

An aerial night photograph of a city intersection, showing illuminated streets, crosswalks, and surrounding buildings. A semi-transparent grey rectangle is overlaid in the center, containing the title and author information.

State of the Urban Ecosystem: Challenges and Opportunities

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Urbanization : PSA

1. In their entirety, all municipal jurisdictions which, whether designated chartered cities, provincial capital or not, have a population density of at least 1,000 persons per square kilometer: all barangays;

2. Poblaciones or central districts of municipalities and cities which have a population density of at least 500 persons square kilometer;

3. Poblaciones or central districts not included in (1) and (2) regardless of the population size which have the following:

- Street pattern or network of streets in either parallel or right angle orientation;
- at least six establishments (commercial, manufacturing, recreational and/or personal services);
- at least three of the following:
 - a town hall, church or chapel with religious service at least once a month;
 - a public plaza, park or cemetery;
 - a market place, or building, where trading activities are carried on at least once a week;

4. Barangays having at least 1,000 inhabitants which meet the conditions set forth in (3) above and where the occupation of the inhabitants is predominantly non-farming or fishing.

Urbanization Defined

a historical process describing the evolution of towns from a rural setting to modern society, accompanied with changes in the physico-ecological, socio-economic and demographic attributes of a population, into a new settlement.

Movement of people from the rural areas, the countryside and the hinterlands towards the city for various reasons

Concentration of human population into discrete areas, leading to transformation of land for non- agricultural uses i.e. **residential, commercial, industrial & transportation purposes**; can include densely populated centers, as well adjacent peri urban or suburban fringes

The Philippine Urban Ecosystem

An urban ecosystem is simply the community of plants, animals, and humans that inhabit the urban environment.

It is an area physically dominated by built structures like buildings, roads, sewers, and power lines.

It also contains a rich patchwork of green spaces — parks, yards, street plantings, greenways, urban streams, commercial landscaping, and unbuilt lots — that provide the living heart of the urban ecosystem (Earth on Edge)



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The Story of Concrete

- Concrete ranks second to water in terms of its wide usage and application on earth (Watts, J., 2019).
- If the cement industry were a country , it would be the third largest CO2 emitter with 2.8 bn tonnes next to China and the US.
- It is the raw materials that fuel modern civilization and urban development putting roofs on our heads, fortifying our defense from disasters both man made and natural ones. (The Guardian, 2019)



Urban Planning and Design: Principles and Strategies

Promote compact urban designs encouraging multiple/mixed use

Establish a network of public open and green spaces not only in the urban core but along the peri-urban areas

Address water quality and minimize dependence on traditional sources, i.e. groundwater extraction





