can expedite and improve results.

Intervention

Using innovative interventions to improve air quality

Some innovations directly target air pollution.

Interventions that encourage the use of public transportation, for example, have been shown to improve outdoor air quality. Purifiers, air filters and venting technologies can directly decrease indoor air pollutants. Other interventions – such as training programmes and social media campaigns – can be used to discourage smoking near children or to show the dangers of burning indoor fires during winter. Whether a physical device or an educational campaign, interventions have the power to directly improve air quality.

Air pollution
An overview

Why is air pollution important?

Air pollution is a global public health crisis that is silently destroying children's lives and futures.

Approximately 600,000 children die each year from acute lower respiratory illnesses caused by contaminated air.[2]

Air pollution is increasing in many parts of the world, and poor communities bear a disproportionate amount of air pollution-related health and development effects.[3]

Why is air pollution a priority for UNICEF?

Air pollution has a devastating effect on children's health. Compared to adults, children breathe more air per kilogram, making them uniquely vulnerable to air pollution. Children's lung alveoli are still developing and their nasal passages aren't able to effectively filter pollutants. Exposure to pollutants, even at low levels, during pregnancy and infancy can result in disease, disability and premature death.[4] According to the research, two billion children – about 90 per cent of children globally – are exposed to air that contains more than 10µg/m3 of fine particulate matter measuring 2.5 micrometres or less in diameter (PM2.5), which is considered toxic. Exposure is exceedingly high for more than 1 billion children, who have a 15 per cent higher chance of death from all causes due to unsafe air.[5]

Air pollution also contributes to child illnesses. It impacts neurodevelopment, childhood growth, obesity rates, endocrine function, allergies and immune function.[6] Studies have also shown that air pollution is strongly associated with respiratory conditions like pneumonia, bronchitis, cardiovascular diseases and asthma.[7]

UNICEF's Children's Climate Risk Index[8] uses data to show how many children are exposed to climate hazards, shocks and stresses. Addressing air pollution is critical to improving children's health and well-being. Learn more about the role of climate, energy, environment and disaster risk reduction in UNICEF's Strategic Plan 2022–2025.[9]

Air pollution's impact on the body

⚠️

Prenatal
Reduced growth
and complications

Birth
Preterm birth,
low birth weight and mortality

Early childhood
Decreased lung growth and
function, asthma, developmental
delays, childhood obesity,
pneumonia and other infections.

Lifelong impacts
Chronic respiratory disease,
cancer and cardiovascular
disease

How can air pollution be addressed?

Tackling air pollution is a critical part of addressing climate change.

Air pollution comes from several sources. Transportation, manufacturing, power plants, waste burning, and even agriculture can release dangerous particles into the air. Household cooking and heating are also a major cause of air pollution, especially in winter, when indoor ventilation is low.[10]

Similarly, there are several ways to address air pollution. Some programmes aim to create policy change. Other initiatives focus on sharing information and knowledge about air pollution. Some support and encourage sustainable energy, which – according to a recent UNICEF report on sustainable energy – can reduce multidimensional poverty while simultaneously lowering emissions.[11]

Air pollution programming has the power to improve children's lives by:

→ Reducing the number of premature births, child deaths, low-weight births, and the frequency and severity of air pollution-related diseases (health benefits);

→ Decreasing negative effects on child development, including learning outcomes (development benefits);

→ Improving air quality, especially where it affects child and maternal health (environmental benefits); and

→ Contributing to a decrease in the emission of pollutants, including long-lived greenhouse gases and short-lived climate pollutants (climate benefits).[12]

Take this free, online course to learn how to begin integrating climate change into programming.

What role do young people play?

As young people around the world continue to engage in climate issues at unprecedented levels, it is important that they play an increasingly visible role in policy discourse. Children's voices remain underrepresented in global discourse on these issues, leading to climate and environmental policies that do not sufficiently address their current and future needs. Urgent action is needed to address social vulnerability, such as health impacts from air pollution and other climate risks.[13]

Innovative tools and approaches are needed to give young people opportunities to shape climate and environmental policies and elevate their voices as agents of change. Today's decision-making will impact the rest of their lives.

What role does innovation play in air pollution programming?

