Opportunities for Mitigation and Adaptation in LMICs

Dr Carlos Dora
Coordinator
Department of Public Health and Environment

Key messages for mini-campaign
Gaps and Opportunities

How to ensure the synergies are identified and funded?

– Capacity of the health sector for inter-sectoral work – e.g. sound practice in HIA
– Mitigation and adaptation initiatives for climate and health that can be multiplied
– Projects - Joint action air pollution and climate change
– Cities, Household Energy and IAP, Health care
– Tracking & Communication
Health as a central rationale for climate action….

**UNFCCC Article 1:** “Adverse effects of climate change” : changes in the physical environment or biota resulting from climate change which have significant deleterious effects on the composition, resilience or productivity of natural and managed ecosystems or on the operation of socio-economic systems or on human health and welfare.

…and to be considered in climate change policy

**UNFCCC Article 4.1 (f):** All Parties...shall: ...f. Take climate change considerations into account, to the extent feasible, in their relevant social, economic and environmental policies and actions, and employ appropriate methods, for example impact assessments, formulated and determined nationally, with a view to minimizing adverse effects on the economy, on public health and on the quality of the environment, of projects and measures undertaken by them to mitigate or adapt to climate change;
• **AGREEMENT PREAMBLE**: Recognizing also that when developing policies and taking action to address climate change, Parties should promote, protect, respect, and take into account their respective obligations on all human rights, the right to health....;

• **ENHANCED ACTION PRIOR TO 2020**: Recognizes the social, economic and environmental value of voluntary mitigation actions and their co-benefits for adaptation, health and sustainable development....;
Joint action to mitigate Air and Climate Pollutants

Transport, energy, land use policies / Combustion, agriculture

- Injuries, physical activity, noise, diet,
- Air pollution (PM)
- Climate change (SLCPs)
- Climate change (CO2)

Local/short term health impacts

Global/long term health impacts

World Health Organization
The Investment Case

- Multiple benefits of acting to reduce AP, to health (AP, injuries, PA, noise etc.), wellbeing, climate, technology development, jobs etc. not known nor accounted for.
- Sector interests overlook co-benefits to other sectors.
- Key role for governments to lead to maximise benefits for all, address inequalities, beyond sector interests.
- Need for analyses, models, demonstration projects, documentation of impacts.
- Health system articulates need for HiAP, model for implementation can enable large scale action.
- **Need for mechanisms for scaling-up solutions** - health system one such mechanism.
FOCUS ON A BIG PROBLEM – where there is agreement on the need to act

Nearly 7 million people per year die from air pollution related diseases. Air pollution, traditionally thought of as an environmental issue, has become an urgent public health crisis.
Health Sector Response: World Health Assembly
Resolution on Air Pollution and Health

Health and the environment: addressing the health impact of air pollution

The Sixty-eighth World Health Assembly,

Having considered the report on health and the environment: addressing the health impact of air pollution;¹

Reaffirming its commitment to the outcome document of the Rio+20 Conference “The future we want”, in which all States Members of the United Nations committed to promoting sustainable development policies that support healthy air quality in the context of sustainable cities and human settlements, and recognized that reducing air pollution leads to positive effects on health;²

Noting with deep concern that indoor and outdoor air pollution are both among the leading avoidable causes of disease and death globally, and the world’s largest single environmental health risk;³

Acknowledging that 4.3 million deaths occur each year from exposure to household (indoor) air pollution and that 3.7 million deaths each year are attributable to ambient (outdoor) air pollution, at a high cost to societies;⁴

Aware that exposure to air pollutants, including fine particulate matter, is a leading risk factor for noncommunicable diseases in adults, including ischaemic heart disease, stroke, chronic obstructive pulmonary disease, asthma and cancer, and poses a considerable health threat to current and future generations;

Concerned that half the deaths due to acute lower respiratory infections, including pneumonia in children aged less than five years, may be attributed to household air pollution, making it a leading risk factor for childhood mortality;

¹ Document A/HG/160.
² UNEA resolution 1/7, PP6.
Household energy

- Outdoor ↔ indoor
- Large BOD from IAP – 4 million deaths a year
- Strong evidence
  - WHO guidelines on fuels and technology for heating, cooking and lighting
- Co-benefits:
  - Burns from fires,
  - Intoxications from kerosene use
  - Time use by children in homes using polluting fuels 15hs vs 5 hs
WHO Guidelines for Indoor Air Quality: Household Fuel Combustion

There is now evidence on:
• How clean is clean enough
• What fuels shouldn’t be used
• All end-uses (e.g. cooking, heating, lighting) need to be clean
• Transition to clean will take time & vary across settings
• Climate co-benefits
New WHO IAQ Guidelines for household fuel combustion

Practical information on the performance and characteristics of domestic combustion technologies and fuels needed to prevent negative health effects attributed to air pollution caused by household fuel combustion.

