CIRCULAR ECONOMY FORUM 2025

Advancing a Circular Economy for a Sustainable Future

KEY TAKEAWAYS REPORT

FORUM OVERVIEW

The Circular Economy Forum is the first-ever conference focusing on the circular economy held at the Asian Development Bank (ADB). With a theme of "Advancing a Circular Economy for a Sustainable Future", the two-day event is a platform for the wider adoption of the circular economy approach in investments and initiatives in the region as presented in ADB's Environment Action Plan 2024–2030. The forum is also a culmination of the ADB regional technical assistance project on Promoting Action on Plastic Pollution from Source to Sea in Asia and the Pacific.

The forum features plenary presentations and three parallel tracks: (i) Enabling Conditions, (ii) Digitalization and Innovation, and (iii) Digitalization of the Plastic Value Chain. The sessions showcase a combination of ADB and external case studies in the region.

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CIRCULAR ECONOMY FORUM 2025
Advancing a Circular Economy for a Sustainable Future

OPENING REMARKS AND KEYNOTE SPEECH

The opening session set the stage for understanding where Asia and the Pacific stands in terms of the circular economy and what to expect from the forum.

Welcome Remarks

Bruno Carrasco, Director General, Climate Change and Sustainable Development Department, ADB

The circular economy (CE) is a system built on three principles: eliminate waste and pollution, circulate products and materials (at their highest value), and regenerate nature. Challenges faced by developing member countries (DMCs) drove ADB to revisit strategies for sustainability. CE provides an integrative systems framework to guide complex and programmatic responses to the triple planetary crisis.

The integrative systems framework and its approaches should aim to:

- Break silos – The system should address the crosscutting and multidimensional nature of the various development challenges.
- Challenge ourselves – Take on today's challenges, not just yesterday's, through innovation and transformation. Go beyond low-hanging fruits to add more value with what ADB and the CE can do.
- Act urgently and at scale – Get out of the starting blocks quickly to address challenges.

HOW ADB IS APPLYING THIS FRAMEWORK

- ADB is supporting integrative marine litter and debris management in Indonesia by approving $1.5 billion through policy-based loans.
- ADB's private sector department is investing in projects that promote informal sector jobs, recycling, and economically viable solutions to prevent plastic bottles from entering our oceans.
- Applying a systems approach allows better measurement of impact that contributes to ADB's Strategy 2030 vision and supports the Sustainable Development Goals.

Investments in CE will be key to meeting ADB's ambitions, and it is ready to support DMCs and partners to take integrated CE solutions forward.

Opening Remarks

Jonas Leones, Undersecretary for Policy, Planning, and International Affairs, Department of Environment and Natural Resources, Government of the Philippines

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THE PHILIPPINES IS A NATION ON THE RISE

Growth, mostly powered by linear models of resource consumption, comes with escalating resource use and waste generation, ending up in landfills, filling waterways, and polluting oceans.

THE COUNTRY'S ACTIVE COMMITMENT TO GLOBAL ENVIRONMENTAL FRAMEWORKS

The Philippines is engaging in the negotiations of the Global Plastics Treaty to showcase its commitment to ending plastic pollution by promoting CE. The treaty, which upholds CE principles, can open a pathway for the Philippines and other countries to raise climate ambitions while aligning them with development targets.

NATIONAL LEGAL FRAMEWORK AND ACTION PLAN

In 2022, the Extended Producer Responsibility Act was enacted, and its provisions are already in motion. The country has also adopted the National Plan of Action for the Prevention and Reduction of Marine Litter.

THE PHILIPPINES NEEDS STRATEGIC INVESTMENTS IN THE FOLLOWING:

- Scaling up materials recovery facilities
- Access to advanced recycling technologies (e.g., chemical recycling)
- Establishing reverse logistics networks
- Creating green industrial parks

Keynote Speech

Rob Kaplan, Founder and CEO, Circulate Capital

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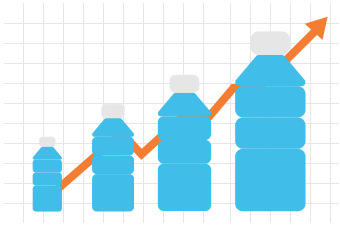
THE PLASTIC PROBLEM

Plastic consumption increased fourfold in the last 30 years at a much faster rate than recycling capacities. This rate of consumption is expected to triple plastic waste generation by 2060. Maintaining the status quo could result in the depletion of the global carbon budget by up to 20% due to the plastic life cycle. All these have detrimental effects on people, especially those who are disproportionately at risk, such as women and informal waste workers.

Asia is at the epicenter of both challenge and opportunity

- The challenge: The region contributes to 50% of global plastic production and generates 46% of global plastic waste. Approximately 70% of ocean plastic leaks via rivers.
- The opportunity: The solutions and the people building them are already available, but they need to keep up with the pace.



CE FINANCING LANDSCAPE

Despite Asia being considered the epicenter of both CE challenges and opportunities, there is a huge gap and misalignment in financing the region relative to North America and Europe. For instance, out of the $190 billion in global private investments in plastic circularity from January 2018 to June 2023, only $18 billion was invested in Asia, while $98 billion and $67 billion were invested in North America and Europe, respectively.

"...Out of the $190 billion in global private investments in plastic circularity from January 2018 to June 2023, only $18 billion was invested in Asia, while $98 billion and $67 billion were invested in North America and Europe, respectively."

LEVERAGING PRIVATE CAPITAL IN ADDRESSING FINANCING GAPS

Private capital is one of the financial tools that could help address global CE financing gaps, accelerating and scaling the adoption of circularity programs and initiatives. Unlocking private capital requires supportive policies, investable pipelines, and risk-sharing financial structures.

GOING BEYOND PLASTIC

Addressing plastic waste could open pathways that enable circularity in other sectors and materials, resulting in a more integrative CE.

PLENARY SESSION 1:
Circular Economy in Sectors

This session covered different contexts of circularity integrated in different sectors such as environment, water and urban development, energy, agriculture and rural development, and transportation.

Circularity in Transport

Miguel Bermundo, Vice President for People and Sustainability, Mober Philippines

ABOUT MOBER PHILIPPINES

Mober runs a CE business model for transportation and mobility. By focusing their strategy on decarbonizing fleets and accelerating sustainability ambitions, Mober's shift to fully operate using electric vehicles (EVs) became a dividend to secure partners. The company has been operating for 10 years but decided to shift to fully using EVs only five years ago.

