stratbase ADR PUBLICATIONS

OCCASIONAL PAPER

NOVEMBER 2022
ISSUE 15.11

DEVELOPING A CIRCULAR ECONOMY IN THE PHILIPPINES

OCCASIONAL PAPER NOVEMBER 2022
02

DEVELOPING A CIRCULAR ECONOMY IN THE PHILIPPINES

This paper highlights the need to shift from the traditional linear economy to one that is more sustainable - a circular economy - amid the different crises arising from the depletion of natural resources that have led to a serious lack of supply of various inputs to production. On top of this, consumers' throw-away mentality and the prevailing linear and fragmented waste management systems across Local Government Units in the Philippines pose a great challenge. This paper argues that collective effort among stakeholders in the government, private sector, and civil society, as well as individuals themselves, is needed in order to sustain the country's recovery.

Development is a two-sided phenomenon. The bright side signifies progress, convenience, and high quality of living. The dark side, on the other hand, includes environmental destruction, harmful waste, and serious health hazards.

Throughout the millennia, people have taken raw materials from the Earth to make food, various products, transport vehicles, and homes. When their usefulness was over, the by-products of the production process were thrown away as waste. Following long periods of literally producing waste, people did not realize that the magnitude of waste they generated also led to the extinction of various living organisms. The extent of the consequences of the prevalent linear process of economic development – characterized by "extraction, production, consumption, and disposal"[1] – was made more pronounced at the height of the COVID-19 pandemic.

Different crises arising from the depletion of natural resources have led to a serious lack of supply of various inputs to production, which have led to global inflation and even wars. It had become clear that the linear economy was unsustainable and not beneficial to humankind. Hence, experts have called for the abandonment of the traditional linear economy and to replace it with one that creates sustainability: the circular economy.

The circular economy is described by the Ellen MacArthur Foundation (EMF)[2] as "regenerative by design and aims to gradually decouple growth from the consumption of finite resources." The circular economy is driven essentially by three principles: (1) the elimination of pollution and waste production; (2) the circulation of products or materials; and (3) the regeneration of resources.[3]

The most distinguishable element in a circular economy is the elimination – or, at the very least, the minimization – of waste and the reusability of existing materials or products. Perhaps the easiest phenomenon to witness is the recycling of plastic products into pellets that, in turn, are reused or redeveloped into new plastic products. When the old plastic materials are recycled into pellets, the waste becomes the new raw material that will lead to the creation of a new product altogether.

* THE VIEWS AND OPINIONS EXPRESSED IN THIS PAPER ARE THOSE OF THE AUTHOR AND DO NOT NECESSARILY REFLECT THOSE OF THE INSTITUTE.

GREENHOUSE EFFECT

The rise in the Earth's temperature depends on the continuous flow of solar energy – in the form of solar radiation – from the sun through the Earth's atmosphere and back to space. Solar radiation is either reflected (30%) or absorbed (70%).[4] The latter results in the warming of the planet, a natural phenomenon called the "greenhouse effect". Eventually, some of the absorbed solar radiation is released back into space as heat or infrared radiation. However, due to the atmospheric greenhouse gases (GHGs) that form a blanket around the planet, some of the infrared radiations are contained and trapped inside the atmosphere, further contributing to the increase in global temperature. In this process, known as radiative forcing, the energy leaving the planet is less than what it initially absorbed.

Ideally, the greenhouse effect positively contributes to the Earth's ecosystem. This is a natural phenomenon that is essential in making the Earth warm and livable. Without this, the world would have remained frozen and uninhabitable.

However, megatrends such as human population growth, the emergence of urban areas, and pollution generated from resource consumption and industrial activities have gravely altered the greenhouse effect. They continue to artificially pump the amount of the three main long-lived greenhouse gases (LLGHG) – carbon dioxide (CO_2), methane (CH_4), and nitrous oxides (N_2O) – along with water vapor and other GHGs that are already present in the atmosphere.

The Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC) in 2014 warned the global economy that the increases in the abundance of atmospheric GHG since the industrial revolution are mainly the result of human activities and are largely responsible for the observed increases in global temperature.[5] This was also reiterated by the National Oceanic and Atmospheric Administration (NOAA) Annual Greenhouse Gas Index (AGGI) 2022 report which presented the direct warming influence of the LLGHG.

Since the industrial revolution, the amount of atmospheric abundance and radiative forcing of the three main LLGHG continue to increase in the atmosphere. The AGGI reached 1.49 in 2021, representing a 49% increase in total radiative forcing from 1990 to 2021 and a 1.2% increase from 2020 to 2021.[6] Carbon dioxide (CO_2) accounts for about 66% of the radiative forcing by LLGHG[7] and is responsible for 80% of the increase in radiative forcing since 1990. Meanwhile, CH_4 and N_2O contributed nearly equally to the increase in radiative forcing since 1990.[8]

Solid waste contributes directly to GHG, particularly CH_4 – emissions due to organic matter that undergoes anaerobic decomposition in landfills. Methane is less abundant in the atmosphere compared to CO_2, but its warming potential is 27 times more compared to that of CO_2.[9] Solid waste also contributes to CO_2 emission due to soil degradation in landfills and the transportation of waste materials. The extraction of new raw materialsfor the manufacture of products, only to end up in landfills – a linear model in waste management – contributes significantly to GHG emissions.