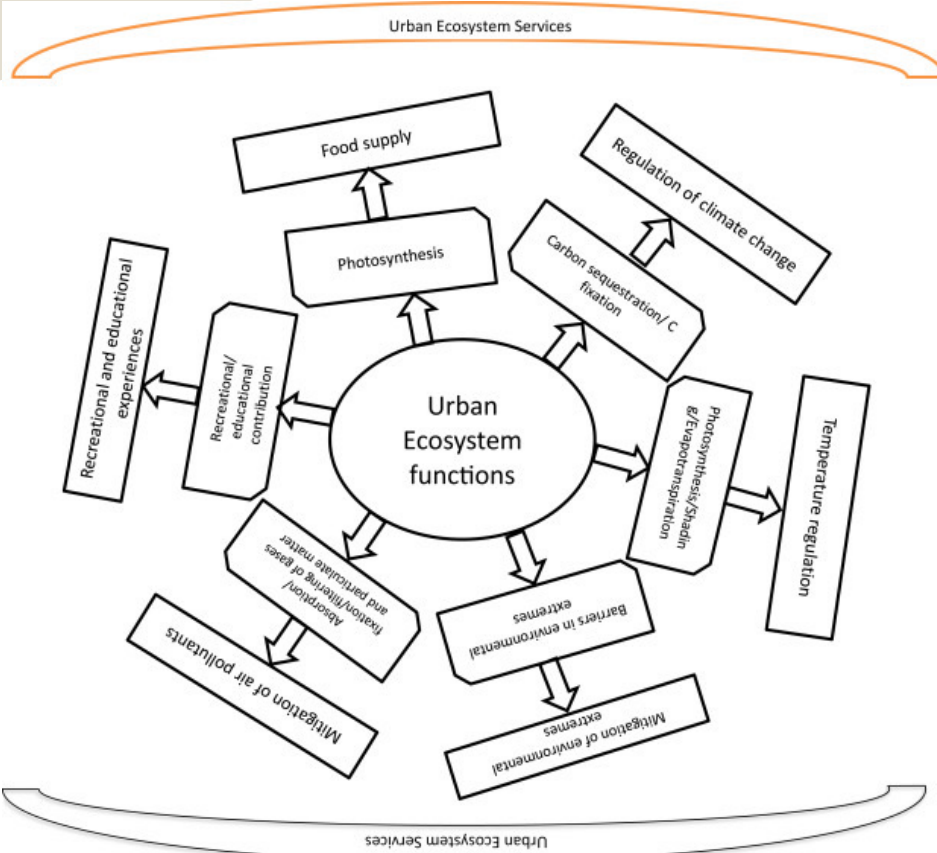
... urban planning design principles

Resolve urban flooding issues through green infrastructure

Establish active mobility model for urban transport system



A Glimpse at the Urban Ecosystem



Where people live in high densities or those where the built infrastructure covers a large proportion of the land