CHALLENGES IN OPERATIONS

By becoming a full-stack green logistics solutions provider, Mober has a big requirement to build charging infrastructures for their EV units. The company also saw the need to train their staff and drivers, from the nuances of driving EVs to maintaining and monitoring battery health. The lack of clear and standardized metrics is also another challenge, affecting the establishment of clear goals on their impact assessment and monitoring the performance of both assets and people.

ADDRESSING CIRCULARITY CHALLENGES IN TRANSPORT

Building infrastructure

Mober was able to acquire 150 EV units and build 56 charging points.

Monitoring the data and impact assessment

Mober created its own transport management system. This serves as a database for monitoring the performance of their assets from EVs to battery health.

Upskilling human resources

Mober established its own Drivers Academy to train drivers on the nuances of operating and maintaining EVs. As part of their commitment to gender equality, the Drivers Academy certifies women drivers and eventually hires them to be part of the workforce to drive EV trucks.

Redefining market competitions

Mober not only introduced zero-emission delivery and logistics solutions, but also reached out to small truck operators to give access to technologies that drive sustainability. This creates a non-competitive environment that will encourage the transport industry to integrate circularity as a new paradigm in operating a business.

UNDERSTANDING MARKET OPPORTUNITIES

Integrating a CE approach in transportation and mobility creates a big market opportunity and positive environmental impact. The logistics space in the Philippines is worth $11 billion. Operating trucks with fuel can cost a company almost ₱9 per kilometer, while EVs only cost ₱2 per kilometer. Aside from revenues, operating EVs also has significant effect in terms of carbon reduction. With 500 EVs, 1,000 tons of annual carbon reduction could be achieved.

WAYS FORWARD

The enabling conditions for integrating a CE approach in transportation and mobility rely on government policies that would support its market and needed infrastructure. Providing incentives (in different aspects) is also crucial for operators to switch to EVs in both the commercial and business space.

PANEL DISCUSSION:
Circular Economy in Sectors

Following the presentation from Mober Philippines was a panel discussion featuring ADB directors representing different sectors and themes, to elaborate the various applications of CE principles for holistic sustainable development.

PANELISTS

Yoko Watanabe
Director, Environment, ADB

Cindy Cisneros-Tiangco
Director, Emerging Areas, Energy Sector Office, ADB

Miguel Bermundo
Vice President for People and Sustainability, Mober Philippines

Norio Saito
Senior Director, Water and Urban Development, ADB

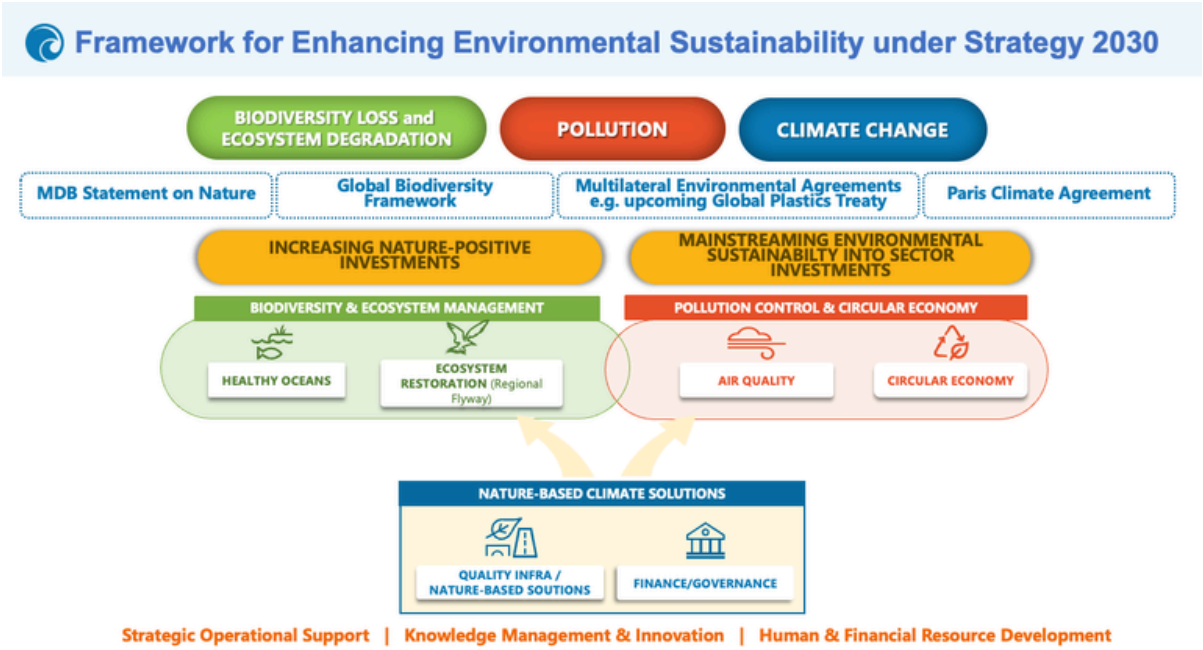
Takeshi Ueda
Director, Agriculture, Food, Nature, and Rural Development, ADB

Moderated by:
Susann Roth
Advisor, Office of the Principal Director, Department of Communications and Knowledge Management, ADB

KEY INSIGHTS

1. What is driving more CE approaches in economies?

CE is not new and ADB has been working on waste management and recycling for a long time. The idea of putting it in a system-wide approach is certainly new and the cooperation of all sectors and cross-country collaborations are needed.



The ADB Environment Action Plan made CE a highlight under the Pollution pillar. Together with Biodiversity Loss and Climate Change, these three pillars are the priorities of the ADB Environment group. This creates a more multi-sectoral and integrated approach toward tackling issues, such as those for circularity.

2. How is CE included in ADB programs and projects?

Urban Development and Waste Management

There is great potential to utilize food (organic) waste for CE-integrated projects. Every year, about 1.3 billion tons of food waste are generated, which makes it an under utilized resource. Developing and supporting projects on composts and biogas generation for fuel and power generation could be pursued and the emergence of organic waste co-digestion technologies should be explored. There is also an increasing amount of requests from governments to support projects that improve waste management systems, not only focusing on waste recovery. This covers collection, transportation, and maximization of material resource recovery to generate resources from waste.

Water and Wastewater Management

Water as a resource has become more scarce and unreliable due to climate change. There is a strong incentive to utilize and treat wastewater for agriculture use and for drinking purposes. In addition, ADB can support building sewage plants. ADB has to work with relevant local governments and ministries to improve policy and regulatory frameworks to pursue circularity.