Poor waste management heavily influences human social environment. It exacerbates the impact of global warming, further exposing the vulnerability of humans to interconnected socio economic and environmental challenges and greater natural hazards. As such, by introducing and scaling a more circular resource and waste management model, GHG emissions across the value chain can be reduced.

EMERGING MEGATRENDS AND WASTE GENERATION

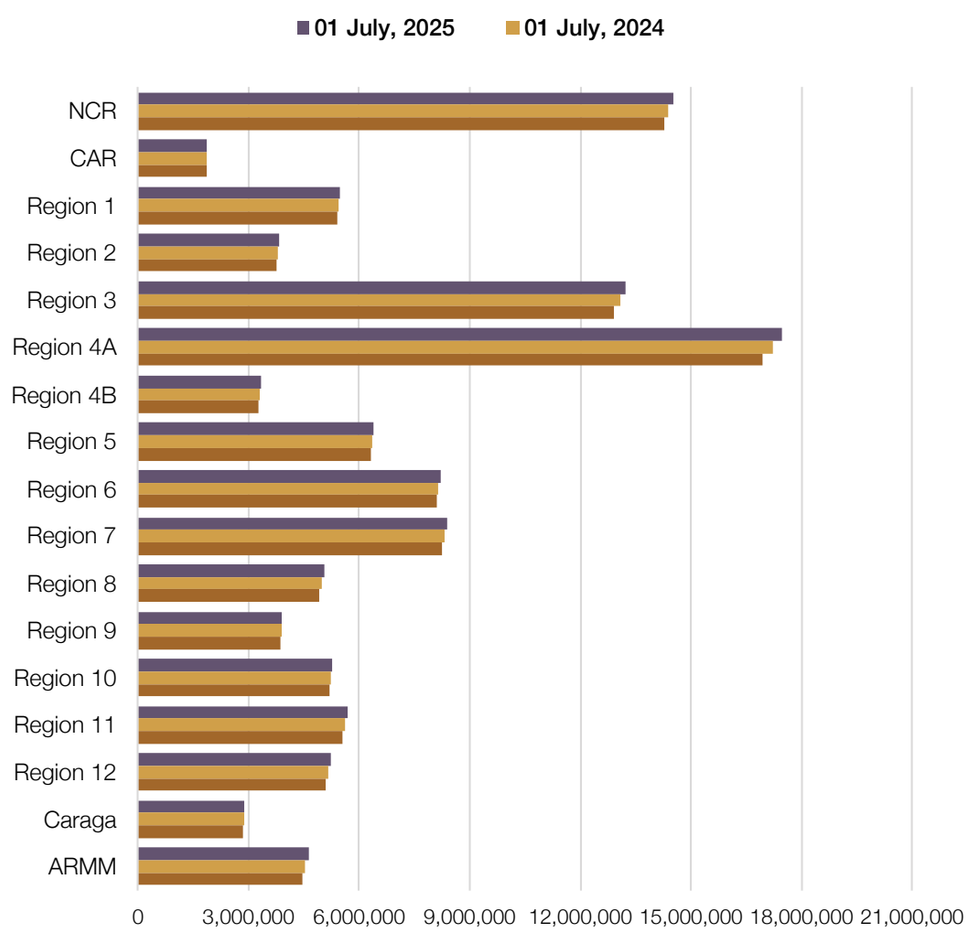
POPULATION GROWTH

As society develops, human population grows. Consequently, this pushes the demand for and consumption of resources beyond what the planet and humans can sustainably produce. This year, 2022, the Earth Overshoot Day, which is the time when humanity has used all the resources that the planet regenerates during the entire year, fell on July 28. This is one of the earliest dates recorded since the industrial revolution; previously, Earth Overshoot Day fell on the month of December. Today, human civilization consumes resources equivalent to that of 1.75 Earths to sustain the needs of the growing population.[10] Together with population is the increase in income that also drives the generation of waste coming from consumed resources that, in turn, are unsustainably and inefficiently managed. As such, annual waste generation by human civilization and its activities are expected to increase year-on-year.

The World Bank estimated that in the year 2020, the global economy generated about 2.24 billion tons of solid waste. This is greater than its initial estimate of 2.01 billion tons of annual municipal solid waste generated globally. The World Bank also estimates that if the global economy does not make drastic measures to address SWM, solid waste-related atmospheric GHG emissions would increase to about 2.3 billion tons of carbon dioxide equivalent per year as solid waste is estimated to reach 3.88 billion tons per year by 2050.[11]