incorporate both planted vegetation such as urban forests, parks and gardens and water bodies like ponds, small lakes and wetlands (Pickett et al. (2001)

Where the health and well-being benefits are most significant

Source: Ecological Economics of Urban Settlements, Vaishali Kapoor, ... Rahul Bhadouria, in Urban Ecology, 2020

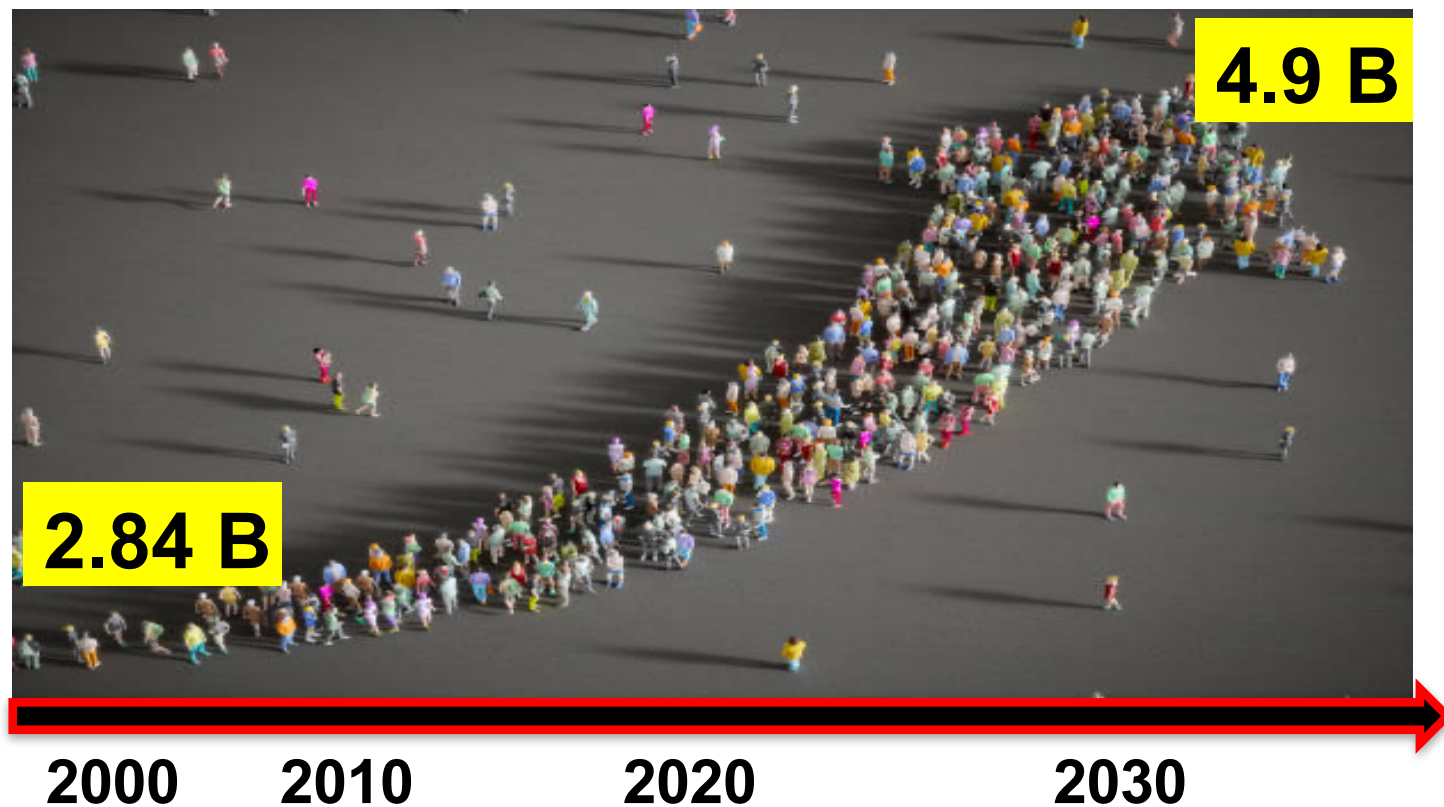
Cities = 2-3% of the Earth's land surface