Innovation is one of the best tools for tackling huge global issues like air pollution. According to UNICEF's Global Innovation Strategy, "through digital, physical product, financial and enabling innovations, we can improve the effectiveness and efficiency of programmes, approaches and processes."[14] UNICEF defines innovation as a new or significantly improved solution that contributes to progress for children. Specifically, UNICEF groups innovation into several unique categories, each with the potential to increase programme results:

→ **Digital innovation**
New or existing digital technologies that are adapted into solutions e.g. EduTech, digital health, data innovations, real-time monitoring, mobile youth platforms.

→ **Physical products**
New or improved physical goods created to meet the needs of children and young people e.g. multiple-purpose, lightweight tents, accessible latrine slabs, portable incubators.

→ **Innovative finance**
Non-traditional mechanism of raising resources to meet children's needs e.g. bridge funds, blended finance, cryptocurrency, transactional financing.

→ **Programme approaches**
Different approaches, processes and ways of working improve effectiveness/efficiency e.g. human-centred design, behavioural science-driven C4D, 'smart' contracts.

→ **Data innovation**
Use of new or non-traditional data sources and applications of data science to gain new insights including through predictive analytics.

→ **Frugal innovation**
Simple products or services that dramatically cut costs, outperform alternatives and can be scaled up e.g. Kangaroo care and safe birth kits, youth social innovation and entrepreneurship.

→ **Social innovation**
New solutions that simultaneously meet a social need (more effectively than existing solutions) and lead to new or improved capabilities and relationships and better use of assets and resources. Social innovations are both good for society and enhance society's capacity to act.

Innovation always has two main purposes. One is to do something more effectively than traditional methods would. The second and most important is to do something faster and more efficiently.

💬

Andria Nadiradze
Health Specialist, UNICEF China

By applying technology and innovative new approaches to their work, UNICEF teams can accelerate results and increase impacts. Whether a digital solution or a new product, innovation is transformative. It plays a critical role in air pollution programming – from using air quality monitors (AQMs) to gather data, to harnessing social media for educational campaigns. Innovation takes many shapes and can be applied to initiatives with any level of budget, expertise or capacity, often providing time-saving and cost-saving advantages when compared with traditional approaches. In addition to directly addressing the needs of young children and pregnant women, innovations help improve meaningful engagement, support data collection, positively influence behaviours and increase demand for child-inclusive climate, environmental and air quality policies.

UNICEF's Office of Innovation
Finding – and scaling – solutions that work

UNICEF's Office of Innovation uncovers existing solutions to some of the world's most pressing challenges. These game-changing innovations use new technologies and approaches to address existing problems. By finding and supporting new approaches, partnerships and frontier technologies, UNICEF's Office of Innovation is able to increase impact and save lives.

The Office of Innovation works across nine different portfolios, each comprising a curated set of solutions with the potential to significantly accelerate results for children. The Office of Innovation's Climate Change Innovation Portfolio, for example, finds transformational solutions that protect children from the effects of air pollution and climate change. The Climate Change Innovation Portfolio supports innovative air pollution programming in seven country offices, both technically and financially. The UNICEF Office of Innovation Venture Fund has invested in 124 solutions, including early-stage start-ups and solutions incubated in country offices.

We can do things differently, and we can do different things… Innovation is not only the most sophisticated technologies, sometimes it's the simplest of things.
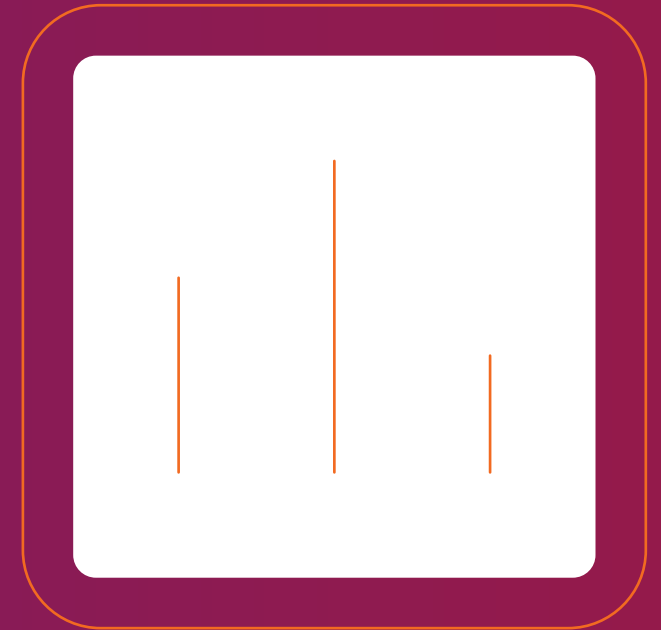
💬