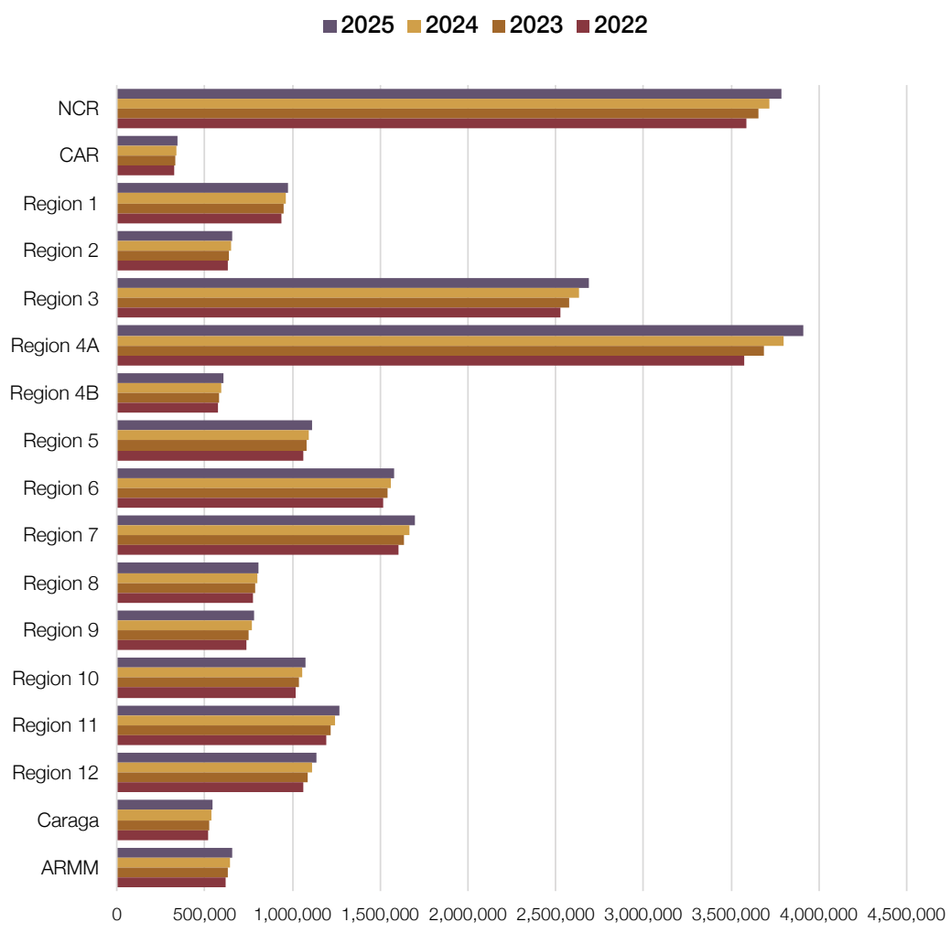
According to the United Nation Environment Program (UNEP), plastic waste already accounts for about 400 million tons of global solid waste generated annually.[12] The Organisation for Economic Co-operation and Development (OECD) pointed out that the world has been producing more plastic waste compared to two to four decades ago.[13]

FIGURE 1 . PROJECTED MID-YEAR POPULATION, BY REGION: PHILIPPINES



SOURCE: PHILIPPINE STATISTICS AUTHORITY (2020)

FIGURE 2 . PROJECTED WASTE GENERATION, BY REGION: PHILIPPINES
(IN METRIC TONS)



SOURCE: DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES-ENVIRONMENTAL MANAGEMENT BUREAU (DENR-EMB)

Solid waste management is a serious challenge for developing countries like the Philippines whose population is expected to reach around 111 million and 116 million, based on the Philippine Statistics Authority's (PSA) 2020 updated Projected Mid-Year Population report[14] and the UN estimate as of July 2022, respectively.[15] The Department of Environment and Natural Resources-Environmental Management Bureau (DENR-EMB) projected that by the end of 2022, the country would have produced about 22.27 million tons of waste.[16]

Data from the PSA and DENR-EMB show a direct correlation between population growth and increase in waste generation. Region 4A, or the CALABARZON Region, is projected to have both the highest number of Filipinos as well as waste generation every year from 2022 to 2025. This is followed by the National Capital Region (NCR), Region 3 (Central Luzon), and Region 7 (Central Visayas).

URBANIZATION

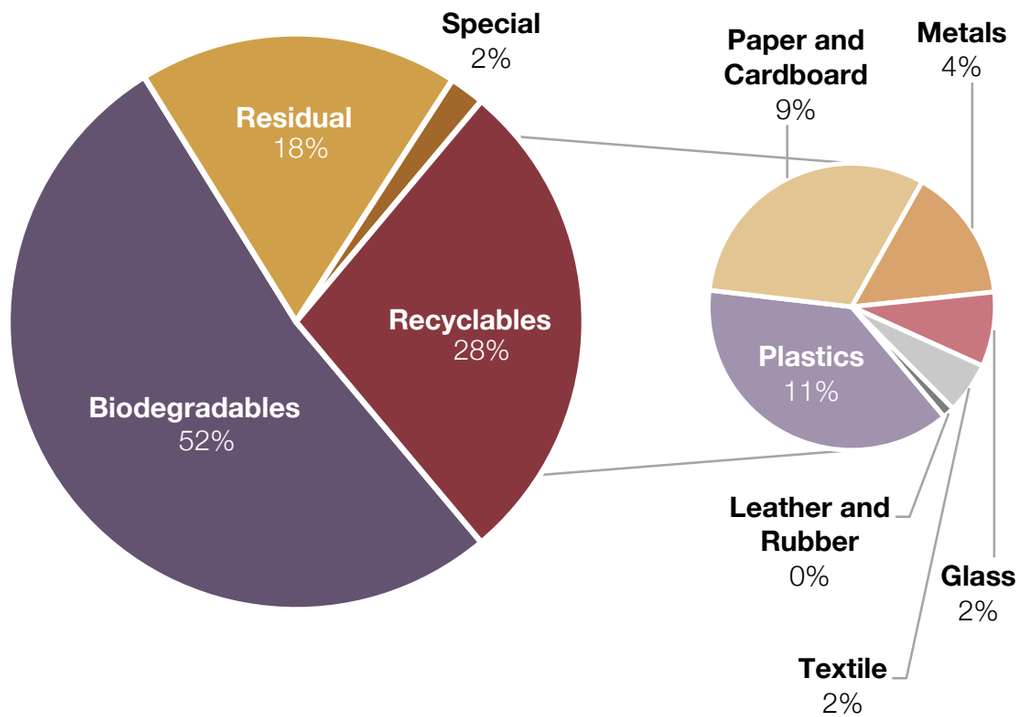
Urban cities are the primary drivers of economic activities, and the principal engines as well for industry growth, development, and innovation. They serve as hubs for job creation and opportunities and resource use. However, with the rapid expansion of economies and the emergence and growth of urbanization, amid unsustainable waste management systems, urban cities serve as centers, too, for waste generation. Moreover, the increasing cost of dealing with waste, which involves processes like collection, segregation, transportation, and processing, poses a significant challenge to developing countries like the Philippines.