Three Major Trends in Urbanization

Cities and Biodiversity Outlook, 2012

1. Increase in total urban area is faster than increase in urban population



Three Major Trends in Urbanization

2. Urban expansion will heavily draw on resources putting at risk ecosystems goods and services; occurring in low economic and human capacity and in areas adjacent to biodiversity hotspots
3. Urbanization rates are highest in poorly capacitated urban governance arrangements



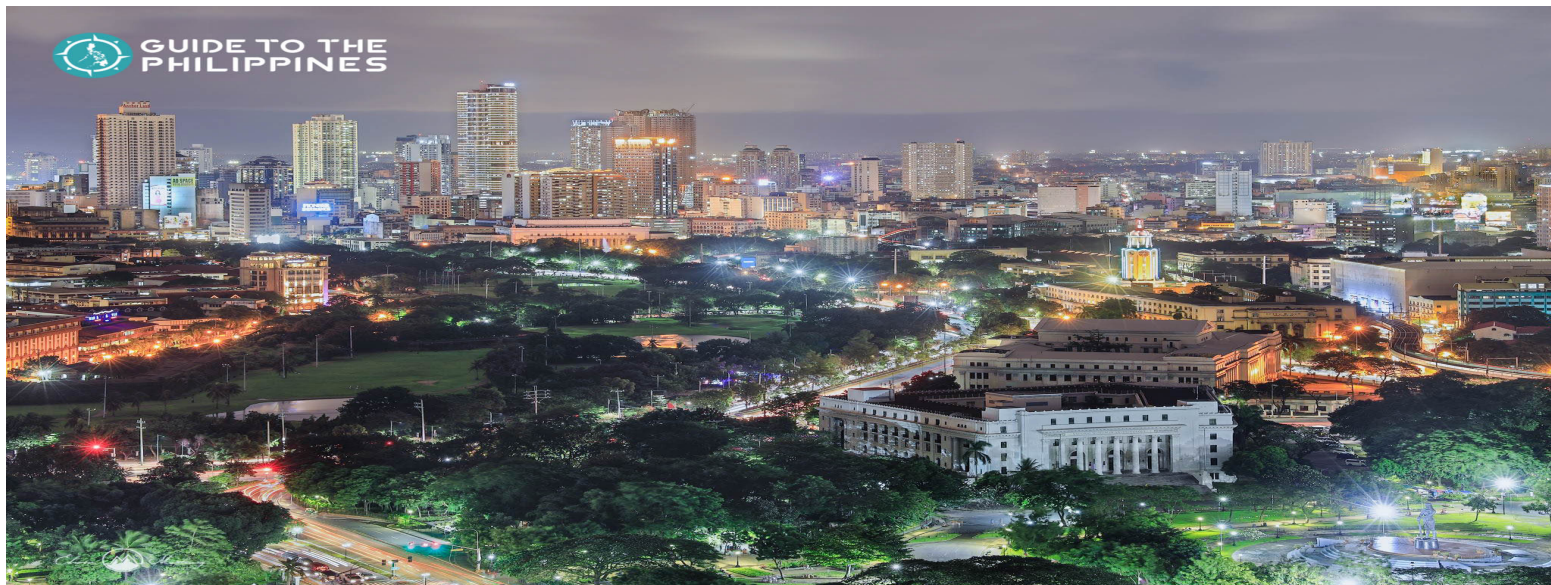
Cities at Risk

- Intensive and rapid urban growth is the greatest Urban areas will add some 2 billion new residents worldwide by 2030, growing from the current urban population of 2.9 billion to 4.9 billion.
- Growth of giant cities — **megacities with more than 10 million people** — will be a factor in future urban growth.
- Urban growth will not occur in these megacities, but in smaller cities – which means for the landscape is that urban areas will be spread over a significantly larger area than today, changing natural areas into urban and suburban environments.
- Within existing cities, more people will use parks and other green areas, and development will gradually fill in vacant parcels, increasing the stress on the remaining green areas.



The Workings of Urban Ecosystems

- biological components include plants, animals, and other forms of life
- physical components i.e. soil, water, air, climate, and topography including energy use and the import, transformation, and export of materials



Urban Ecosystems Vs Other Ecosystems



- Urban ecosystems are generally highly disturbed systems.
- Buildings, roads, parking lots, and other constructions form impenetrable covering of the soil.
- Unlike natural ecosystems however, urban ecosystems are a hybrid of natural and man-made elements.

The Urban Landscape

- The plant life is different characterized by many nonnative and invasive species.
- Environmental stresses also modify the natural elements of urban ecosystems