Agriculture, Food, Nature, and Rural Development

Financing food system transformation is one of ADB's key priorities. Food production, transportation, and consumption create negative impacts like the production of greenhouse gases, soil degradation, and groundwater pollution. ADB's agriculture sector supports initiatives that consider the entire food system to reduce impact born out of agricultural and food production activities. One example is the Livestock Production Project in the People's Republic of China. ADB helped the government to develop a meat value chain to address animal and production wastes. Incentives were given to meat production companies and ADB helped these companies to establish processes to convert their wastes into biofuel or biomass.

Energy

The energy sector has not yet explore its full potential for circularity but there have been efforts with waste-to-energy and increasing energy efficiency. To create appropriate solutions, it is necessary to look at the context holistically and see the challenges hindering CE integration to drive maximum impact. One example is the ADB solar panel project in Kiribati, where the lack of land area posed a problem for installing solar photovoltaic (PV) panels. As a solution, the solar PVs were built on top of a freshwater land resource. To continuously use the land as a freshwater resource despite the PV panels covering the land area, rainwater catchment systems were installed and a buffer zone to plant trees for affected vegetation were allocated. In another case, ADB has installed its first floating solar PVs on the surface of the ocean. Aside from generating electricity, the biorock method (electric reef) used in installing the floating PVs became beneficial for coral reef growth. These solutions are expensive but there are trade-offs and additional benefits.

Transportation

For Mober's experience, the source of their energy is still in the grid. This means that there are some reduction to emissions but not yet in full. The company is also seeking to apply to the government's green energy program that will enable them to tap different sectors to help improve their systems. In terms of waste management, there is still no comprehensive waste policy for hazardous wastes (like batteries) in the Philippines. The company sends their batteries abroad for proper management.

3. Who are the global actors facilitating the discussion of CE now?

ADB acts as an enabler but the three actors are the government, private sector, and civil society. Local leadership can make a huge influence on facilitating the CE ecosystem. ADB can support local leadership through enabling policy, finance, and capacity building to encourage them to facilitate discussions. Government ownership is also crucial, especially the involvement of local agencies in discussing implementation and coming up with solutions.

4. How do you find the right solutions for the CE context in a particular country?

In India, ADB processed a sustainable urban delivery service program. With this policy-based loan, when the government achieves certain policy actions, ADB disburses the funding. ADB has been instrumental in facilitating government discussions and consultations that will create policies.

In the People's Republic of China, ADB is currently supporting a zero-waste city program. This project has been processed through results-based lending (RBL). The approach is comprehensive, as it includes strengthening institutional capacities and knowledge; supporting the policy establishment; financing the infrastructure for segregation, sorting, and recycling; influencing people's behavior change; and supporting CE industries. One key feature of an RBL is its focus on outcomes. If the results are not seen, funding will not flow to the government. This incentivizes the governments to achieve results like increasing the recycling rate and formulating policies promoting the CE approach.

5. With the current global economy, do you think that the CE is considered as a great opportunity or seen as expensive and difficult?

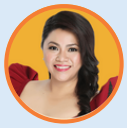
Investing in the discussion on CE would be cheaper than waiting in the future to take action. There is a great opportunity for positive environmental impact but there is also a need to internalize the external policies and frameworks, financial incentives, and community engagement. In the private sector, there is a need to rehash the language to create a direct link on how CE is connected to businesses and what they can get from it.

TRACK 1.1: ENABLING CONDITIONS:
Legal Frameworks and Policy

This session illustrates how legal frameworks, regulations, and policies can promote or enhance a circular economy.

RESOURCE SPEAKERS

Roger Joseph (Rocky) Guzman
International Governance, Policy, and Legal Specialist (Consultant), ADB



Dorothy Delarmente-Bagting
Councilor, Quezon City Government (Philippines)

Sara Lim
Researcher/Administrator, ADB-Korea Climate Technology Hub

Discussant:
Dian Kurniawati
Founder, PT Tridi Oasis Group

Progress on the Global Plastics Treaty: Outcomes and Insights

Roger Joseph (Rocky) Guzman, International Governance, Policy, and Legal Specialist (Consultant), ADB

OVERVIEW AND TIMELINE

The development of the Global Plastics Treaty (GPT) is in response to UN Environment Assembly Resolution 5/14 entitled "End plastic pollution: Towards an international legally binding instrument." The negotiations started in November 2022 in Uruguay and are mandated to deliver a finalized treaty for adoption by 2025.

KEY ISSUES OF CONTENTION

There are two key issues of contention: (i) Plastics and Chemicals and (ii) Supply and Sustainable Production.

SHARED INTERESTS ON KEY ISSUES

Countries with shared interests on key issues presented their positions as unified groups. The High Ambition Coalition, Pacific Small Island Developing States, and the African Group called for a comprehensive approach (including production) on the contested provisions. On the other hand, the Like-Minded Group argued for a narrower focus on downstream waste management (excluding production). Many countries also reaffirmed the need for a strong and binding treaty, and called for a clear, legally binding obligation to phase out most harmful plastic products and chemicals of concern.

FINANCE AND IMPLEMENTATION

To finance measures and initiatives supporting the GPT, developed countries suggested establishing a mechanism based on the Global Environment Facility, relying on voluntary contributions from all parties, and highlighting innovative financing sources. Meanwhile, developing countries suggested the creation of a dedicated and independent multilateral fund, as well as for developed countries and other public and private sources to contribute. They also emphasized the need for stable and predictable financing for implementation.

SCALING UP FINANCE UNDER THE GPT

The financing program is vital for supporting key activities such as capacity building, technical assistance, and technology transfer, as well as infrastructure for waste management. Countries have to commit to clear goals, incorporating both public and private funding sources, to establish a multilateral fund. For example, countries could have innovative financing models or outcomes-based financing. The implementation of the GPT requires additional mobilization and redirection of finance toward emerging economies and integrating private sector participation.

POTENTIAL WAYS FORWARD

UN member states can determine a forum of negotiating and agreeing a treaty. The three options that countries may opt for for the next negotiations are the Consensus Approach, UN Process Opt-out, and Differential Treatment.

ADB and GPT support

In preparation for implementation, ADB can support policy development and investments to fulfill country commitments and to promote action on plastic pollution at sea in Asia and the Pacific. The opportunities for ADB to support the GPT implementation are through planning and programming support through financing, technical assistance, capacity building, and technology transfer.

ADB's financing role for policies and investments

For the GPT, ADB can assist in the identification, preparation, and implementation of government and private sector actions and investments. This may include the necessary policy, financial, and technical support to help developing member countries meet their obligations.

