

SUSTAINABILITY BOOKLET

# SERIES 4 CITIES



WRI INDONESIA

# DO YOU KNOW?

The UN predicts that

**68%**

of the global population **will live in urban areas by 2050.**

The number equals to an additional of

**2.5 BILLION people.<sup>i</sup>**

Among those urban population, there are

**881 MILLION people**

who lives in slums and **do not have any basic access to water, sanitation, and housing.**



If the pattern continues, **the number of slum dweller** will reach

**1.2 BILLION by 2050.<sup>ii</sup>**

These communities are highly vulnerable to the **impact of climate change** and have **limited access to infrastructure.**



**The large number of urban areas also contribute to carbon and greenhouse gases emission.**

IPCC (Intergovernmental Panel on Climate Change) estimates that

**more than 70%**

of carbon emissions come from household or industry in urban areas.<sup>iii</sup>



Therefore, the **urban populations will play a significant role in tackling the effect of climate change** as well as **resolving issue related to living in the city** such as:



Air Pollution



Mobility



Water Depletion



Waste Management

**Let's dissect them one by one!**

# AIR POLLUTION AND GREENHOUSE GAS EMISSION

Before we dig deeper on the causes of air pollution, we need to understand what emissions are.

The term emissions usually refer to **any gases or particles that are being released to the air as a result of our activities.**



**In a context of a city, there are two types of emissions.**

First, the emission of **Greenhouse Gases (GHG)** which **directly impact our climate.** Some of the GHG emissions include:



Carbon Dioxide



Methane



Nitrous Oxide

The second type of emission is the emission that causes **air pollution** and could potentially be **detrimental for our health.** Some of the emissions are:



Sulfur Dioxide



Carbon Monoxide



Nitrogen Dioxide



PM 2.5

**Now let's talk about air pollution. Air pollution remains one of the daily issues that urban dwellers faced. Air pollution directly affects us and almost every important aspect for our survival:**

#### HEALTH



Globally, indoor and outdoor air pollution is linked to 7 million premature deaths annually.<sup>iv</sup> In Jakarta, the air pollution is estimated to cut 2.3 years from the average lifespans.<sup>v</sup>

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#### CLIMATE CHANGE



According to the Climate and Clean Air Coalition, short-lived climate pollutants (SLCPs) are responsible for 30-40% of the global warming to date. The SLCPs consisted of three highly potent pollutants, which are black carbon (a component of Particulate Matter), tropospheric ozone, and methane. These pollutants need to be curbed alongside carbon dioxide (CO<sub>2</sub>) to limit global temperature rise to 1.5°C (2.7°F) thus preventing catastrophic climate impacts.

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#### WATER AND WEATHER



Air pollution can significantly affect the weather and ultimately the water cycle, as it can reduce the amount of solar radiation that reaches the earth's surface. This affects the water evaporation rate and cloud formation. One of the documented case is the changes in intensity and distribution of rainfall in India and China, that have been linked to particulate matter (PM) pollution.

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#### ENERGY



Solar energy yields also drop in areas with significant particulate matter pollution, since sunlight cannot fully penetrate the smog. WRI has found that air pollution appears to cost China 11GW of power annually.

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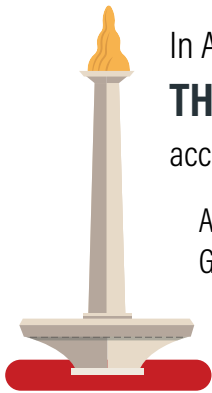
#### FOOD AND VEGETATION



Ozone can damage plant cells and negatively affect photosynthesis, while particulate matter can reduce the amount of sunlight that reaches plants and food crops. A study in India found that the amount of wheat, rice and soy crops lost annually due to air pollution could have fed close to 94 million people, approximately 35% of the entire Indonesia's population.<sup>vi</sup>

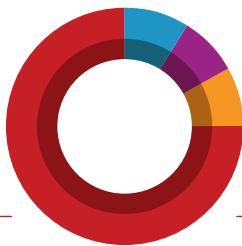
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# THE SOURCE OF AIR POLLUTION IN CITIES CAN COME FROM DIFFERENT SOURCES. IT CAN COME FROM TRANSPORTATION EMISSION, INDUSTRIAL ACTIVITIES, AS WELL AS NEARBY FOSSIL-BASED POWER PLANTS.



In August 2019, Jakarta, the Indonesian capital, was declared **THE MOST POLLUTED CITY IN THE WORLD** according to Air Visual.