To help develop, implement and evaluat policy to secure health benefits of household energy, with a primary (but not exclusive) focus on LMICs.
Focus of the recommendations:

1. What device and fuel emission rates are required to meet WHO air quality guideline for PM$_{2.5}$ (annual mean) and for CO (24 hour mean)?

2. In light of the acknowledged challenges in securing rapid adoption and sustained use of very low emission household energy devices and fuels, what approach should be taken during this transition?

3. Should coal be used as a household fuel?

4. Should kerosene be used as a household fuel?
Extensive Evidence Reviews

- **Fuel use**: Global; for cooking, heating & lighting
- **Emissions**: range of technology & fuel options, how relate to AQG
- **Levels**: HAP and exposure
- **Health impacts of HAP**: risk for pneumonia, COPD, lung cancer, etc., including exposure-response.
- **Burns and poisoning**: risks, burden and interventions
- **Intervention impacts**: HAP/exposure in routine use
- **Adoption at scale**: barriers and enablers, costs/benefits, finance
The need to test!

Kerosene heater  Flue-less gas
Model linking emissions to air quality

**Inputs:**
- Emission rates:
  - PM2.5
  - CO
- Kitchen volume
- Air exchange rate
- Duration of use (hours per day)

**Outputs:**
- Predicted average concentrations of:
  - PM2.5
  - CO

Assumes uniform mixing of pollutants and air in kitchen
**Rec. 1(a): Emission rate targets (PM$_{2.5}$)**

**Recommendation**
For 90% of homes to meet the WHO AQGs for PM$_{2.5}$, emission rates should not exceed the emission rate targets (ERTs) set out below.

<table>
<thead>
<tr>
<th>Emissions rate targets (ERT)</th>
<th>Emission rate (mg/min)</th>
<th>Percentage of kitchens meeting AQG (10 µg/m$^3$)</th>
<th>Percentage of kitchens meeting AQG IT-1 (35 µg/m$^3$)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unvented</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final</td>
<td>0.23</td>
<td>90%</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Vented</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final</td>
<td>0.80</td>
<td>90%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Rec. 1(b): Emission rate targets (CO)

Recommendation
For 90% of homes to meet the WHO AQG for CO, emission rates should not exceed the emission rate targets (ERTs) set out below.

<table>
<thead>
<tr>
<th>Emissions rate targets (ERT)</th>
<th>Emission rate (g/min)</th>
<th>Percentage of kitchens meeting AQG (7 mg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unvented</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final</td>
<td>0.16</td>
<td>90%</td>
</tr>
<tr>
<td>Vented</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final</td>
<td>0.59</td>
<td>90%</td>
</tr>
</tbody>
</table>
Recommendation 2: Policy during transition

**Recommendation:**
- Promote clean fuels where and when possible
- For many, it will take time to meet AQGs (especially PM$_{2.5}$), so intermediate steps (solid fuel stoves) may be required
- Solid fuels: test emissions (ref Recommendation #1), use best possible options
- Monitor use and air pollution (not just laboratory)

**Rationale:**
- Health evidence: need low levels for major health benefits (ALRI)
- In practice, solid fuel stoves not achieving low levels (some vented wood stoves 35-70 µg/m$^3$)
- Even clean fuel users well above IT-1 (other sources)
- Based on evidence, requires (near) exclusive use of clean fuels to achieve AQG (PM$_{2.5}$).
Where is the gap now? Supporting implementation in countries

COUNTRY

ACTION PLAN

Multisectoral ‘task group’

Survey and AQ measurement tools

Needs assessment and mapping

Intervention options assessment

HAPIT tool

M&E strategy, capacity and resources

Policy (finance, market, &c.) for adoption and sustained use

Standards, testing and certification

Emissions model
Clean Household Energy Solutions Toolkit (CHEST)

- WHO is developing a Clean Household Energy Solutions Toolkit (CHEST) with tools, guidance and other materials that can be used at the local, national or regional level to support countries implement the WHO Guidelines for indoor air quality: household fuel combustion (IAQG) as requested in WHA 68.8 and progress toward reaching SDG 7.

- Why?
  - The IAQG include a chapter defining the need for collaboration and the role of the health sector to address the adoption of cleaner and safer household energy.
  - The IAQG call for tools and guidance be available for the health and other sectors for household energy policy planning including:
    - Needs assessment
    - Tools to evaluate intervention options
    - Standards, testing and regulation
    - Monitoring the use and impacts of household energy solutions including through household surveys, air quality and health measurements
Scaling-up long low carbon development in cities

Hanoi, 1993

Hanoi, 2001

Hanoi, 2002
Including Air Pollution Climate and Health into the Habitat III agenda.

Habitat III not yet integrated in the principles, challenges, opportunities, and means of implementation and monitoring that constitute the New Urban Agenda.