LINK TO PRESENTATION

Progress on the Global Plastics Treaty: Outcomes and Insights
by Roger Joseph (Rocky) Guzman

Closing the Loop: Extended Producer Responsibility System in the Republic of Korea

Sara Lim, Researcher/Administrator, ADB-Korea Climate Technology Hub

INTRODUCTION TO EXTENDED PRODUCER RESPONSIBILITY IN THE REPUBLIC OF KOREA

The Republic of Korea (ROK) introduced the Extended Producer Responsibility (EPR) scheme in 2003, requiring producers to take responsibility for the entire life cycle of products, such as collection, disposal, and recycling after use. Initially, the items covered under the EPR were only 11 product categories and four types of packaging. Over time, the scope expanded to include 24 product types.

Slide from the presentation "Closing the Loop: Extended Producer Responsibility System in the Republic of Korea"

EPR ECOSYSTEM IN THE ROK

Multiple stakeholders are involved for an effective implementation of the EPR system. This ranges from the Ministry of Environment who are responsible for enacting laws, regulations, and guidelines up to the consumers who are responsible for properly separating and disposing products and packaging materials in use.

FEES AND IMPLEMENTATION

Every five years, the Ministry of Environment establishes long-term recycling targets and annually announces recycling obligation rates for responsible producers. The EPR scheme has resulted in cumulative landfill cost savings of W7.1 trillion (approx. $4.9 billion), the creation of up to 22,000 jobs, and an estimated reduction of 11.19 million tons of carbon dioxide emissions.

KEY ENABLERS

There are four key enablers for the ROK's EPR system:

Institutional frameworks

The country's institutional frameworks road map started in 1986 with the introduction of the Waste Control Act, which laid the legal foundation for waste collection sites, sorting facilities, and treatment plants, applying to all sources of wastes. These legal frameworks developed and established a clear EPR ecosystem until 2022 when the country introduced the deposit scheme for disposable cups that requires customers and restaurants to pay W300 for deposit per cup and is refundable upon return.

Public-private partnership

In the EPR context, PPP is not defined using its meaning on project financing contracts but this has been considered a key enabler as a regulatory PPP model. This means that it engages the public and private stakeholders in the entire EPR ecosystem from regulations, implementations, and monitoring.

Informal sector integration

In the ROK, the informal sector is comprised of an elderly population (aged above 60). Similar to other countries, the ROK also identified the integration of the informal sector into the formal system as a challenge. Local governments joined the Ministry of Health and Welfare, nongovernment organizations, and social enterprises to reach the informal sectors and provide the targeted services. This includes key areas on safety measures, employment, care services, and livelihood and housing.

Public awareness

The country has implemented key measures to increase public awareness through availability of segregation infrastructure, information and education campaigns, publications, and economic incentives.

LINK TO PRESENTATION

Closing the Loop: Extended Producer Responsibility System in the Republic of Korea
by Sara Lim

Building a Plastic-Free Quezon City through Legislation and Beyond

Dorothy Delarmente–Bagting, Councilor, Quezon City Government (Philippines)

ABOUT QUEZON CITY

With a land area of 161.12 square kilometers and a population of 3.2 million, Quezon City is the most populous city in the Philippines.

THE PLASTIC PROBLEM

In 2009, the onset of Typhoon Ketsana (local name: Ondoy) revealed the overwhelming presence of plastic waste across Metro Manila. The plastic wastes clogged the drainage systems and scattered across the communities after flood waters receded. In 2012, the city's Waste Analysis and Characterization Study (WACS) revealed that 13% of the total waste composition of Quezon City is plastic.

RESPONSE TO THE PROBLEM

The city government created targeted laws for a gradual plastic ban in the city:

2011

SP-2103, S-2011
An ordinance mandating business establishments using plastic bags to display the notice, "Save the Environment, Bring your own recyclable/reusable bags"

2012

SP-2127, S-2012
Plastic and styrofoam ban in Quezon City Hall and several city-owned facilities

SP-2140, S-2012
Plastic Bag Reduction Ordinance

2013

SP-2202, S-2013
Prohibiting the use of plastic advertisement and propaganda materials

2014

SP-2350, S-2014
Quezon City Environment Code

2019

SP-2868, S-2019
Plastic Ban Ordinance

SP-2876, S-2019
Single-Use Plastic/Disposable Materials Ban Ordinance

2021

SP-3107, S-2021
Green Public Procurement Ordinance

2025

Executive Order No. 3. S-2025
Guidelines in Reducing Plastic Waste in Quezon City Government Departments and Offices

WHOLE-OF-GOVERNMENT APPROACH TO PLASTIC REDUCTION

The whole-of-government approach of Quezon City to plastic reduction covers the crafting and implementation of targeted policies, raising awareness and changing behavior, and encouraging stakeholder engagement and community participation through consultations and circular economy initiatives.

CHALLENGES AND OPPORTUNITIES

There are still challenges on shifting behavior from plastic dependence to more sustainable practices, limitations on implementations due to lack of manpower considering the size of the city, and the lack of national legislation targeted toward plastic reduction. The city takes this challenge as an opportunity to refine existing policies based on their experiences on implementation gaps, enforcement, and growing evidence. The city also looks at the opportunity to create a more targeted local legislation on banning plastic bottles and managing textile waste.

LINK TO PRESENTATION

Building a Plastic-Free Quezon City through Legislation and Beyond
by Dorothy Delarmente–Bagting

TRACK 2.1: DIGITALIZATION AND INNOVATION: *Breakthroughs in Practice*

This session showcases successes and challenges of ongoing local case studies that use digitalization and innovation to promote a circular economy.

RESOURCE SPEAKERS

Eileen Ortega-Gamo
Director (Community Bamboo Development and Carbon Removal), Rizome Philippines

Surbhi Jore
Founder, ASM Global

Rudolph Peralta
Senior GIS Analyst, Arup

GHG Measurement through Community Mobilization

Eileen Ortega-Gamo, Director (Community Bamboo Development and Carbon Removal), Rizome Philippines

ABOUT RIZOME PHILIPPINES

Rizome Philippines is a fully Filipino-owned subsidiary of a U.S.-based company. It is developing a holistic bamboo value chain across the country, including projects like the Tacloban International Airport. The company sources 100% of its bamboo from Indigenous Peoples (IP) communities.

WHY BAMBOO?

Bamboo is an ideal material for regenerative development and climate resilience. It grows 10–15 times more biomass and captures significantly more carbon per hectare than species like Douglas fir. As a fast-growing and renewable resource, bamboo offers continuous benefits through regenerative thinning: the more you harvest, the more it grows. This creates a sustainable loop of productivity and carbon sequestration.

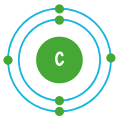
One acre of cultivated bamboo can sequester up to 400 metric tons of CO_2 annually.

