



CONTEXT : in AFRICA ...

- (1) Aerosol levels in urban areas are 3 to 15 times higher than the standards recommended by the World Health Organization (WHO)
- (2) Air pollution is due to a mixture of anthropogenic urban sources (domestic fires, old vehicles, waste burning, etc..) and regional sources (desert dust, savannah fires), with strong seasonal variations
- (3) Important health effects in terms of inflammation and premature deaths are due to fine particles with one million of premature deaths per year
- (4) Projections in the future show an increasing importance of anthropogenic emissions, air pollution and health impacts if no mitigation is implemented
- (5) Air pollution is one of the hazards faced by people on a daily basis, linked to poverty and/or the social hierarchy. Health risks in the long term are often not a priority, in favor of short-term risks.
- (6) From all these results, mitigation efforts to limit sanitary risks linked to air pollution and particularly particulate pollution with the most harmful effects are urgently needed.**



Introduction

APIMAMA :
Air Pollution Mitigation Actions for Megacities in Africa
Abidjan as a real world laboratory study

Key words

AIR POLLUTION	ATTENUATION
PERSONAL EXPOSITION	ADAPTATION
SANITARY RISKS	INFRASTRUCTURES
AEROSOL POLLUTION	MOBILITY
POPULATION	ECOHEALTH
VULNERABILITY	SUSTAINABILITY
EMISSIONS	

Duration

From JANUARY 2022 to DECEMBRE 2025

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Executive committee : C. Liousse, S. Becerra, V. Yoboué

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Partners

French Team :

Laboratoire d'Aérogologie, Toulouse : Cathy Liousse, Jean-François Léon, Claire Granier, Fabien Solmon, Eric Gardrat and Maria Dias-Alvès (*emissions, personal exposition, aerosol pollution*)

GET, Toulouse : Sylvia Becerra et Alain Bonnassieux (*social sciences*)

IDESP, Université de Montpellier : Isabella Annesi-Maesano (*health, exposology*)

BFA, Université de Paris : Armelle Baeza (*aerosol biological impact*)

Team in Côte d'Ivoire

UFHB, Abidjan : Véronique Yoboué, Nicolas Brou, Tiembré Isaac, Gnamien Sylvain, Evelyne N'Datchoh Touré, René Kouao, Coulibaly Mbegnan, Flavie Evilafo, Brama Kone, Alain Kouadio, Julien Bahino, Eric Assamoi, Akoua Adaye (*emissions, personal exposition, aerosol pollution, health, social sciences, economy*)

University of Korhogo : Sekou Keita, Madina Doumbia (*emissions, aerosol pollution*)

Institut Pasteur, Abidjan : Joseph Djaman, Kouamé Kouadio (*health*)

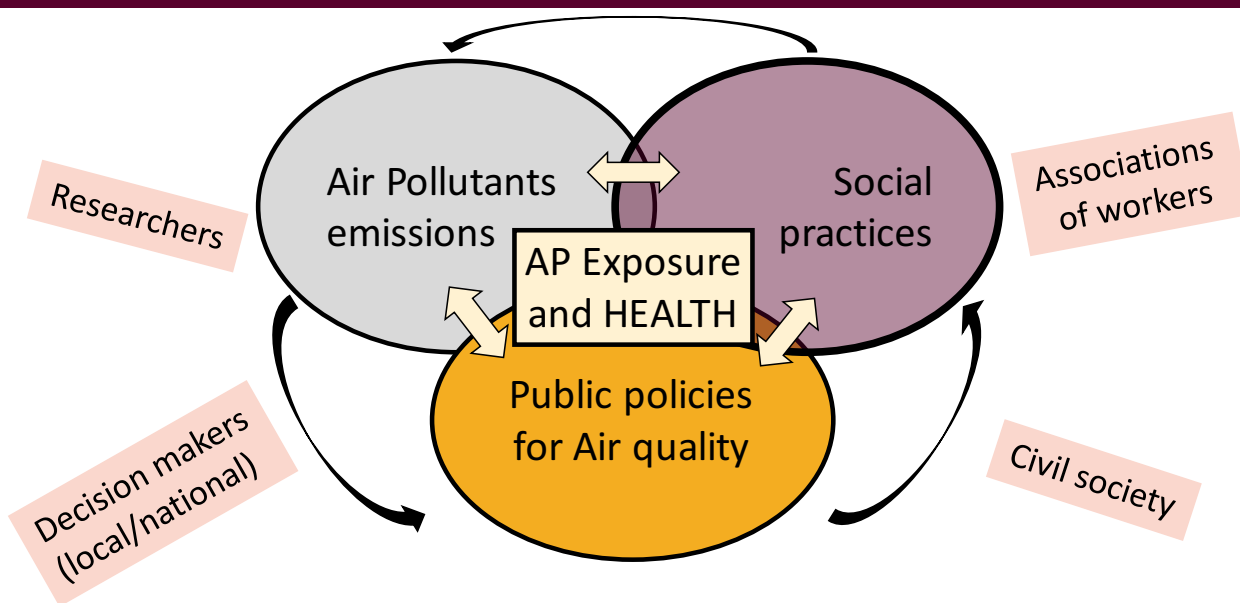
Collaboration with Rajesh Kumar (NCAR, Boulder, USA) on modeling issues