Six months from Habitat III in Quito, Ecuador
Air Pollution in Low and Middle Income Country cities is Getting Worse

Trend in PM$_{2.5}$ or PM$_{10}$ based on cities available in several versions of the database, by region$^1$.

<table>
<thead>
<tr>
<th>Region</th>
<th>Trend over the mean period 2008-2013$^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa (Sub-Saharan)</td>
<td>NA</td>
</tr>
<tr>
<td>America, LMI</td>
<td></td>
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<tr>
<td>America, HI</td>
<td></td>
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<tr>
<td>Eastern Mediterranean, LMI</td>
<td></td>
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<tr>
<td>Eastern Mediterranean, HI</td>
<td></td>
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<tr>
<td>Europe, LMI</td>
<td></td>
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<tr>
<td>Europe, HI</td>
<td></td>
</tr>
<tr>
<td>South-East Asia</td>
<td></td>
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<tr>
<td>Western Pacific, LMI</td>
<td></td>
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<tr>
<td>Western Pacific, HI</td>
<td></td>
</tr>
<tr>
<td>World$^3$</td>
<td></td>
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</tbody>
</table>

1 Criteria for inclusion: cities with measured PM2.5 or PM10 values in the three database versions covering a period of 3 years or more, or in two versions and covering a period of 4 years or more.  
2: More than 5% decrease over the five-year period;  
3: More than 5% increase over the five-year period.  
3 The mean for the World is based on weighting by regional urban population.

LMI: Low- and middle-income countries; HI: High-income; NA: Not available.

Results are based on 795 cities and are to be interpreted with caution, as 1) cities included might not ensure representativeness, 2) yearly variations due for example to climatic changes can be important and 3) a 5-year comparison does not necessarily represent trends, in particular when changes are limited.
What cities can do to improve climate, clean air and public health?

- Clean household fuels and technologies
- Sustainable urban transport
- Clean energy sources
- Waste management
- Diets with more fruits & vegetables, less meat
- Health facilities equipped with clean & sustainable energy
Need to account and track the health benefits of pollution reduction measures and costs for inaction

Currently working on a model for strengthening capacity of urban stakeholders and the health sector to support decision making in other sectors with relevant information

‘Green’ clustered housing developments, Beijing
Initiative A: Urban AP & Health

To strengthen capacity of health system & urban stakeholders to integrate health into urban policies so as to support prevention of AP-related diseases

- Estimate health benefits from AP reduction measures
- Document the cost of inaction in prevention on health systems, health expenditure, deaths and disease
- Scenarios – compare health consequences of different courses of possible action
- Equip clinicians & nurses to advise on AP protection measures as part of prevention of NCDs and child pneumonia
- Engage & contribute to urban decisions (regarding AP&Health benefits)
- Pilots starting in Africa in cooperation with Norway, CCAC, World Bank
How to trigger transformation?

1. Enabling cross-sectoral cooperation

- **In the health sector to:**
  - Engage in local policy processes for air and climate pollution and health
  - Document which policies have greatest benefits for health, air quality and climate
  - Communicate about benefits/savings to those policies

- **In development sectors to:**
  - Be aware of health costs associated to air and climate pollutants.
  - Support opportunities to increase health co-benefits through air and climate pollutants reduction measures
  - Engage in health promotion, air quality and climate protection

- **Communications:**
  - Parliamentarians, mayors, interest groups, mothers of children with asthma, patient groups,
How to trigger transformation?

2. Mainstreaming air pollution reduction into key public health programmes and thinking

• Include AP in mainstream public health programmes – e.g. prevention of heart disease, stroke, COPD, asthma, pneumonia

• Engagement with professional associations, (heart, lung, GPs, Nurses, CHWs)
How to trigger transformation?

3. By connecting data-bases – developing joint analyses of local data

- Air & climate pollution data
  - air quality monitoring (place – GIS, time, pollutants) at local level
  - air pollution sources (EI, SA) in each city

- Data on AP sources

- Health Data
  - Health databases (vital statistics, morbidity, use of health services, health care costs by condition, health insurance payments…)

- Capacity to analyse/link data bases, report on the linkages between health and SLCPs/air pollution.

- Big data, data mining experience/capacity
Framework of Collaboration

Tools

Knowledge

Health Sector

Urban Development Sectors

TRANSFORMATION

Build capacity
Urban Air Pollution and Health Project:
Components to support multiple pilot cities

**Analytical health and economic tools**

Development and customization of tools, including:
- Health impact assessment
- Cost-benefit and cost-effectiveness analysis (CBA/CEA)
- Air quality risk assessment tool
- Geo referencing tools
- Tools measuring cost of inaction
- Monitoring and tracking tools

**Web-based information platform and interface**

Development and operation of a platform including:
- **Information repository**
  - Access to WHO data, tools, good guidance documents and communications material
  - Access to local data, statistics and experience shared by other (pilot) cities
- **Resource gateway**
  - Access to relevant web links
  - Connection to city networks, such as CAA, C40, ICLEI, Healthy Cities

**Capacity building material and good guidance documents**

Development of material including:
- CB material to train clinicians on the health impacts of air pollution on NCD, child health, primary health care and respiratory diseases
- Briefing material on sector specific guidelines related to air pollution and health, including the transport, waste, urban planning, housing and energy sectors, as well as industry, etc.