SUSTAINABILITY AND CARBON SEQUESTRATION

As part of a formal carbon program, Rizome's projects are designed to last a minimum of 40 years, embedding sustainability into every stage of the operation. The main product of its carbon development is data, which is used to track environmental impact, ensure accountability, and continuously improve outcomes. Rizome's bamboo plantations are powerful carbon sinks. Data shows that just one acre of cultivated bamboo can sequester up to 400 metric tons of CO_2 annually. In addition to carbon capture, bamboo improves air quality by producing 35% more oxygen than an equivalent area of traditional forest.

ROLE OF INDIGENOUS PEOPLES IN DIGITALIZATION AND INNOVATION

This model doesn't just offer jobs; it creates local expertise and ownership, laying the groundwork for lasting impact. Technology and ancestral knowledge work hand-in-hand in Rizome's operations.



Before planting begins, IP geotaggers map ancestral domains using offline tools to ensure compliance with carbon standards.

Each bamboo plant is then individually geotagged. In Carmen, North Cotabato, 613,000 bamboo poles have been planted by 31 Manobo geotaggers. Transportation is done carefully, via crates and carabaos, to avoid damaging the bamboo.

Three months after planting, maintenance begins and continues in 3–4 cycles, depending on the size of the area. Each bamboo plant is revisited, checked for survival, and monitored through photographs and metadata collection.

This data-driven method not only ensures plant health but also strengthens the community's ability to manage large-scale, tech-enabled forestry projects.

BREAKTHROUGHS IN PRACTICE

Rizome's model centers IP communities as key implementers, not just participants. Indigenous members are strategically hired into operational roles and trained to lead crucial activities like measurement, reporting, and verification, or MRV. Their work ensures accurate data collection and compliance with international carbon accounting standards, enhancing transparency and accountability.

This approach creates local expertise and builds trust. One key success has been the development of seasoned IP geotaggers who now train others in new project areas, demonstrating a scalable and resilient model for upskilling.

This progression not only strengthens individual capacity but also ensures the long-term sustainability of the project and enables replication of best practices across regions.

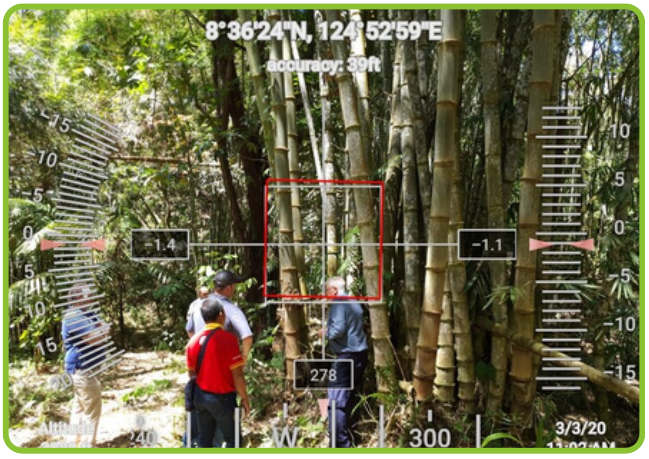


Photo from Rizome Philippines (www.rizomephilippines.com)

LINK TO PRESENTATION

GHG Measurement through Community Mobilization
by Eileen Ortega-Gamo

Pasig River Plastic Waste Digital Twin Project

Rudolph Peralta , Geospatial and Digital Lead, Arup Manila

ABOUT THE PASIG RIVER PLASTIC WASTE DIGITAL TWIN PROJECT

The digital twin for the Pasig River aims to simulate environmental interventions and generate actionable insights for reducing plastic pollution in Manila. Arup was the winner of the ADB Challenge: Pasig River Plastic Waste Discovery Space. This initiative leverages real-time data, forecasting, and machine learning to identify plastic hotspots, track seasonal pollution patterns, and support decision-making. The ultimate goal is to hand over to the government working digital public infrastructure that strengthens long-term urban development and environmental management.

MANAGEMENT OF THE PASIG RIVER

The Pasig River, a central artery of Metro Manila, connects numerous government and community stakeholders, including the Department of Environment and Natural Resources, Metropolitan Manila Development Authority, and barangays. The digital twin initiative aligns with broader efforts to make Manila more livable and sustainable.

Officially launched in April 2025 with ADB, the tool will enhance current cleanup efforts and provide visibility on where pollution originates, how it flows, and where it accumulates.

GROUNDWORK AND PROJECT DEVELOPMENT

The team is developing a framework for a dynamic, real-time representation of the Pasig River that can later be layered with analytics. The approach is to ensure seamless implementation by starting with robust data architecture, identifying existing datasets, data sources, and visualization methods.

PATH FORWARD

By combining geospatial and environmental data with predictive analytics, Arup aims to deliver a blueprint for Pasig River and Manila Bay plastic waste management, one that is scalable, financially sustainable, and replicable in other river systems worldwide.

LINK TO PRESENTATION

Pasig River Plastic Waste Digital Twin Project
by Rudolph Peralta

Community-based Digital Solutions

Surbhi Jore, Founder, ASM Global

ABOUT ASM GLOBAL

ASM Global works on community-based digital solutions that bring together every stakeholder in the value chain, from households and junk shops to schools, local government units, and private sector brands, by giving them access to real-time, traceable data. The goal is to address key pain points in plastic waste management through transparency, inclusivity, and end-to-end digital tracking while ensuring alignment with policies such as the Extended Producer Responsibility (EPR) law in the Philippines, also known as RA 11898.

ASM GLOBAL'S PLATFORM INTEGRATES MULTIPLE LAYERS OF DIGITAL INNOVATION:

SMART LEDGERS

Provides secure, tamper-proof records for recovery and plastic credit generation that are critical for EPR compliance.

INTERNET OF THINGS INTEGRATION

Enables real-time monitoring of waste throughput and contamination rates at material recovery facilities.

AI AND ADVANCED ANALYTICS

Forecasts waste generation hotspots and flags anomalies, helping municipalities plan interventions.

DIGITAL MARKETPLACE

Facilitates pricing, matching supply with demand, and monetizing plastic credits through verified data.

END-TO-END TRACEABILITY

From material tagging at origin to reintegration into the circular system, all activities are logged, tracked, and auditable.

CASE STUDY:
Digitizing Local Waste Flows

In Plaridel in the Philippines, ASM Global partnered with the local government, schools, and community centers to improve an existing plastic recovery program. Initially, waste was being collected but handed over to unregulated junk shops with no digital tracking. Reporting was manual, segregation at source was limited, and the city could not meet the requirements for participation in the national EPR program. To address this, ASM Global deployed its full suite of digital tools. Materials were tagged at the source using a mobile app, with AI models computing environmental impact and dashboards visualizing data for compliance.