An « Ecohealth » Methodology

To limit air pollution exposure and sanitary risks

APMAMA



To bring together **researchers** (physicochemists, doctors, biologists, human scientists and economists) as well as the main **actors of the city** to jointly define how the project will be implemented from scientific measurements and surveys to the definition and experimentation of mitigation/adaptation measures.



Objectives

To contribute to a reduction of the health risks associated with air pollution through the implementation of emission mitigation strategies and adaptation of the populations in their daily activities but also of public action on urban space organization

MICRO-SCALE STUDIES

STUDIES ON WOMEN GROUPS

To test the impact of new technologies and practices on risk reduction, with a detailed study of domestic and commercial cooking activities carried out by women.



AT THE SCALE OF THE CITY

MODELING STUDY

To test the impact of emission reduction scenarios for all pollutant sources (residential and commercial activities, traffic, waste burning, industries, etc.)





Micro-scale studies on women groups in Yopougon district of Abidjan: *Impact of improved cooking stoves and practices on the reduction of the health risks*



1. Set of measurements performed with traditional practices and technologies
2. Introduction of improved practices and technologies



3. 1 year after :
Set of measurements performed with improved practices and technologies



Micro-scale studies on women groups in Yopougon district of Abidjan: *Impact of improved cooking stoves and practices on the reduction of the health risks*

Set of measurements

- Real-time PM2.5 personal exposure (2 months each time : 30 women/group)
- Daily measurements of aerosol chemical composition and oxidative potential (personal exposure) (15 days each time : 3 women/group)
- In vivo health measurements (spirometry tests, inflammatory markers in blood and urines), etc... : 30 women/group
- Semi-structured interviews : 30 women/group