António Guterres
United Nations Secretary-General

Learn more about UNICEF's
Office of Innovation

Innovation to **improve data collection**

Limited data on where/when/how

air pollution impacts children

Air pollution programmes require accurate data for planning, budgeting and implementation

Air pollution programmes require accurate data for planning, budgeting and implementation. In many cases, air pollution monitoring is an important first catalyst for change. Air quality monitors can fill large gaps in air quality data while also providing the public with accurate information on the state of their air. Air quality monitoring – and the data it yields – is also useful in identifying the sources of pollution, such as burning garbage or indoor cooking. This information helps people adapt their behaviours to reduce both air pollution and their exposure to it. Air quality monitoring can also inspire people to take action and become clean air advocates.

Accurate data can shape personal behaviour, community-level interventions and national public health policy. Low-cost air quality sensors can show when and where air pollution poses a risk to children. This data can be processed and transformed into information that can be used to help youth protect themselves from air pollution, inform teachers and parents so they can make health-focused choices for children, and provide evidence for policy change or for practitioners to seek funding and develop air pollution programming.

How can innovation help solve the problem?

Innovation

Secured stronger evidence

New pools of data gathered by UNICEF programmes filled a critical information gap in many countries. These datasets showed need and made the case for action to governments and communities.

Improved youth advocacy

Increased access to data empowered youth, motivating them to become clean air ambassadors and champions for change.

Increased engagement

Young people shared data with their friends, families and schools, using newly available information to spread awareness through the wider community.

Uncovered effective approaches

UNICEF distributed air purifiers, testing their use and exploring the best ways to improve indoor air quality.

Identified new approaches

Experimentation led to the development of new resources, curricula and informational materials on air pollution

Monitoring air pollution levels can set the stage for intervention

Assessing air pollution risks in **Serbia**

UNICEF Serbia placed 135 air quality monitors in schools to provide students with an interactive, project-based learning experience. By tracking and monitoring the devices, students learned about the data collection process while also learning about air pollution and its risks. The monitors showed when air pollution was heaviest, and many students used this new-found knowledge to inform teachers and parents, spreading information within the community.

This initiative not only taught students about data collection and air pollution, but it empowered them to become air pollution advocates who encourage others to stay indoors and adjust activities according to spikes in pollution levels. In fact, forty youth from various parts of the country were trained to become national air quality ambassadors.

These participants learned how to organize volunteers and ultimately mobilized more than 700 young people from 20 cities to contribute to the Serbia Youth Declaration on Air Quality.

This work forms part of UNICEF's Norway-funded Schools for Better Air Quality project in Serbia.[15]

The air quality monitors placed in schools were for children to understand that air pollution is not something abstract. It's something within their own everyday environment. The monitors helped students understand air pollution's direct health impacts on them, their families and their communities.

Ana Prodanovic
Child Rights Monitoring Specialist, UNICEF Serbia

Innovation themes

Product innovation

Intervention

Standardize data across projects

Comparing data from different air quality monitors is difficult because each device uses slightly different measurements.

This can be a problem when comparing data from across countries and regions. Instead of researching and testing different devices, consider those that UNICEF country offices have successfully used in the past. Using the same devices will broaden monitoring, enabling comparisons of data across countries and regions. This allows for country offices to adopt and scale proven interventions by other countries. To ensure accuracy and to replicate, scale, and compare data across regions and countries, the measurements must be from the same device. Standardizing air quality monitoring devices helps to standardize data.

Types of monitors to consider

There are thousands of different air quality monitors available for purchase. All devices rely on the same principles and technology – they measure particulate matter, or PM2.5, and the level of gases, such as oxygen and carbon dioxide (CO_2), in the air. PM2.5 is the most common measurement for air quality.

Low-cost monitors often provide all the data points needed for a meaningful assessment of air quality. When needed, networks of cost-effective devices can be deployed to evaluate spatial variability in pollutant concentrations. Most low-cost devices also report data in real time to the cloud, thus making them a great tool for public awareness.

In 2019, UNICEF Mongolia undertook a study focused on low-cost sensors for particulate matter monitoring. The devices purchased for the study measured PM2.5, CO_2 and carbon monoxide (CO), while also featuring global positioning system (GPS) functionality and offline data storage.