Every action—from collection to recycling—was logged using smart ledgers, creating a verifiable digital trail. This structured data made it possible for the municipality to access EPR credits, with activities independently verified by certified public accountants (CPAs).

BREAKTHROUGHS IN PRACTICE

ASM Global's approach created systemic change by embedding digital infrastructure into a highly fragmented ecosystem. Over 1 million kilograms (kg) of waste was source-segregated, 700,000 kg plastic upcycled, and ₱1 million in financing was unlocked. Junk shops now use the company's tools embedded in their point of sale systems, supporting transparent transactions and traceable flows.

By integrating CPA verification, smart ledger auditing, and a credit marketplace, ASM Global ensured trust in its reporting framework. The solution also strengthened community livelihoods by formalizing waste collection systems and ensuring fair wages for workers. ASM Global's model is now recognized internationally and is deployed across more than 35 countries—proving that inclusive, tech-driven waste management systems are not only possible, but scalable and sustainable.

LINK TO PRESENTATION

Community-based Digital Solutions
by Surbhi Jore

TRACK 3.1: DIGITALIZATION OF THE PLASTIC VALUE CHAIN: *Developing Digital Road Maps*

This session introduced key concepts of digitalizing the plastic value chain to accelerate circularity and how to assess readiness levels using a maturity assessment tool made specifically for the plastic value chain.

RESOURCE SPEAKERS

Vincent Aloysius
Team Leader and Circular Economy Specialist, Seureca-Veolia

Emilio López Cano
Associate Professor, Rey Juan Carlos University

Moderated by:
Erin Sinogba
Project and Knowledge Management Lead (Consultant), ADB

Digitalization of the Plastic Value Chain in Southeast Asia

Vincent Aloysius, Team Leader and Circular Economy Specialist, Seureca

DOWNLOAD PRESENTATION HERE

DIGITAL MATURITY ASSESSMENT

Under ADB's technical assistance to address plastic pollution, the digital maturity assessment tool was developed to understand the current situation, identify applicable technical solutions, and determine how digital solutions can accelerate plastics circularity. It assesses the digital maturity of Indonesia and Viet Nam by looking at national-level enablers and informs the development of digital road maps.

DIGITAL ROAD MAP OBJECTIVES AND AMBITION SETTING

Gathering feedback and consulting with various stakeholders are necessary to establish a balanced target and ambition for the digital road map in plastic waste management. It involves setting specific objectives and ambitions for five key components:

- reporting and monitoring of plastic production, imports, exports, and waste
- plastic pollution identification and monitoring
- the physical supply chain
- the financial supply chain
- awareness and skills

The road maps for digitalization developed for Indonesia and Viet Nam are divided into three phases, with Phase 1 focusing on planning and piloting, Phase 2 on scaling up digital solutions by 2030, and Phase 3 aiming for an advanced digital economy in plastic waste management by 2040.

RECOMMENDATIONS FOR THE DIGITAL ROAD MAP

Improve collection infrastructure to reduce plastic waste leakage and raise public awareness about the environmental impact of plastic waste

Promote the development of digital innovation in waste management technologies and support enhanced plastic waste tracking, monitoring, and data-driven decision-making

Enhance the integration of circular economy practices within both the formal and informal sectors

PANEL DISCUSSION KEY TAKEAWAYS

- Digital solutions play a pivotal role in advancing the circular economy by providing transparency, traceability, and enabling accountability and visibility across the waste management life cycle. These solutions should support policy and market-based instruments and be integrated with regulatory frameworks such as EPR schemes.
- A foundational step for developing digital road maps involves comprehensive stakeholder engagement, encompassing policymakers, industry participants, and both formal and informal waste sectors. This should be coupled with baseline assessments evaluating existing digital capabilities and physical waste management systems.
- When implementing a data platform for monitoring, organizations should prioritize simple, scalable solutions aligned with FAIR principles (Findability, Accessibility, Interoperability, and Reusability), leaning towards open-source tools to ensure broader accessibility and sustainability.
- To ensure successful platform adoption, it's essential to develop high-quality visualizations that offer actionable insights, guarantee data timeliness for effective decision-making, create user-friendly dashboards, maintain regular data updates, and incorporate predictive capabilities where feasible.
- Project implementation lessons stress the importance of securing senior-level engagement for sustained commitment, ensuring adequate resource allocation, fostering ownership for long-term sustainability, and including implementation support within the initial project scope.

SUMMARY OF OUTCOMES FROM TABLE DISCUSSIONS

Informal sector engagement:

- Focus on junk shops as key data sources for plastic waste
- Need to register informal businesses as legitimate entities
- Provide basic digital skills training and localized tools
- Consider limited technology access of informal sector

Priority areas:

- Implementation of digitalization programs through junk shops
- Two identified pathways: public sector engagement and private sector partnerships
- Collaboration with startups and local shops
- Focus on bureaucratic alignment across governance levels

Capacity-building support:

- Technical skills development
- Basic digitalization training
- Data collection at ground level
- Stakeholder engagement and awareness building

Municipal digital solutions:

- Need for tailored approaches based on municipality classification (first class vs. rural)
- Requirement for international and local government support
- Integration with existing programs (e.g., Coca-Cola Foundation, United Nations Development Programme Green Local Government Units project)
- Focus on specific areas like food packaging

Key considerations include the need for localized solutions, stakeholder engagement, and basic technological infrastructure before implementing complex digital solutions.

TRACK 1.2: ENABLING CONDITIONS: *Sustainable Finance*

The session explored the current use, challenges, and opportunities associated with environmental credits and auditing; provided insights into the importance of project bankability for the CE transition; and, presented a business case for refilling as one of the alternative product delivery systems that upholds CE principles.

RESOURCE SPEAKERS

Ma. Celina Anonuevo
Team Lead (Sustainability and Emerging Assurance), Deloitte Philippines

Claire Alembik
Investment Specialist, Infrastructure Finance Division 2, ADB

Laarnie Cancio
Cofounder and Managing Director, Back to Basics Ecostore

Plastic Credits and Auditing: Promoting Transparency and Accountability

Ma. Celina Anonuevo, Team Lead (Sustainability and Emerging Assurance), Deloitte Philippines

PLASTIC CREDITS AND ITS ROLE IN CE

A plastic credit refers to a transferable unit representing a specific quantity of plastic that is avoided from use, collected and managed, or recycled. It is important to note that plastic credits should be treated as a supplementary source of funding, not a replacement for the budget that local government units are mandated to provide. Plastic credits can serve as an incentive and offer a traceable framework, with the potential to increase participation and recognition of the informal waste sector in waste management.