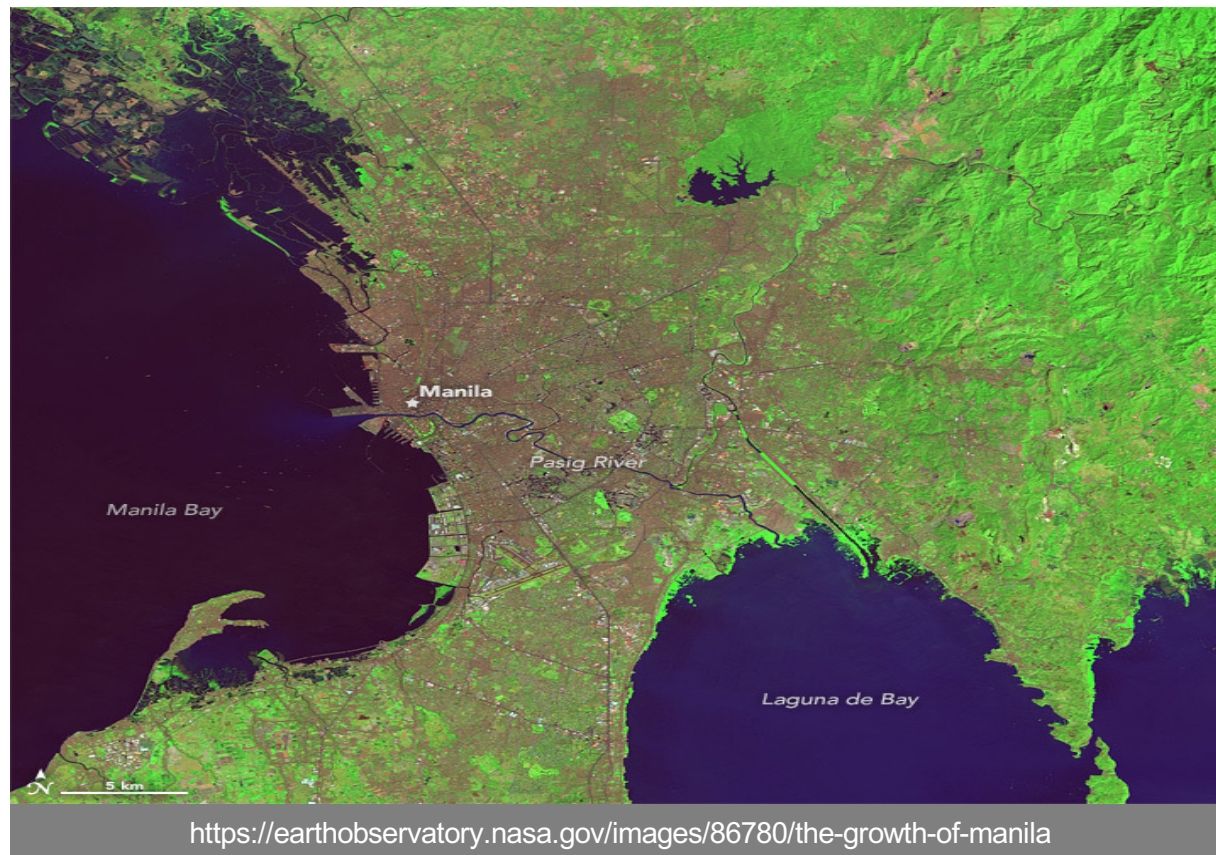


UHI and Vegetation

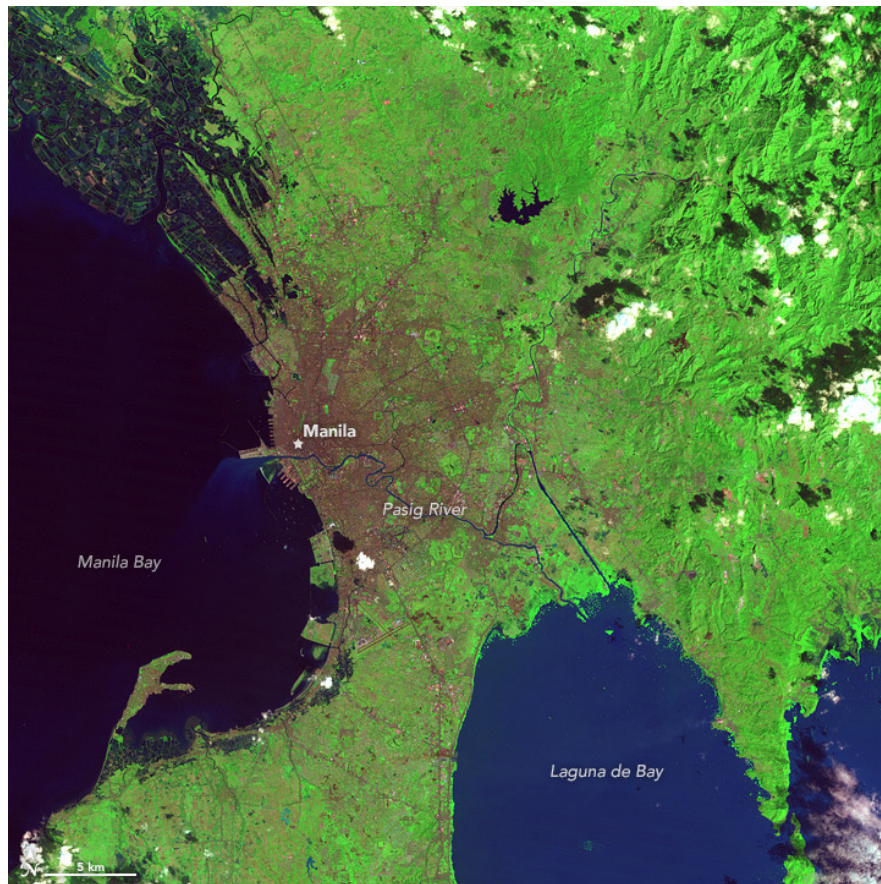
Urban landscapes with 50–90% impervious ground cover can lose **40–83 % of rainfall to surface runoff**, whereas forested landscapes lose only about 13im% of rainfall input from similar precipitation events