The assessment identified several low-cost devices with these and other important attributes:

Device	PM Sensor	Local Data Storage	Battery	Website Map	Widget	Price
AirVisual Pro	AirVisual	Yes	Yes	Yes	Yes	US $269
Purple Air	Plantower	Yes	No	Yes	Yes	US $259
Air Quality Egg	Plantower	Yes	No	Yes	No	US $450*
Laser Egg	Plantower	No	Yes	No	No	US $200
Air Beam 2	Plantower	No	Yes	Yes	No	US $249

* Air Quality Egg devices can be customized by the user

The World Meteorological Organization published an evaluation of low-cost sensors. The Air Quality Sensor Performance Evaluation Center provides an in-depth look at air quality monitors and their functionality.[16] Both are great resources for anyone interested in deploying low-cost air quality monitors.

Tip 1.2

Plan for ongoing maintenance and prolonged data collection

Operating and maintaining technologies often requires significant budgets. Air quality monitors, for example, require regular maintenance to stay operational.

They also require data-related budgets (for cloud storage, data analyst time and quality assurance, among other things). While these costs are considerably higher for reference-grade air quality monitors, low-cost sensors also require budget for ongoing maintenance and prolonged data collection.

Maintenance costs vary greatly depending on the chosen intervention. These secondary costs can add up quickly and should be considered and incorporated into project budgets before procurement or implementation.

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Looking forward
Air quality monitoring at child-centric facilities

Many countries lack data connecting air pollution to health impacts. These gaps are due to limited air quality monitoring coverage and limited data on air pollution-related health effects. With this in mind, UNICEF is exploring the feasibility of establishing a model to conduct ground-level air quality monitoring at UNICEF premises and via other child-centric facilities, such as schools and youth centres.

UNICEF is currently monitoring air quality at the United Nations offices in Ethiopia and has established networks of monitors at schools in some of the countries profiled in this document.[17] When fully realized, these efforts could complement satellite data, expand the low-cost sensor network and provide monitoring coverage in locations where data is currently limited. The ultimate goal is to inform appropriate paths for effective programming.

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Insight 2

Assessing interventions to increase impacts

Evaluating interventions in **China**

UNICEF China supported the country's National Institute of Environmental Health to conduct a randomized controlled trial, to identify scalable solutions for indoor air pollution. A total of 108 rural households were enrolled in the pilot and provided with two real-time, online air quality monitors for each home. The monitors assessed PM2.5, temperature and humidity, uploading data to a dedicated cloud platform every five minutes. Considering children's heights, the air quality monitors were installed approximately 1 metre above the floor in children's bedrooms and in household kitchens. The bedroom monitors were installed as close as possible to children's sleeping areas, while the kitchen monitors were installed close to stoves.

After retrieving data, the households were then divided into treatment and control groups. Treatment groups received air purifier devices, while the control groups did not. The air quality monitors collected indoor air pollution data to assess the impact of the air purifiers on air quality (both in comparison with the control groups, as well as pre- and post-intervention within the treatment groups). More research and innovation is needed to advise on the global use of air purifiers, but the team's experiment revealed that air purifiers with high efficiency particulate air (HEPA) filters were effective at improving indoor air quality.

Innovation themes

Product innovation

Intervention

Experimentation

Air quality monitors give us accurate data to monitor, to understand and to see the impact of interventions in improving air quality. This is our goal. We want children to grow up in an environment that is safer for their health and lives.

Andria Nadiradze
Health Specialist, UNICEF China

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Tip 2.1

Expect difficulties procuring new products and technologies

Procuring physical technologies such as air quality monitors may come with supply chain issues, import delays and shipping challenges.

These hurdles can delay implementation and hinder roll-out. Similarly, digital technologies such as apps and online platforms can also be difficult to procure, translate and make viable for local communities. Plan accordingly and build extra time into the project implementation plan to mitigate potential delays.

Insight 3

Using new technologies and approaches to improve data collection

The next generation of data collectors in **Mongolia**

UNICEF Mongolia's Air Pollution Youth Mappers Programme teaches young people how to collect data on air pollution. Participants learn the adverse effects of air pollution, then begin working as community researchers. In 2019, 75 adolescents from 25 high schools joined the programme – acquiring critical skills and becoming junior air quality researchers, while also providing valuable data on air quality. In early 2020, participants used the data they gathered to develop and disseminate awareness messages and materials for their peers, teachers and parents. This included data about air quality levels, information on the sources and impact of air pollution, content on maternal and child health, and good practices for combating air pollution.