Notably, the PSA and DENR-EMB data show a direct connection between the development of urban cities and an increase in waste generation. Among the country's regions undergoing rapid urbanization are the CALABARZON and Central Luzon Regions, due to their proximity to the National Capital Region. Likewise, Central Visayas is already considered a highly urbanized area due to Cebu City which is often referred to as the second capital of the Philippines. Other provinces in the region undergoing rapid urbanization are Bohol, Negros Oriental, and Siquijor.

PLASTIC WASTE

According to the World Bank, about 2.7 million tons of the annual waste generated by the Philippines are plastic wastes.[17] Filipinos' high reliance on more affordable products that are packaged in multi-

FIGURE 3 . COMPOSITION OF MUNICIPAL SOLID WASTES IN THE PHILIPPINES
(2008-2013)



SOURCE: DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES-ENVIRONMENTAL MANAGEMENT BUREAU (DENR-EMB) NATIONAL SOLID WASTE MANAGEMENT STATUS REPORT (2008-2018)

layer sachets led the country to be known as a "sachet economy". On top of this, consumers' throw-away mentality and the prevailing linear and fragmented waste management systems across local government units (LGUs) pose an even greater challenge for the country.

Data collected by the National Solid Waste Management Commission (NSWMC) from 2008 to 2018 show that plastics account for 10.55% of the recyclable municipal solid waste generated annually. Despite the significant share of plastics, the post-consumption plastic packaging recycling rate of the country remains discouraging. In 2021, the World Bank conducted another study on plastics' circularity in the Philippines and found that the country has a recycling capacity gap of 85%. This means that only 28% of total plastic waste was recycled in 2019.[19]

The efficient and effective management of solid waste is a challenge for various Philippine communities, especially in densely populated urban areas. The passing of the Republic Act (RA) No. 9003 or the Ecological Solid Waste Management Act of 2000 was meant to ensure effective solid waste management by establishing the necessary frameworks and mechanisms and mandating the local government units (LGUs) to achieve 25% waste reduction in their respective areas. However, despite the law's existence for more than two decades, the problem of plastic wastes persists in the country.

Some of the main gaps and challenges in Philippine plastic waste management are shown in Table 1.[20]

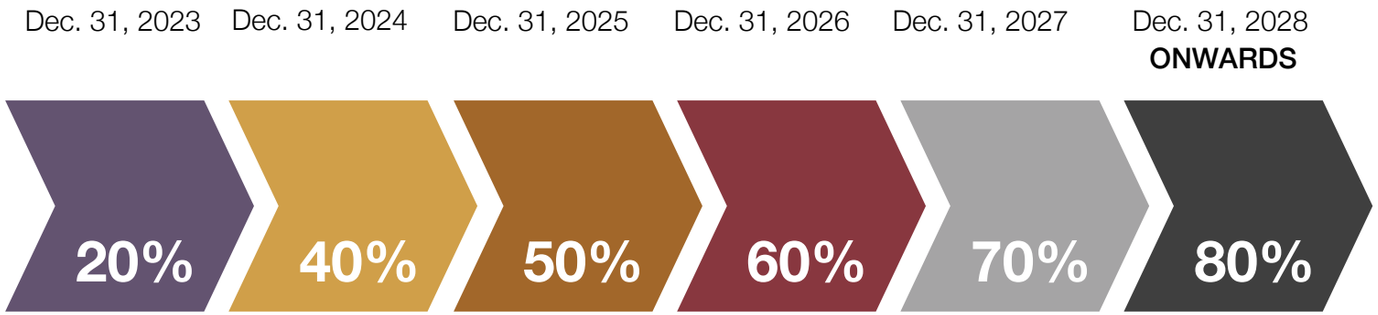
To address these concerns, both houses of Congress under the 18th Congress passed an Extended Producer Responsibility (EPR) bill which lapsed into law on July 23, 2022, under President Ferdinand "Bongbong" Marcos Jr.'s administration. Republic Act No. 11898 or the Extended Producer Responsibility Act of 2022 amends RA No. 9003 by institutionalizing the practice of EPR. The "obliged"