**Informs evidence collection on city level**

**Dissemination of good practices and lessons learned**

**Provides the training material for capacity building in pilot cities**

**Global communications, advocacy and awareness raising**

**Communications**

Development of a global awareness / social media platform and communications content for global use; preparation and implementation of events, such as the Breathe Life Campaign and related activities, etc.
Urban Air Pollution and Health Project:

Components for intervention in one pilot city

**City action plan**
Formulation of a city-level action plan/strategy to support the implementation of the preferred intervention identified by stakeholders and decision makers on city level.

**Stakeholder engagement & consultation**
Consultation of stakeholders, including representatives from key sectors such as health, transport, household energy and waste management, as well as academic institutions, civil society organizations, the media, the private sector/industry, for engagement at various points in the project.

**Scenario development**
Analysis of costs and co-benefits for health and health systems of mitigation policies and strategies in different sectors.

**Evidence collection**
Gathering and analysing health and pollution data to assess the health, health care, environmental and societal cost of inaction on air pollution mitigation.

**Health & economic tools**
Customization of analytical tools to local context.

**Capacity building of local PH experts**
On using health and economic tools, data management, analysis, interpretation, communication.

**Engagement and capacity building of health practitioners**
(NCDs, child health, GPs, nurses, etc.) on the linkage between air pollution, its sources and health, and recommendations to avoid AP exposures.

**Communications**
Customized strategies and campaigns in cities:
- Public awareness raising on the risks of air pollution
- Solutions to AP and health
- Training on communications skills for the health sector

**Bankable projects in the health sector and other sectors, including transport, waste, energy, environment, etc.**

**Pilot city study/intervention**

**Project coordination**
Local project coordination and liaison with key partners.
Accountability

- Tracking progress
- Climate, air pollution, health
- Policy implementation
- Communications
## SDG 3: Health

<table>
<thead>
<tr>
<th>Goal 3</th>
<th>Ensure healthy lives and promote well-being for all at all ages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Target 3.9</strong></td>
<td>By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution from contamination.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Target</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.9</td>
<td>3.9.1. Mortality rates attributed to air pollution outdoor and to indoors</td>
</tr>
</tbody>
</table>
### Goal 11

Make cities and human settlements inclusive, safe, resilient and sustainable.

### Target 11.7

By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality, municipal and other waste management.

<table>
<thead>
<tr>
<th>Target</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.7</td>
<td>Annual mean levels of fine particulate matter (i.e. PM$_{2.5}$) air pollution in cities (population weighted)</td>
</tr>
</tbody>
</table>
## SDG 7: Energy

<table>
<thead>
<tr>
<th>Goal 7</th>
<th>Ensure access to affordable, reliable, sustainable, and modern energy for all</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target 7.1</td>
<td>By 2030, ensure universal access to affordable, reliable and modern energy services</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Target</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1</td>
<td>7.1.1 Percentage of population with electricity access</td>
</tr>
<tr>
<td></td>
<td>7.1.2 Percentage of population with primary reliance on clean fuels and technologies at the household level*</td>
</tr>
</tbody>
</table>

Also reporting to the Global Tracking Framework of SE4All
Global Platform on Air Quality and Health

- **Aim:** To improve quality, access, transparency of data on human exposure to Air Pollution that will be used to estimate BOD
- **Convenes experts, scientists, national and international agencies (WMO, World Bank, UNEP, UNECE, IASA, JRC, EEA, US EPA, JAXA, NASA, etc.)**
- **Next meeting January 2017**
  - New developments on the exposure response curve,
  - On sources of AP data,
  - Establishment of a research overview group
  - Data presentation – combining many risks to health combining satellite imagery, ground-level monitoring,
New estimates on exposure to AP and BOD for countries and the world this Summer

Improved modelling using data integration: Satellite sensing, chemical transport model and ground measurements

Modelled AAP exposure, Iran, 2015 (draft for country consultation)
Global Communications on AQ and Health Campaign
A global campaign to protect our health and climate by improving air quality

MARCH 2016
Conclusions

– Mechanism to ensure the synergies are identified and funded

– Install global capacity of the health sector to contribute - good practice in HIA

– Projects: Joint action air pollution and climate change – cities, homes and clinics

– Global tracking mechanism to monitor policy implementation and progress – using the SDGs

– Communications