The Rapid Growth of Manila



31 January 1988



07 February 2014



Urban ecosystems put pressure on the biodiversity condition of an area and adjacent ecosystems



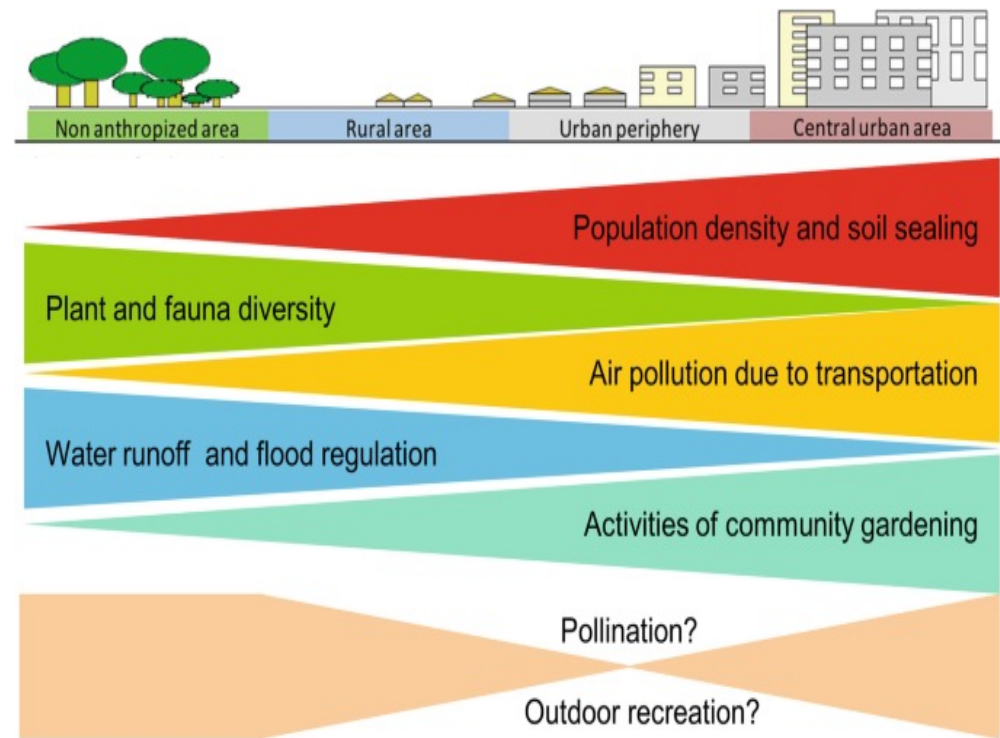
Urban biodiversity as the variety and richness of living organisms and habitat diversity found in and on the edge of human settlements. It ranges from the rural fringe to the urban core.(Muller et al, 2008)

Heat Equity

- refers to the development of policies and practices that mitigate heat islands
- people adapt to the impacts of extreme heat in a way that reduces the inequitable distribution of risks across different populations within the same urban area
- ensures that all residents have equal access to local heat island mitigation programs and tailoring a city's response to severe heat to meet the unique needs of the most at-risk residents.