Because many communities in Mongolia lack knowledge and information about air quality, the programme also sparked targeted political and social change advocacy efforts. To this end, the Air Pollution Youth Mappers Programme actively participated in social campaigns and events to increase meaningful engagement, while also mobilizing new air quality champions. The Air Pollution Youth Mappers programme highlights the strength of adolescent engagement and is being used as an example for empowering young people through data collection.

Innovation themes

Experimentation   **Intervention**

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Children that live in the countryside of Mongolia are difficult to reach, especially when COVID-19 restrictions were in place. We had to rethink our approaches and strategies to engage young people and to make them more motivated, inspired and interested in air pollution work.

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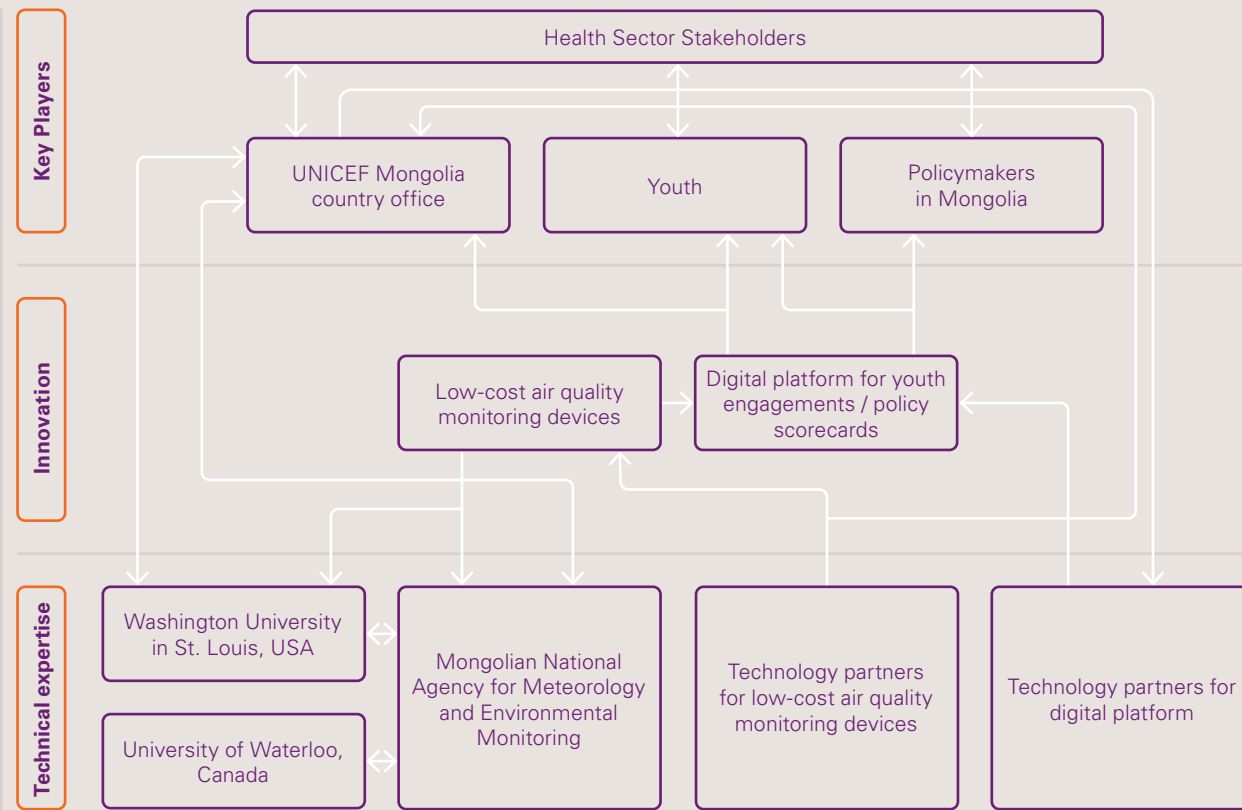Health Specialist, UNICEF Mongolia

Tip 3.1

Secure technical expertise and buy-in

Innovation requires a network of partners and technical experts for successful implementation.