According to the data from the Environmental Agency of Jakarta Government, the biggest source of emission in Jakarta is:<sup>vii</sup>



- Transportation (75%)
- Power plants and heater (9%)
- Industrial burning (8%)
- Domestic burning (8%)

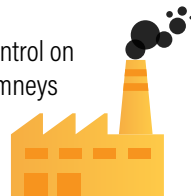
The first thing needed by Jakarta to solve air pollution is **to know the causes**. What gets monitored, gets managed. Hence, **Jakarta requires an emission inventory** to precisely identify the sources of air pollution and effectively use their resources to manage the sources, especially the ones that contributes the most.

Jakarta government has published a series of instruction to improve air quality. Some of them include:

- Expanding the odd-even traffic policy
- Limiting the age of public transportation and privately owned vehicles that can be driven
- Tightening emission tests



- Tightening control on industrial chimneys

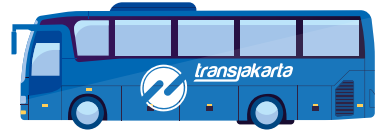


- Promoting the use of pollutant-absorbing plants

# One way to reduce air pollution and greenhouse gas emissions in urban areas is by making integrated public transport – one that is safe, reliable, and comfortable – a reality.

According to Jakarta Transportation Agency, **the ridership of public transportation in Jakarta** is only

**19.8%** in 2015.

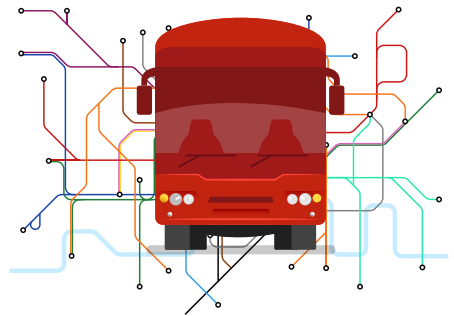


The massive use of private vehicles results in congestions, which cost up to

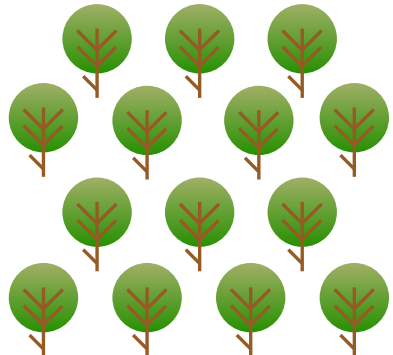
**RP 100 TRILLION** in 2017.

We as individuals need to reduce the use of private vehicles and shift to public transport.

At the same time, building integrated multi-modal public transport, creating a more compact city and transforming the city center areas with Transit-Oriented Development must be accelerated.



Finally, we need to maintain our forests and trees, super technologies that can absorb greenhouse gas emission and pollution. There are many benefits of having forest, parks, and trees in cities.<sup>viii</sup> Cities, companies, and civil societies should work together in promoting urban green spaces in cities.



# WATER

## DO YOU KNOW?



Almost

**90%**

of rivers that supply water to Jakarta are polluted,

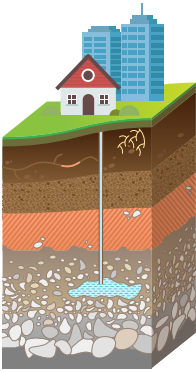


and

**40%**

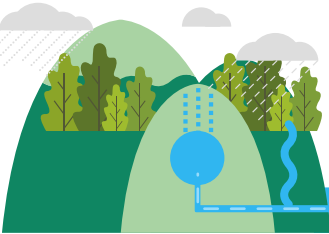
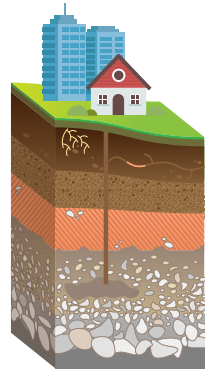
Jakarta residents have no access to clean water!<sup>ix</sup>

## HOW COULD THIS HAPPEN?



With the increasing number of populations, cities development often consumes excessive number of groundwater.

The water, unfortunately, is seldom replenished because of the lack of trees and soil that can capture the water in the cities and outside of the cities.



Take Jakarta and Ciliwung river as an example. Ciliwung is one of the major rivers that runs 120 kilometers from the upper watershed in Bogor, where the remaining forest lies, to the coast of Jakarta.

The impact? The watershed's capacity to regulate water flow and control water quality has been greatly reduced.