TABLE 1 . MAIN GAPS AND CHALLENGES IN PHILIPPINE PLASTIC WASTE MANAGEMENT

GAPS RELATING TO RECYCLING AND PLASTIC WASTE MANAGEMENT	ISSUES
Mixed waste collection	• Although a few LGUs have adopted a "no segregation, no collection" policy, many LGUs still practice mixed waste collection. • Bulk of recyclable waste extraction takes place at multiple points of aggregation. • The current practice of at-source segregation, separation, and recovery of recyclable waste varies by area depending on the degree of enforcement imposed by the barangay or the LGU.
Inadequate infrastructure for segregation, recovery, and recycling	• It is difficult to secure land to build MRFs and sanitary landfills, particularly in urban areas. • The difficulty of securing land is attributed to the limited LGU funds to buy land and the convoluted process to procure public land due to unclear land classification and stringent land-use laws, especially in highly urbanized areas. • Negative perception of residents concerning SWM facilities within their vicinity. • Current legislation does not require the provision of public infrastructure for recycling. The few existing and upcoming recycling facilities/projects are private-led.
Limited public funds and technical capacity to cover full SWM services at the LGU level	• Public funds for SWM are insufficient to cover the full cost of public SWM services and, so far, focus only on the collection and disposal of waste.
Inadequate infrastructure for segregation, recovery, and recycling	• The level of feedstock is not enough to serve large buyers or make the business viable for SMEs. • Contracts to harvest feedstock from local sources require strong (insider) relationships with LGUs. • SMEs rarely have the funds to purchase and operate advanced recycling technologies such as those needed for producing food-grade recycled resins. • SMEs usually lack liquidity and are unable to meet the environmental, health, and safety compliance standards of their operations.
Poor quality of collected plastic waste	• Sixty-one percent of the packaging mix in the Philippines is composed of low-value flexible packaging. • The average material value of this kind of waste is often not high enough to motivate collection and diversion, especially in remote areas considering the high transportation costs in the Philippines. • Packaging materials are difficult to recycle since they have different plastic components with differing processing requirements
Lack of integration of the informal sector in the plastic value chain	• The recycling sector lacks financial resources, incentives, skills, and technology to increase and improve its capacity, stability, and productivity.
Lack of readily available information on government support for investments in recycling technology and capacity	• Information on available incentives for recycling and good practices is not easily accessible. • There is a lack of a clear interagency approach to recycling within the NSWMC.
Absence of robust policy to address problematic and unnecessary SUPs	• Despite efforts on policies, there seems to be very limited information that shows the effectiveness of the bans on reducing plastics and litter or even diversion from landfills in the country.

SOURCE: THE WORLD BANK (2022)

FIGURE 4 . REPUBLIC ACT NO. 11898: EXTENDED PRODUCER RESPONSIBILITY ACT OF 2022 TIMELINE OF RECOVERY RATES



NOTE: AUTHORS' DIAGRAM OF THE PLASTIC PACKAGING WASTE RECOVERY RATES, BASED ON REPUBLIC ACT NO. 11898 OR THE EXTENDED PRODUCER RESPONSIBILITY ACT OF 2022

enterprises that produce, sell, and use plastics are mandated to establish their EPR programs individually, collectively with other obliged enterprises, or through a producer responsibility organization (PRO), to divert plastic wastes away from landfills and prevent their leakage to the environment, thus achieving plastic neutrality.

The EPR Act aims to establish an efficient waste management system that focuses on plastic waste reduction, recovery, and recycling, and the development of environment-friendly products. Obliged enterprises are given target recovery rates starting in the year 2023 at 20% of their generated plastic waste in the immediately preceding year, and to consistently increase the amount by a certain percentage per year until it reaches 80%.

Since recovery alone will not solve the plastic waste problem in the country, the obliged enterprises, under the Act's implementing rules and regulations, are mandated to identify the after-recovery disposition, whether for reuse, recycling, recovery as feedstock for coprocessing, waste-to-fuel, waste-to-energy or other legally allowed technological applications, or for final proper disposal at a duly licensed Sanitary Landfill Facility (SLF).

To ensure the compliance of obliged enterprises under the Act, such enterprises are required to engage a third-party auditor to conduct a compliance audit and certify the reported plastic product footprint generation, recovery, and overall EPR program compliance.

Furthermore, the Act mandates the National Ecology Center (NEC) to further identify, review, and update the list of non-environmentally accepted products (NEAP) and plastic packaging material that shall be phased out. The DENR is also mandated by the Act to formulate a national framework for all types of product waste. Materials already included in the preliminary list of priority product waste includes general packaging and NEAP; tires and end-of-life tires, automotive and industrial batteries and used batteries; vehicles and end-of-life vehicles; electric and electronic equipment; and textile.

THE ROLE OF THE PRIVATE SECTOR

Any large-scale endeavor requires the extensive support and participation of all stakeholders in order to succeed. In the case of mitigating the risks of climate change, attaining a circular economy, and taking care of the environment, it is not just the government that is expected to exert efforts through the formulation and implementation of policies. Industry players equally make a valuable contribution through their investments in renewable energy, recycling, and other areas. This responsibility of protecting the planet we live in should involve civil society, academe, and the media, and boils down even to every individual.