Senior management buy-in and technical experts need to be complemented by local experts. On-the-ground support – often including a regional focal point as well as in-country support – was critical for many of the case studies presented in this document.
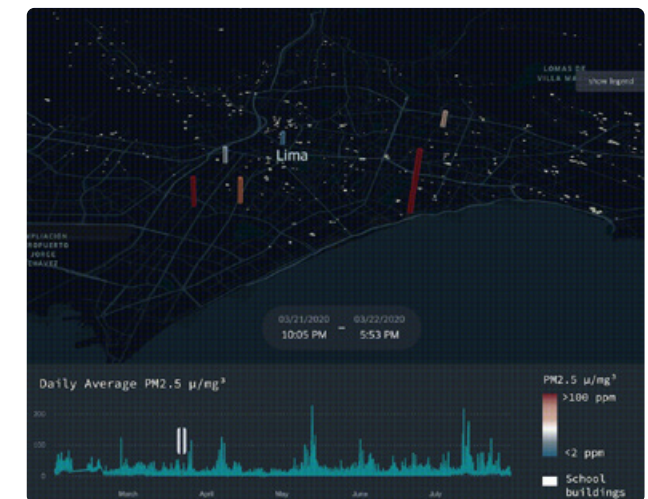
In Mongolia, for example, the health sector plays a key role in many interventions. In addition to important health sector players, a complex network of stakeholders worked together to get UNICEF's innovative air pollution programming off the ground:

Predicting air pollution exposure

Air Quality Artificial Intelligence (AQAI) is a start-up that predicts air pollution exposure. AQAI bridges the gap between available data and environmental policy targets by creating the world's first open-source global repository that uses machine learning to predict air pollution exposure. The start-up harnesses sensor pollution concentrations and satellite imagery to predict pollution concentrations with high granularity, augmenting existing air pollution data.

AQAI was supported by the UNICEF Venture Fund and is now working with UNICEF country offices to test its air quality prediction engine and dashboard more closely. UNICEF offices share geolocated, time-stamped air pollution data and local health metrics to help AQAI improve its machine learning, refine its systems and get ready for widespread adoption.[18]

Diagram

Key Players
- Health Sector Stakeholders
- UNICEF Mongolia country office
- Youth
- Policymakers in Mongolia

Innovation
- Low-cost air quality monitoring devices
- Digital platform for youth engagements / policy scorecards

Technical expertise
- Washington University in St. Louis, USA
- University of Waterloo, Canada
- Mongolian National Agency for Meteorology and Environmental Monitoring
- Technology partners for low-cost air quality monitoring devices
- Technology partners for digital platform

Problem 2

Innovation to **improve engagement**

Lack of meaningful youth engagement leading to policy change
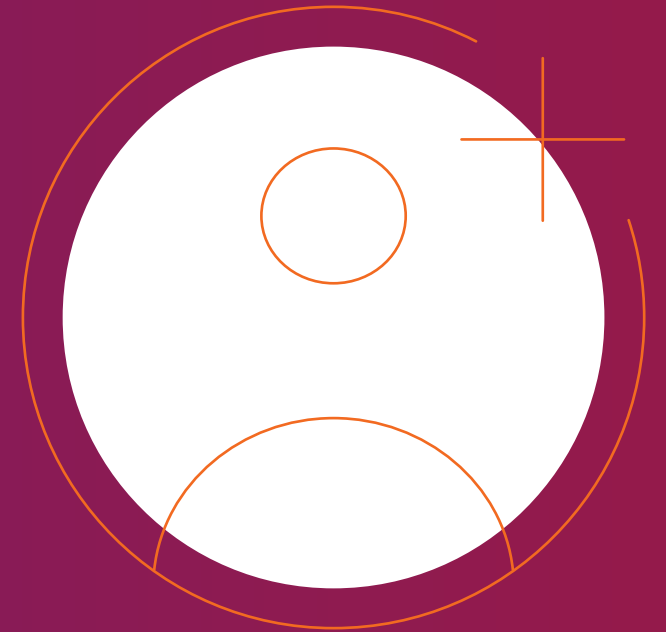
Engaged citizens are more likely to take action.

Whether they decide to protect themselves against air pollution or take a more active role in championing policy change, engagement is often the first spark for behaviour change. Engagement is a vital part of personal well-being and representative democracy – it is the catalyst that translates ideas into actions.

Engaging citizens does not need to be complicated. It can happen in person or through different innovative online platforms. Social media and apps, for example, are regularly used to engage youth and mobilize communities. No matter the platform, engagement helps people learn about air pollution's effect on health and empowers them to prevent, detect and treat it.

Innovation

How can innovation help solve the problem?

Increased youth involvement

UNICEF country offices used innovative digital platforms to inspire youth to actively engage with air pollution programmes and initiatives.