CHALLENGES ASSOCIATED WITH PLASTIC CREDITS AND AUDITING

- There is no uniform standard for credit generation.
- There are varying levels of maturity and transparency. In the Philippines, the Department of Environment and Natural Resources has not clearly imposed standards for plastic credit systems.
- Plastic credit prices vary depending on the type of plastic, diversion method, and location.
- There is a risk of double counting credits.
- Plastic credits may disincentivize plastic generators from reducing usage, as they can simply "buy" compliance, especially since all credits are treated equally, allowing producers to fulfill obligations without making actual reductions.

SCOPE OF AUDITING

In the Philippines, only obliged enterprises (OEs) are required to be audited. In contrast, in other countries, waste diverters are commonly the ones audited, not the OEs.

IMPORTANCE OF AUDITING

Improves internal systems

Builds trust with stakeholders

Fights fraud

Maintains the market price of legit credits

Auditing plays a crucial role in strengthening the plastic credit system. It improves internal systems and builds trust by ensuring legitimacy and transparency. It also helps fight fraud; for instance, in India, out of the six waste diverters audited, three were found to have sold fraudulent credits. Auditing also helps maintain the value of legitimate credits, as the presence of fraudulent credits can drive down overall market prices.

LINK TO PRESENTATION

Plastic Credits and Auditing: Promoting Transparency and Accountability
by Ma. Celina Anonuevo

Private Sector Perspective on Bankable Projects Supporting Circularity

Claire Alembik, Investment Specialist, Infrastructure Finance Division 2, ADB

PRIVATE SECTOR'S ROLE IN TRANSITIONING TO CE

There is a huge financing gap in CE. The annual global gap is between $50 billion and $120 billion out of $1.64 trillion in global financing; only 8% is directed toward plastic circularity investments. The private sector can help fill this financing gap to scale CE and accelerate the global transition to circularity. Private investors can support CE by:

- **Investing in sustainable solid waste management business**
- **Cofinance waste management projects at scale through public-private partnerships**
- **Redesign value chains to cut resource consumption and waste**
- **Focus on collaboration and coordinated action to identify bankable projects in waste management**

FACTORS THAT AFFECT A PROJECT'S BANKABILITY

- An enabling legal and economic environment is essential. This includes the presence of supportive policies, Extended Producer Responsibility (EPR) frameworks, and a cap on credit pricing.
- A strong sponsor—such as a company, consortium, or government entity—is critical. Credible sponsors bring technical capacity and financial strength, which contribute to the long-term sustainability of the project.
- The project must be built around commercially viable technology that is proven and scalable.
- Predictable cash flow is necessary, with clear revenue streams established through offtake agreements and long-term contracts.
- There must be a willingness to comply with high environmental and social standards, including addressing the project's potential environmental and social impacts.

CHALLENGES IN FINDING BANKABLE CIRCULAR ECONOMY PROJECTS

Collection systems and infrastructure	• Nascent plastic collection and segregation systems • Limited availability of high-quality input waste for recycling, due to poor segregation resulting in mixed waste, making them difficult to recycle • Instability in the supply of feedstock for recycling especially in the informal waste sector
Offtake risk	• High competition for PET (polyethylene terephthalate) packaging and quality recycled PET (rPET), with virgin PET also competing in some cases • Buyers may not find rPET attractive due to a number of reasons (e.g., cost of rPET compared to virgin PET), resulting in insufficient demand for recycled materials • Fluctuations in prices of recycling materials
Operational and technology risks	• High operational costs and low-profit margins due to competition • Environmental and social risks: For example, in developing countries, CE projects aim at reducing environmental harm, but certain practices (e.g., waste-to-energy) must ensure that air pollution and wastewater are managed, and that community health is also protected. Social risks include ensuring fair wages for informal workers, avoiding child labor, and promoting gender equality—some companies do not always take these seriously.
Regulatory and policy roadblocks	• Varying policies across Asia and the Pacific • Lack of sufficient incentives for circular business models

WHAT CAN ADB DO?

ADB can support by providing loans, loan syndication, equity investments, blended finance, guarantees, and policy engagement.

LINK TO PRESENTATION

Private Sector Perspective on Bankable Projects Supporting Circularity
by Claire Alembik

The Business Case for Refilling

Laarnie Cancio, Cofounder and Managing Director, Back to Basics Ecostore

ABOUT BACK TO BASICS ECOSTORE

Located in Quezon City in the Philippines, Back to Basics (BtB) Ecostore carries eco-friendly products, promotes sustainable consumption, and helps consumers avoid single-use plastics.

Choosing their products

The store's selection criteria are based on their advocacy. They prioritize high-volume staples (e.g., pantry items) and respond to customer requests, giving preference to locally sourced products whenever possible.

Business report

BtB Ecostore has 2,274 customers, 18.4% of which are regular customers. These consist of a combination of close networks, consumers looking for alternative delivery systems, and neighbors who are opting for refillable products. Plastic diversion efforts have led to the avoidance of 106,444 plastic units (excluding sachets), which is equivalent to gallons and other types of containers.

ECONOMIC BENEFITS OF REFILLING FOR CONSUMERS

Customers enjoy savings due to the absence of packaging costs and the convenience of one-stop refills for essentials. However, the cost savings are relative and depend on the consumer's lifestyle or spending power, tying back to the importance of targeting the right market. Refilling also reduces waste, as customers can buy only what they need, avoiding overconsumption and unnecessary packaging.

IMPACT ON COSTS AND PROFITABILITY

There are risks such as spillage and spoilage, and there is an investment required for sealed containers. Additional costs include container cleaning, and the business operates on thin profit margins.

CHALLENGES IN REFILLING INDUSTRY FRAMEWORKS

There is an inconsistent and often lacking supportive regulatory framework for the refilling business model. However, some supportive policies exist, such as single-use plastic bans and incentive programs.

LINK TO PRESENTATION

The Business Case for Refilling
by Laarnie Cancio

TRACK 2.2: DIGITALIZATION AND INNOVATION:
Data Collection and Management

This session presents challenges and successes of collecting and managing data through case studies, and how data can be used to inform circular economy strategies.