After all, we all live on only one planet. Most, if not all, resources needed by humankind in order to survive are finite. The consequences of climate change, waste mismanagement, and the irresponsible use of resources are challenges that are felt globally. It is only crucial, then, for a concerted whole-of-society effort for a global predicament such as this to be dealt with.

During the Post-State of the Nation Address (SONA) Economic Briefing[21] in July 2022, DENR Secretary Ma. Antonia "Toni" Yulo-Loyzaga underscored the crucial role that the private sector plays in the building of sustainable cities. She described the private sector as a player with a "strong influence on the way our cities are shaped, the way investments are made in infrastructure, the way investments are made in the kind of support systems that give life to the metabolism of our cities."

The Filipino public shares the same sentiments on the significant role of the private sector in development. A survey commissioned by the Stratbase ADR Institute to Pulse Asia Research Inc. in September 2022 found that 86% of Filipino adults agree that the private sector plays a crucial role in accelerating the country's economic growth. The survey also revealed that 89% of Filipinos believe that the government and the private sector should engage in partnership to sustain the country's economic recovery. Specifically, as shown in Table 2, some 19% of Filipinos believe that private investors can manage natural resources and take care of the environment.

According to the 2022 CEO Survey[22] of PwC Philippines and the Management Association of the Philippines (MAP), CEOs identified the following as the major changes they did in their business plans: included technology and digital upskilling goals in the business plan (64%); introduced new talent retention and development strategies (58%); improved the customer experience (49%); increased the investments in innovation (46%); incorporated ESG goals in the business plan (30%); and expanded the stakeholder engagement goals by including employees, communities, and suppliers (29%). Meanwhile, 11% of CEOs did not make any significant changes.

TABLE 2 . ISSUES THE PRIVATE SECTOR CAN ADDRESS TO BOOST THE PHILIPPINE ECONOMY, SEPTEMBER 17-21, 2022
(IN PERCENT, UP TO 3 RESPONSES)

Base: Total Interviews, 100%								
		LOCATION				CLASS		
In your opinion, which of the following can private investors address to boost the Philippine economy? You may give up to three issues.	**RP**	**NCR**	**BL**	**VIS**	**MIN**	**ABC**	**D**	**E**
Creating jobs	69	77	71	60	66	62	71	64
Help uplift the lives of Filipinos out of poverty	65	70	60	64	73	66	68	52
Expanding livelihood opportunities	49	50	47	57	48	51	49	50
Improving healthcare systems	37	29	44	37	27	33	38	34
Improving the quality of and access to digital services	27	31	29	30	18	37	25	28
Managing natural resources and taking care of the environment	19	18	17	24	21	15	20	20
Developing public infrastructure	16	14	16	15	21	16	15	25
Improving the quality of education	12	10	13	8	12	18	10	13

SOURCE: PULSE ASIA RESEARCH, INC.

One notable example of a private sector initiative is Coca-Cola Beverages Philippines' (CCBPI) first polyethylene terephthalate (PET) plastic bottle recycling facility known as PETValue, which began operating at full capacity in 2022. With the aim of developing a circular economy, the PHP 2.28-billion recycling plant is expected to process around 2 billion pieces of used clear PET plastic bottles every year. This is aligned with the company's goals of making 100% of their packaging recyclable by 2025, and of using at least 50% recycled material in their packaging by 2030. Notably, this facility, which is a joint venture between CCBPI and Thailand-based chemical company Indorama Ventures, was granted pioneer status by the Philippine Board of Investments (BOI) in January 2021. This meant that the project is eligible for tax incentives.[23]

Indeed, the private sector has consistently demonstrated its capacity and willingness to contribute to the crusade against climate change and environmental conservation. At the same time, through its green sustainable investments, not only will economic productivity increase, but jobs can be created as well, and people can attain income security that, ultimately, will help contribute to poverty reduction and overall improvement in the people's quality of life.

In November 2022, the think tank Stratbase ADR Institute organized its annual *Pilipinas Conference*, which brought together stakeholders from government, private sector, and civil society to share their insights and policy recommendations to address pressing issues in Philippine society, including environmental sustainability.

In her keynote speech for the panel themed "Bolstering Private Sector Initiatives: Promoting Investment-led, Sustainable, Resilient Economic Growth," DENR Sec. Yulo-Loyzaga noted that numerous corporations have indeed reassessed and recalibrated their respective priorities to not just aim for profits, but also to become "agents of environmental conservation and champions of

community progress and empowerment." She added: "This shift towards advancing financial gains while leaving no community and no ecosystem behind is based on social equity and environmental sustainability. It is how environment, social and governance (ESG) can truly become ESGR that includes resilience."

In light of the country's growing population, it is only imperative to ensure that cities are sustainable, resilient, and use resources in a responsible manner. During the same forum, Mr. Guillermo "Bill" Luz, chairperson of Liveable Cities Philippines, stated that building local competitiveness starts with cities. He stressed the need to accelerate the trend towards designing, building, and redeveloping "livable cities" that are competitive, sustainable, and resilient. "Diversification of investment and job opportunities will cast the net wider, further, and create these opportunities in the secondary and tertiary cities… it really enables us to create new wealth and grow out the middle-class across the country than far more broadly," he added.