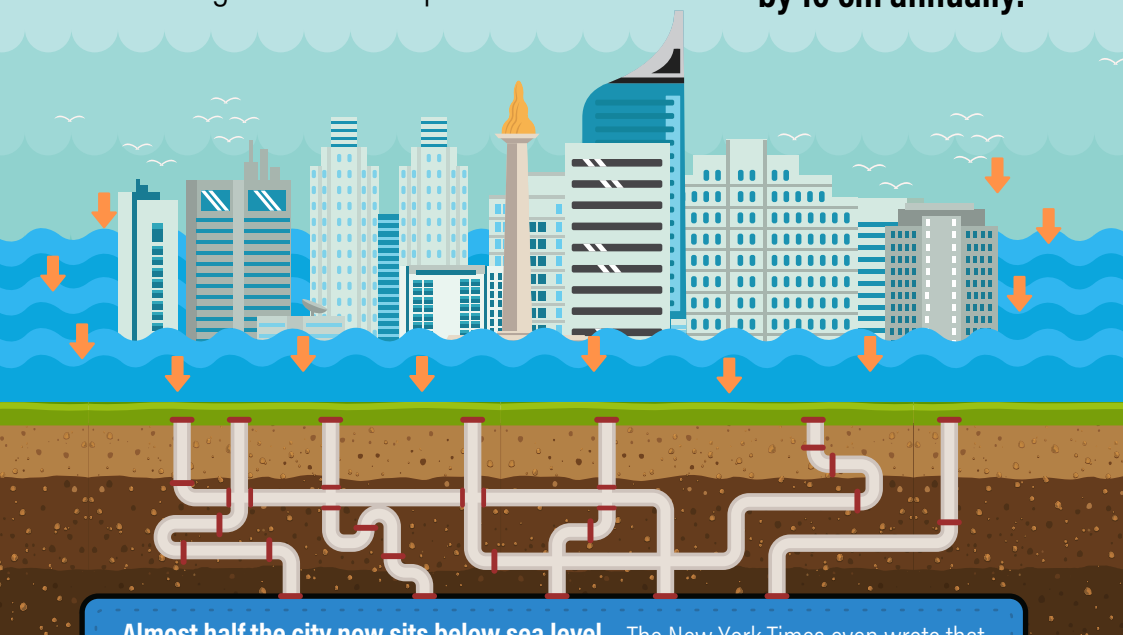
The forests surrounding the Ciliwung watershed have been lost and converted to urban residence or farming land.



Consequently, the downstream city of Jakarta now experiences less flood protection from this natural landscape. The flood disasters taking place in Jakarta in early 2020 has taken 66 lives and created huge economic loss.<sup>x</sup>

Aside from flood, cities like Jakarta now are vulnerable to land subsidence due to the extreme groundwater depletion.

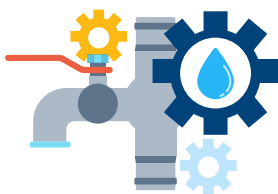
Studies show that **Jakarta is sinking by 10 cm annually.**<sup>xi</sup>



Almost half the city now sits below sea level, and in lower areas of the city, excessive rainwater stays longer, causing flooding.

The New York Times even wrote that factoring a rising sea level, **Jakarta will be under water by 2030.**<sup>xii</sup>

## WHAT DO WE DO ABOUT OUR WATER?



To reduce groundwater extraction, the city government needs to create a robust regulatory framework to manage its ground water extraction.



To protect against floods, and provide more clean water, cities can support restoration of forests and watersheds in upstream areas.



There is also a need to improve our drainage infrastructure to manage excess water flows and waste water.



# WASTE DO YOU KNOW?

The world generates

**2.01 BILLION TONS** of **solid municipal waste** annually in 2016,

or almost  
equal to

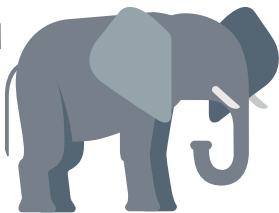


**28,715**  
oil tanker ships! <sup>xiii</sup>



Meanwhile,  
Indonesia produced

**65.8**  
**MILLION TONS**  
of waste in 2017<sup>xiv</sup>,



equals to more than  
the weight of

**12** **MILLION**  
**ASIAN**  
**ELEPHANTS!**

## MOST OF THESE WASTES ARE GENERATED BY CITIES.

For example,  
Jakarta produced  
almost

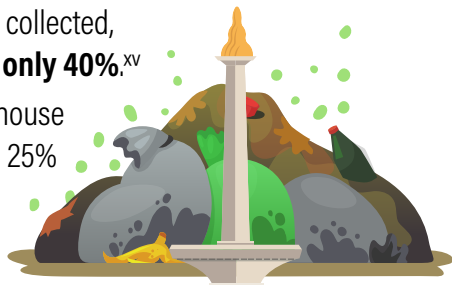
**7,500 TONS**  
of waste daily in 2018

(Source: Jakarta Environment Agency).