Improved stakeholder support

Online communication improved UNICEF's engagement with government officials. It also provided a platform for youth to begin dialogues with government stakeholders.

Inspired policy change

Interventions and pressure mounted through online educational campaigns supported policy change, ultimately creating tangible results.

Increased capacity and knowledge

Training, workshops and curricula built critical skills with young people, government officials and other stakeholders.

Harnessing data collection to meaningfully engage youth

Having fun
with data collection
in **Belize**

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UNICEF Belize re-envisioned the potential for AQM devices. Instead of using the monitors exclusively as a data collection tool, the team found a way to bring children along on the journey. The AQM devices serve as the central part of an interactive, educational youth engagement initiative. The children – called Air Quality Champions – take home an AQM device to log household air quality. They track the time, the PM2.5 in each room, and any notes (for example, if dinner was being prepared or if someone was smoking). This engaging process empowered many of the children to become community advocates, teaching their parents and peers about air pollution.[19] This creative approach to air quality monitoring yielded data on indoor air quality, while simultaneously creating a pool of youth air pollution advocates.

Innovation themes

Digital tools   Intervention

© Alexander Orellano, Nvision LLP

Since the children started monitoring air quality, we have noticed that the children have already looked at other areas in their communities where pollution is an issue, what are some of the things they can do as young persons, and what they can do to educate their peers and their community.

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Paulette Wade
Monitoring and Evaluation Specialist, UNICEF Belize

Looking forward
The child air quality tracker

Child air quality trackers are being explored as an innovative new way to provide real-time air pollution data. Once this concept is fully realized, the trackers could monitor pollutants where children live, learn and play.

This innovation relies on an air quality forecast tool – currently being developed by the United States National Aeronautics and Space Administration (NASA) – which will use machine learning to recognize patterns in monitored data and accurately forecast air pollution exposure. Once rolled out, the tool will be able to produce forecasts tailored for specific locations – giving caregivers the information they need to adjust activities (for example, keeping class inside during times of high air pollution, such as rush hour) and prevent children's exposure. Once fine-tuned, these forecasted patterns can also be packaged for wider use at health facilities, schools and on social media.

Developing digital platforms to meaningfully engage youth

Keeping youth informed in **Mongolia**

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In Mongolia, data collected from AQM devices was used to inform the knowledge management platform Agaar Neg, which contributed to developing a youth-oriented online policy scorecard dashboard.[20] Co-created with young people, the dashboard allows youth to access and interpret policies related to climate change and air pollution. By monitoring the uptake in climate change mitigation and air pollution elimination policies, it gives adolescents a new window into the decision-making process. The dashboard allows young people to explore key policies and learn more about the decisions that will impact their lives.

This innovative online platform was designed to be engaging while simultaneously providing access to valuable information and knowledge – equipping users with both the tools and skills to advocate for climate change and air pollution issues that are important to them. The platform fills a critical role in the air pollution landscape, bridging the gap between young people and air pollution policy.[21]

Innovation themes

Digital tools

Intervention

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To replicate this innovative approach in other country offices, obtaining high-level commitment is one of the most important success factors.

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Khishigjargal Batjantsan
Programme Officer, UNICEF Mongolia

Tip 5.1

Involve youth in the design and development process

For example, young people know
the best ways to reach other young people.

Students know the best time of day to reach other students. Whether it is guidance on the best platform, the best communication style, or the best medium to reach audiences – direct input from young people themselves can ensure that digital efforts effectively reach and engage youth.

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Empowering youth advocates to reach decision makers

Building momentum and inspiring policy change in **Mongolia**

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UNICEF Mongolia developed several new, innovative platforms to engage youth. One initiative – called Teen Parliament – attracted 900 applications from young people, creating a forum for them to discuss air pollution while also giving them a chance to meet decision makers, including representatives from the Parliament of Mongolia. To encourage and promote youth participation in decision-making, Teen Parliament inspired and empowered 4,257 young people from across Mongolia to be active citizens that combat climate change and air pollution. The initiative inspired young participants to speak up, and they used their meeting with parliamentarians to advocate for clean air.

Another platform, the Youth for Clean Air Network (YouCAN), enables young Mongolians to engage in two-way communication with policymakers. The programme was launched in 2020 to continue adolescent-led air quality monitoring and the dissemination of evidence-based information aimed at reducing air pollution risks. YouCAN members are equipped and mobilized to advocate for climate change and air pollution reduction policies, then host events, digital discussions, social media campaigns and hackathons to create momentum and mobilize others.