MITIGATING THE ENVIRONMENTAL RISKS: OPPORTUNITIES TO PROMOTE A CIRCULAR ECONOMY

In a circular economy, an important highlight is the reference to environmental responsibility. In the Philippines, the newly passed RA 11898 or the Extended Producer Responsibility Act of 2022 is a clear step in this direction. Grocery stores in most parts of Metro Manila no longer use plastic bags to hold grocery items. Similarly, consumers have gotten used to bringing their own bags – or purchasing non-plastic bags – when they make their purchases.

The government must fulfill its mandate to create an enabling policy and regulatory environment that would encourage and support sustainable investments of the private sector. In fact, the new administration has committed to implementing an 8-Point Socioeconomic Agenda in the near- and medium-term – which includes strategies on environmental sustainability – to respond to external risks and steer the economy back to its high growth trajectory:[24]

- Protect the purchasing power of families by ensuring food security, and reducing transport, logistic, and energy costs;
- Reduce vulnerability and mitigate scarring from the COVID-19 pandemic by tackling health, strengthening social protection, and addressing learning losses;
- Ensure sound macroeconomic fundamentals by improving bureaucratic efficiency and ensuring sound fiscal management;
- Create more jobs by promoting investments, improving infrastructure, and ensuring energy security;
- Create quality jobs by increasing employability, expanding digital infrastructure, and encouraging R&D and innovation;
- Create green jobs by pursuing a green and blue economy and establishing livable and sustainable communities;
- Uphold public order and safety, peace, and security; and
- Ensure a level playing field by strengthening market competition and reducing barriers to entry and limits to entrepreneurship

Indeed, while the government has exerted continuing efforts to slowly transition to a properly functioning circular economy, it needs the cooperation of the public and the manufacturers. Moreover, civil society must pursue high-impact projects that address pressing climate change issues. These sectors working together are crucial for the Philippines to fulfill its international commitments to mitigate the negative effects of climate change, and to transform its economy to be more sustainable and resilient.

For the circular economy to work over the long term, the public should also support the idea of patronizing sustainable products. During the last few decades, many Filipino consumers purchased items because of their low price, not for their sustainable usefulness. It is about time that the public consciously shifted to a more responsible mindset to replace the throw-away practice of consumer behavior. Advocacy groups, together with the media, the Department of Education (DepEd) and the Commission on Higher Education (CHED), can help in this shift of consumer behavior by making students aware of the long-term benefits of having a working circular economy in place.

MOVING FORWARD: A CIRCULAR ECONOMY FOR A GREEN ECONOMIC RECOVERY

Collective effort towards sustaining the economy's recovery requires the appropriate policies and infrastructure set by government. If sustainability principles are deeply embedded in both business operations as well as in other aspects of our lives, not only will costs be minimized, but the further destruction of our planet can be hindered. Environmental stewardship must be the centerpiece in creating a better and more resilient planet that can withstand future shocks and can be enjoyed by the future generations to come.

Thought leaders, policymakers, academics, media, and civil society should join hands in making sure that the public is always kept abreast with developments in this area to make the collective actions and directions sustainable. After all, it is this public that will serve as the strongest determinant of the success of this environmental shift while also serving as the biggest beneficiary of the feat. More than anything else, a circular economy is about ensuring a sustainable future for humankind.

REFERENCES

[1] Hoballah, A. & Averous, S. (2015). Goal 12—Ensuring sustainable consumption and production patterns: An essential requirement for sustainable development. United Nations. Retrieved from https://www.un.org/en/chronicle/article/goal-12-ensuring-sustainable-consumption-and-production-patterns-essential-requirement-sustainable

[2] Ellen MacArthur Foundation. (n.d.). The circular economy in detail. Retrieved from https://archive.ellenmacarthurfoundation.org/explore/the-circular-economy-in-detail

[3] Ellen MacArthur Foundation. (n.d.). What is a circular economy? Retrieved from https://ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview

[4] World Meteorological Organization. (2019). The Sun's impact on the Earth. Retrieved from https://public.wmo.int/en/sun%E2%80%99s-impact-earth

[5] Intergovernmental Panel on Climate Change. (2014). AR5 Climate Change 2014: Mitigation of Climate Change. Retrieved from https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_full.pdf

[6] National Oceanic and Atmospheric Administration. (2021). Annual Greenhouse Gas Index 2021. Retrieved from https://gml.noaa.gov/aggi/aggi.html

[7] World Meteorological Organization. (2022). WMO Greenhouse Gas Bulletin No. 18. Retrieved from https://library.wmo.int/doc_num.php?explnum_id=11352

[8] National Oceanic and Atmospheric Administration. (2021). Annual Greenhouse Gas Index 2021. Retrieved from https://gml.noaa.gov/aggi/aggi.html

[9] Intergovernmental Panel on Climate Change (IPCC). (2022). AR6 Climate Change 2022: Mitigation of Climate Change, Chapter 7: Agriculture, Forestry, and Other Land Uses (AFOLU). Retrieved from https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_Chapter_07.pdf

[10] Global Footprint Network. (2022). Earth Overshoot Day. Retrieved from https://www.footprintnetwork.org/our-work/earth-overshoot-day/

[11] Kaza, S., Yao, L., Bhada-Tata, P., & Van Woerden, F. (2018). What a Waste 2.0: A Global Snapshot of Solid Waste Management to 2050. Washington DC: World Bank Group.