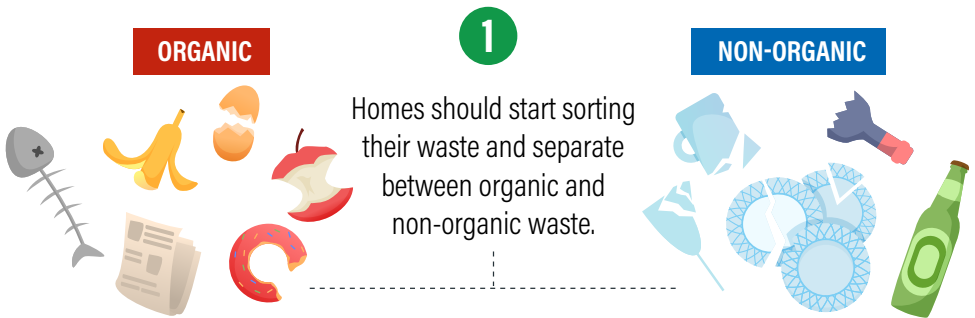
While majority of Jakarta's waste will go to landfill, some will end up in the streets or thrown into the river, and eventually polluting the ocean.

Unfortunately, a large number of wastes are not collected, given that **Indonesia's collection capacity is only 40%.**<sup>xv</sup>

However, that's not the only problem, the greenhouse gases released by the waste also contributed to 25% of GHG emission.<sup>xvi</sup>



# WHAT CAN WE DO ABOUT OUR WASTE?



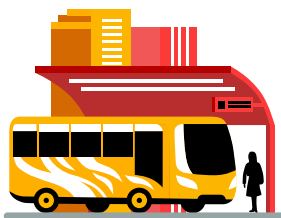
**2** Consider a circular economy approach with adequate waste management facility. The approach means that we need to think about a product's life cycle before it is created, so that it can be used and reused. Circular economy looks at the way materials are sourced, the environmental and ethical viability of manufacturing, and the multiple lives a product can have.



## SO, WHAT'S NEXT?



The increasing number of urban populations means we need to work fast and work together to reduce the environmental impact that urban populations cause to the climate.



Therefore, our decisions do matter, from our decision to use public transportation to how we treat our waste.



Another thing that we can do is to ensure that our cities have enough trees. Trees can be useful for improving air quality, capturing rainwater, and preventing flood. Additionally, trees in the parks can provide psychological benefit from serving as recreational area for the urban population.



Join our community by following our social media, visit our website, send us an email at **indonesiaoffice@wri.org**.

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## REFERENCES

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- <sup>ii</sup> Source: "Palm Oil's Complicated Journey from Farm to Chocolate Bar" from [wri-indonesia.org](http://wri-indonesia.org)
- <sup>iii</sup> Source: "The future of forests: How to balance development with conservation?" from [eco-business.com](http://eco-business.com), published on May 21, 2019
- <sup>iv</sup> Source: "Indonesia: The scars of El Nino" from [straitstimes.com](http://straitstimes.com), published on June 9, 2019
- <sup>v</sup> Source: Energy Policy Institute at the University of Chicago (EPIC). Worsening Air Pollution Reducing Lifespans in Indonesia. (2019)
- <sup>vi</sup> Source: "5 Under-recognized Impacts of Air Pollution" from [wri.org](http://wri.org), published on June 05, 2019
- <sup>vii</sup> Source: Jakarta Environment Agency
- <sup>viii</sup> Source: "Building greener cities: nine benefits of urban trees" from [fao.org](http://fao.org), published on November 30, 2016
- <sup>ix</sup> Source: Ministry for Development Planning's presentation during a national dialogue in May 2019
- <sup>x</sup> Source: "Tanpa Hutan, Kondisi Air Jakarta Semakin Memburuk" from [wri-indonesia.org](http://wri-indonesia.org), published on August 02, 2017
- <sup>xi</sup> Source: "Sinking cities: An integrated approach toward solutions" from [dektares.nl](http://dektares.nl), published on October 2013 updated on January 2015
- <sup>xii</sup> Source: "Jakarta is Sinking So Fast, It Could End Up Underwater" from [nytimes.com](http://nytimes.com), published on December 21, 2017
- <sup>xiii</sup> Source: World Bank, 2018
- <sup>xiv</sup> Source: Presidential Decree No.97/2017
- <sup>xv</sup> Source: World Bank, 2018
- <sup>xvi</sup> Source: Indonesia's Ministry of Environment



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