These activities have attracted thousands of participants and generated 1.5 million unique users, and this meaningful engagement has helped spark lasting change: the Ministry of Construction and Urban Development approved three national codes to improve the building design of kindergartens, schools and health facilities; the Ministry of Environment and Tourism Action integrated four UNICEF recommendations on community outreach and youth engagement into national plans; and Mongolia's 2030 draft mid-term environmental policy integrated key interventions and recommended measures on climate change and air pollution.

Together, these initiatives have empowered young people to find their voices – and have those voices be heard. This has strengthened the air quality advocacy landscape.

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Innovation themes

Digital tools   **Intervention**

Frame air pollution as a health issue

Is air pollution an environmental issue or a children's health issue?

Is air pollution an environmental issue or a children's health issue? Air pollution can be – and has been – politicized. This creates significant hurdles for programme deployment. In addition to politicization, air pollution may seem less pressing than communicable diseases and more immediate public health concerns. While slower, air pollution is still a major killer. It also has devastating impacts on children's development and well-being. The ways in which the issue is framed are therefore important when mobilizing resources and support for air pollution programming.

Because air pollution is often politicized and sometimes written off as non-urgent, stakeholders are more likely to respond to and prioritize this issue when it is presented as a health concern. Nitrogen oxide, carbon dioxide, and particulate matter have a direct negative impact on health, and thus warrant attention. Instead of presenting air pollution as a climate issue, policymakers may be more receptive to programming efforts if air quality is framed as an indicator of children's health.

To this end, UNICEF initiated a study on air pollution and health in Kyrgyzstan. The assessment examined the health and social impacts of PM2.5 air pollution on children and women, building a foundation to inform government institutions and provide recommendations for air pollution to become a national priority.

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Next steps
Putting innovation into action

Policymakers, United Nations agencies, civil society, academia, and the public and private sectors play a critical role in using and promoting innovation. Innovation is a vital tool for change – a catalyst with the power to amplify results and address some of the world's most pressing issues. UNICEF is dedicated to applying innovation to its work and calls on other agents of change to do the same. The innovations outlined in this document serve as a model for improving programming and increasing impact.

In addition to supporting new technologies, innovations and collaborations to address air pollution, UNICEF's Office of Innovation is focused on bringing innovation to more country-level programmes. Some UNICEF country offices – such as those featured in this document – have already started using innovation to address air pollution. Others have a tremendous opportunity to begin applying new technologies and approaches to their work. Innovation has the power to increase and expedite results for children.

The initiative "Schools for Better Air Quality: Citizen-Based Monitoring, STEM Education, and Youth Activism in the Western Balkans" was launched in 2022 by the UNICEF Europe and Central Asia Regional Office (ECARO) and the Climate Change Innovation Portfolio, funded by the Government of Norway and the Swedish International Development Cooperation Agency (Sida). The project aims to scale the innovative air pollution work undertaken by UNICEF Mongolia – including the air quality monitoring and youth outreach activities discussed in this document – to six new countries in the Western Balkans. The initiative puts air quality sensors in schools to strengthen youth-led air pollution advocacy efforts in Albania, Bosnia and Herzegovina, Kosovo*, Montenegro, North Macedonia and Serbia. With data generated by the sensors, the project will scale up youth and civic engagement activities, in order to increase demand for child-oriented clean air policymaking and environmental protections across the region.

The UNICEF Venture Fund has invested in several start-ups tackling air pollution, including AQAI, an India-based start-up that is developing a predictive machine learning model for air quality. Another start-up that received investment from the UNICEF Venture Fund is qAIRa, which uses drones to assess air quality in illegal mining areas in Peru.

In 2022, Thinking Machines – a data science consultancy – used machine learning trained exclusively with open-source data to successfully estimate particulate matter in Thailand. In 2023, the UNICEF Venture Fund and Thinking Machines will launch the Artificial Intelligence for Development (AI4D) Research Bank, a collaboration focused on accelerating the adoption of machine learning within the development sector. By providing access to code, documentation and pre-processed datasets, development professionals will be able to make more informed, data-driven decisions. Information on AI4D air quality monitoring, and instructions on how to train regression models and generate training datasets are available on GitHub.

* All references to Kosovo in this guide should be understood to be in the context of United Nations Security Council resolution 1244 (1999).

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