The Urban – Rural Gradient

- The loss and fragmentation of natural habitat has reduced the richness of taxa in the urban core to less than half of that found in rural areas (McKinney, 2002).
- Competition from exotic-invasive species further reduces native species diversity.



Vision of a City



To manage all the green spaces as a single living ecosystem that benefits both wildlife and people.



Advance the science of urban ecology — how its green elements interact with surrounding rural areas, as well as with the city's human inhabitants.



Find a new way to assess and manage urban green spaces

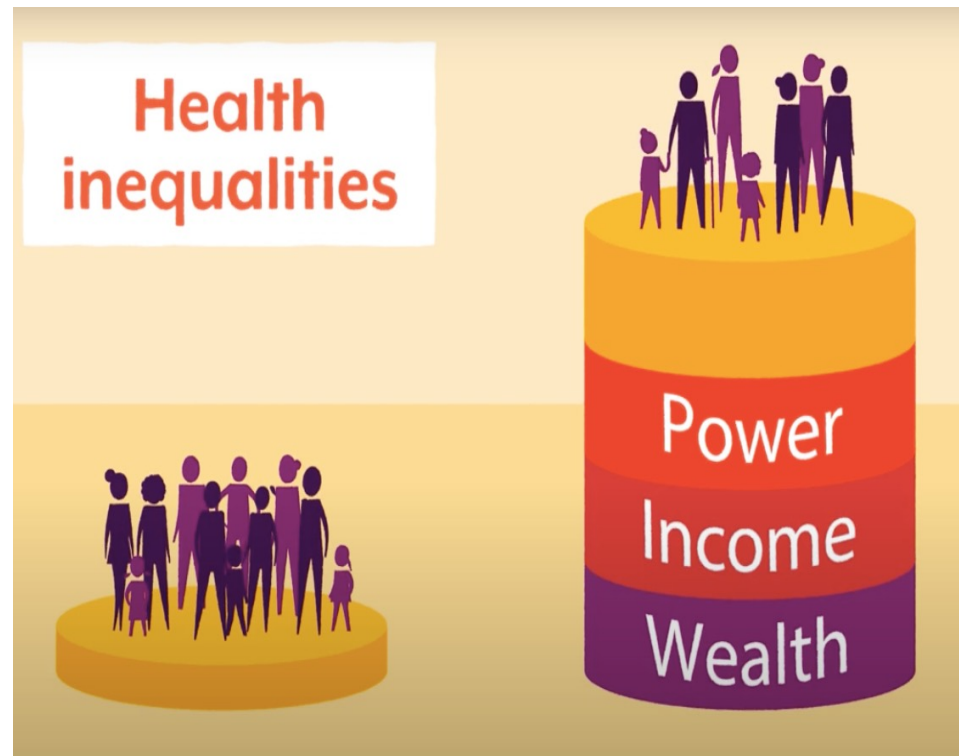


The Gray-Green divide: A Case of Social and Economic Inequality/ Climate Justice

Gray- Green Divide Health and Wealth Inequalities (Climate Injustice)

Gray refers to the dominant color of **gray** from roads, sidewalks, and rooftops.

higher-income neighborhoods show more vegetation that provide a “**greener**” view to the imagery.



Gray-Green Divide



A photograph of a child walking on a beach at sunset. The child is in silhouette, walking from left to right. The sun is low on the horizon, creating a bright reflection on the water. The beach is littered with trash, including plastic bottles and other debris. The sky is a warm orange color.

The Way Forward

A vibrant highly urbanized human settlement that provides ample opportunities, in harmony with the natural environment, to promote livability, walkability and dignity for all the Filipinos.