[12] United Nations Environment Programme (UNEP). Our planet is choking on plastic. Retrieved from https://www.unep.org/interactives/beat-plastic-pollution/

[13] Organization for Economic Cooperation and Development (OECD). (2022). Plastic pollution is growing relentlessly as waste management and recycling fall short, says OECD. Retrieved from https://www.oecd.org/environment/plastic-pollution-is-growing-relentlessly-as-waste-management-and-recycling-fall-short.htm

[14] Philippine Statistics Authority. (2020). Updated projected mid-year population for the Philippines based on the 2015 POPCEN results: 2020-2025. Retrieved from https://psa.gov.ph/sites/default/files/attachments/hsd/pressrelease/Cities%20and%20Municipalities%20Population%20Projections_2015CBPP_Phils.pdf

[15] World Population Review. (2022). Philippines Population 2022 (live). Retrieved from https://worldpopulationreview.com/countries/philippines-population

[16] Department of Environment and Natural Resources-Environmental Management Bureau. (n.d.) Projected Waste Generation from 2020 to 2025. Retrieved from https://app.powerbi.com/view?r=eyJrIjoiNjc4OTE2OTktMDdhMC00YzM1LTkwMjEtYWUxMDIyMjI0MWMwIiwidCI6ImY2ZjRhNjkyLTQzYjMtNDMzYi05MmIyLTY1YzRlNmNjZDkyMCIsImMiOjEwfQ%3D%3D&pageName=ReportSection&fbclid=IwAR264Sfm3ocnSBovLnpGgdSKXljXQeGAx9JpZlxcAS3YyV4voqVpHzPTBNw

[17] World Bank Group. (2021). Market study for the Philippines: Plastics circularity opportunities and
barriers. Marine Plastics Series, East Asia and Pacific Region. Washington DC.

[18] National Solid Waste Management Commission. (2019). Solid wastes. Retrieved from https://emb.gov.ph/wp-content/uploads/2018/09/3-Solid-Waste-1.8.pdf

[19] World Bank Group. (2021). Market study for the Philippines: Plastics circularity opportunities and barriers. Marine Plastics Series, East Asia and Pacific Region. Washington DC: World Bank Group.

[20] The World Bank. (2022). Reducing plastic waste in the Philippines: An assessment of policies and regulations to guide country dialogue and facilitate action. Washington DC: The World Bank.

[21] Office of the Press Secretary. (2022, July 26). Post-SONA economic briefing. Retrieved from https://ops.gov.ph/wp-content/uploads/2022/07/20220726-POST-SONA-ECONOMIC-BRIEFING.pdf

[22] PwC Philippines & Management Association of the Philippines. (2022). The wins of change: Thriving in a world of in-betweens (PwC MAP 2022 CEO Survey). Retrieved from https://www.pwc.com/ph/en/publications/ceo-insights-surveys/ceo-survey-2022.html

[23] Monzon, A. M. (2022, October 15). Coca-Cola PH ramps up output of recycling facility. Philippine Daily Inquirer. Retrieved from https://business.inquirer.net/367946/coca-cola-ph-ramps-up-output-of-recycling-facility

[24] Mercado, N. A. (2022, July 26). Bongbong Marcos team presents 8-point economic agenda. Philippine Daily Inquirer. Retrieved from https://newsinfo.inquirer.net/1635258/bongbong-marcos-team-presents-8-point-economic-agenda

Picture Credits:

[1] Cover page and back page: beveragedaily.com/Article/2022/07/26/Coca-Cola-on-driving-up-recycled-content-of-plastic-bottles

[2] Page 2: phys.org/news/2021-11-sustainable-future-common-plastic

15.11

VOLUME

ABOUT

Venice Isabelle Rañosa

is the Research Manager at the policy think tank Stratbase ADR Institute. She handles the Institute's quarterly publications, Politika and Economic Snapshots. In her larger role at the Stratbase Group, she oversees research engagements on the economy, public policy, and sustainable development. She was the co-author of a special study on Extended Producer Responsibility in the Philippines which was published by the Stratbase ADR Institute in 2018. She received her Master's Degree in Development Policy and a Bachelor's Degree in International Studies, with honors, from De La Salle University-Manila and was awarded a Diploma in Spanish by the Instituto Cervantes in Madrid, Spain.

Engr. Felix Jose Vitangcol

is a fellow for Environment at the Stratbase ADR Institute. He also serves as secretary-general of the Philippine Business for Environmental Stewardship (PBEST), a non-government organization that advocates for sound developmental policies and governance to ensure effective stewardship of the environment as a prerequisite for public and private operations.

stratbase + ADRi
ALBERT DEL ROSARIO INSTITUTE
FOR STRATEGIC & INTERNATIONAL STUDIES

STRATBASE ADR INSTITUTE
is an independent international and strategic research organization with the principal goal of addressing the issues affecting the Philippines and East Asia

The Financial Tower
6794 Ayala Avenue, Makati City
Philippines 1226

V 8892.1751
F 8892.1754

www.stratbase.ph