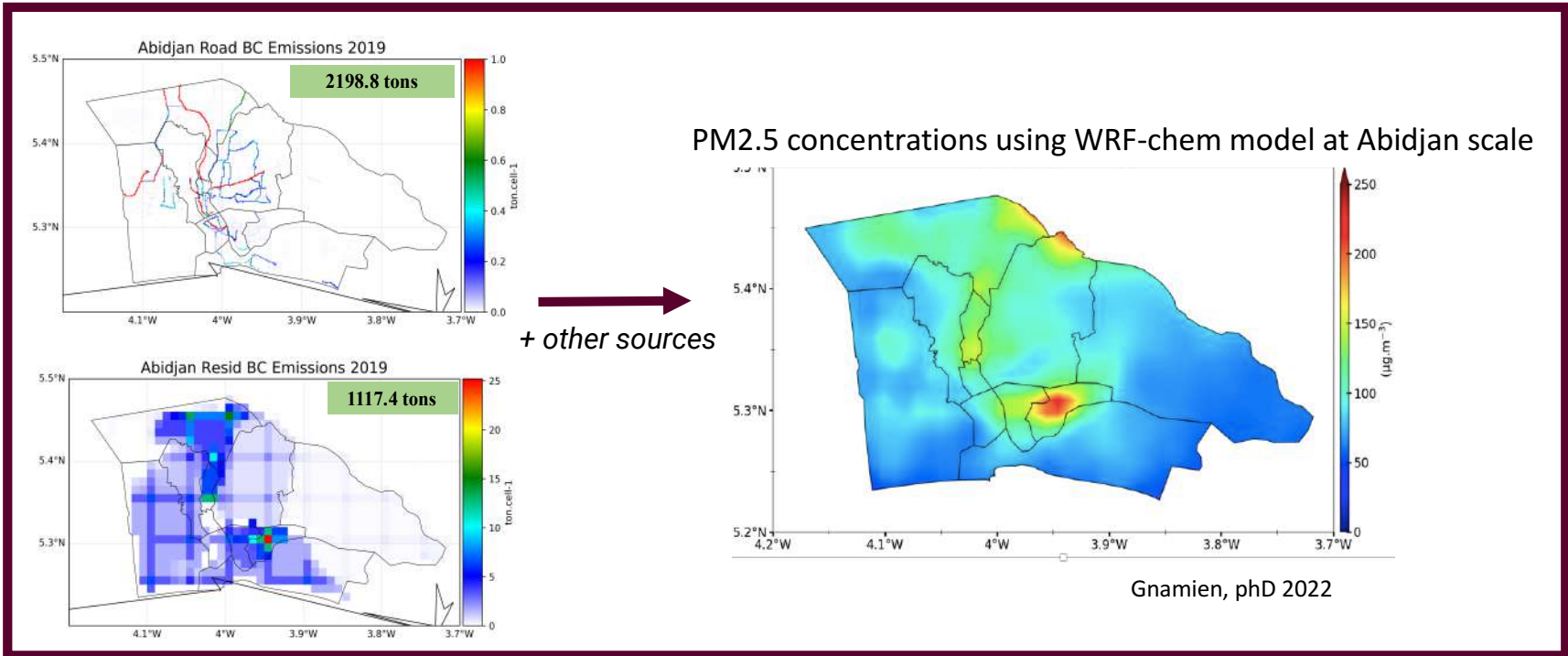




At the scale of the city : modeling studies

Impact of various emission scenarios on air pollution and health

Background

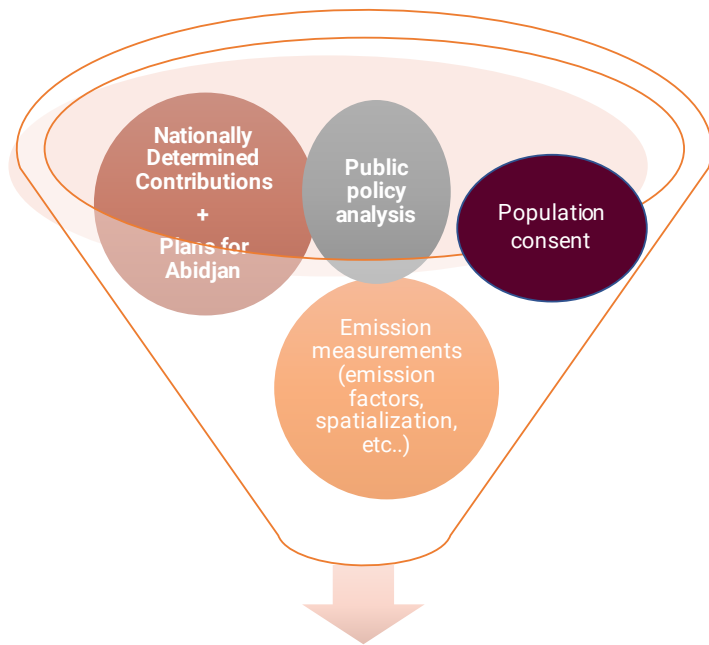


Preparation of WRF-chem model for APIMAMA works in collab. with R. Kumar : e.g. health impact module
Improvement of Abidjan emission inventories : e.g. waste burning spatialization, road dust emissions

At the scale of the city : modeling studies

Impact of various emission scenarios on air pollution and health

1



To develop emission scenarios for the different sectors of activities (road, residential and commercial, waste management)

2

To produce distribution maps for PM2.5 and health risks for each emission scenarios.

3

To identify the **leverage and constraints** for future **implementation** of strategies to mitigate health risks.

4

To **sustain exchanges** around the recommended actions, between the different partners following the APIMAMA program in support of public action. APIMAMA project proposes a methodology and strategy applied to the **city of Abidjan**, capital of Côte d'Ivoire, which can be further **deployed in other cities with similar characteristics**.

Thanks for your attention