RESOURCE SPEAKERS

Miguel Yorro
Business Development, Sustainability, and Product Innovation Lead, Restore Solutions PH

Ana Kumarasamy
Associate Program Officer, Coordinating Body on the Seas of East Asia (COBSEA)

Surbhi Jore
Founder, ASM Global

Digital Evolution of Plastic Recovery: One Sachet at a Time

Miguel Yorro, Business Development, Sustainability, and Product Innovation Lead, Restore Solutions PH

ABOUT RESTORE SOLUTIONS PH

Restore Solutions PH, by Safewater Technologies, is a flexible plastic waste upcycler based in Bulacan. It addresses the Philippines' sachet waste crisis by reimagining flexible plastics, especially single-use sachets, as a renewable resource.

THE RESTORE JOURNEY

Restore Solutions's approach to circularity follows a simple but powerful framework:

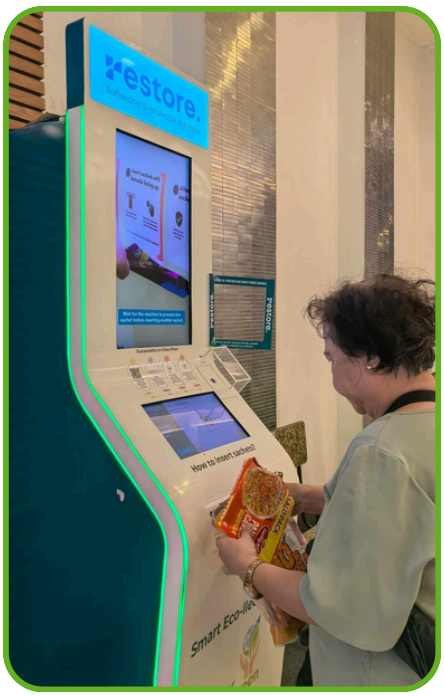
RETHINK:
Community-based collection

RECYCLE:
Waste to boards

REIMAGINE:
Boards to wonder!

DEPLOYING A DIGITAL SOLUTION

Restore developed a smart eco-collection bin, which is a sensor-based machine designed to accept and identify plastic sachets by SKU. The bin gamifies the recycling experience to encourage people to earn points and badges in real time, which can be exchanged for goods or services from partner retailers. The system also captures data on user demographics, participation rates, and behavior, turning everyday individuals into "eco-warriors" while providing brand partners with EPR-compliant traceability and a loyalty-like engagement model.



RESTORE'S REACH AND IMPACT

- Deployment of 5 machines in Metro Manila malls
- Grew to 1,700 registered users
- Over 500,000 clean and dried sachets collected, totaling up to 1.5 metric tons

More than just the numbers, Restore is fostering behavioral change. The community is actively cleaning and segregating sachets before deposit, and users are even collecting sachets from others. While the system was originally designed with younger, tech-savvy users in mind, it unexpectedly resonated more with the older generation—particularly household members who had the time and routine to engage with the bins regularly. Many of them embraced the gamification features, taking pride in collecting and depositing sachets, and rising through the digital ranks of "eco-warriors".

CHALLENGES AND LEARNINGS

High community participation means bins often reach capacity quickly. Another challenge is user misidentification—some people mistake the bin for a parking payment machine, revealing a need for clearer visual design and public awareness, especially for non-tech-savvy users. Still, the response proves that with the right incentives and accessible technology, even low-value waste like sachets can be part of a high-impact circular solution. Restore aims to take sustainability beyond waste management, striving to offer innovative solutions that promote environmental stewardship and drive positive change.

LINK TO PRESENTATION

Digital Evolution of Plastic Recovery: One Sachet at a Time
by Miguel Yorro

Plastic Pollution and Monitoring in the East Asian Seas

Ana Kumarasamy, Associate Program Officer, COBSEA

ABOUT COBSEA

The Coordinating Body of the Seas of East Asia, which is hosted in Bangkok and administered by the UN Environment Programme, leads regional collaboration to protect and sustainably manage the marine environment in the East Asian Seas region. As part of broader multilateral coordination with the Association of Southeast Asian Nations and the Asia-Pacific Economic Cooperation, COBSEA focuses on creating a harmonized, region-wide response to marine litter challenges through science-based, scalable action.

REGIONAL ACTION FRAMEWORK

COBSEA's Regional Action Plan on Marine Litter consists of four key actions:

- Prevent and reduce marine litter from land-based sources
- Prevent and reduce marine litter from sea-based sources
- Strengthen monitoring and assessment
- Create enabling conditions for action, including knowledge sharing, regional coordination, education, and research

MONITORING AND ASSESSMENT

COBSEA partners with CSIRO (Commonwealth Scientific and Industrial Research Organisation) to develop harmonized guidance for national marine litter monitoring. This collaborative effort ensures that data collection is both standardized and tailored for the East Asian region, with the goal of aligning practices across countries. Capacity building is central to this initiative, empowering local teams with the skills and tools needed to conduct reliable marine litter monitoring across diverse environments such as inland areas, rivers, coastal zones, etc.

APPROACH AND METHODOLOGY

Using the CSIRO methodology, marine litter monitoring involves randomized site sampling, 3–6 transects per site, and debris recording via the Open Data Kit mobile app. This framework provides a replicable and accessible model that participating countries can integrate into national programs.

REGIONAL MONITORING OUTCOMES

The collaborative project involved five countries: Cambodia, Malaysia, the Philippines, Thailand, and Viet Nam, covering 1,474 transects across coastal, riverine, and inland sites. It is the first harmonized regional dataset of its kind, offering on-the-ground evidence for targeted action.

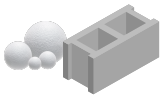
KEY FINDINGS

- Highest debris density was found in coastal areas, except in the Philippines (where currents displaced debris) and Viet Nam (where monitoring was focused in mangrove regions).
- Sandier environments had higher debris presence.
- Residential zones showed significantly more waste accumulation.

Top Items Found

Whole items: Food wrappers (inland and river)

Bottles and caps (coastal)



Fragmented: Polystyrene, brick, and cement

These findings point to the need for targeted cleanup efforts, better waste management systems, and action to address mismanaged land-based waste before it reaches the ocean.

ENSURING CONTINUITY

When current projects conclude, COBSEA will continue advancing marine litter efforts through the MA-RE Design Project, a collaborative initiative with GIZ, World Wide Fund for Nature, and COBSEA. The program will focus on strengthening national systems and ensuring long-term integration of marine litter monitoring into environmental planning across the region.

LINK TO PRESENTATION

Plastic Pollution and Monitoring in the East Asian Seas
by Ana Kumarasamy

Data-driven Decision-making for Circular Economy Strategies

Surbhi Jore, Founder, ASM Global

ABOUT ASM GLOBAL

ASM Global is pioneering the global transformation toward a circular economy by using data as a tool for transparency, trust, and inclusion. In a world where supply chains are increasingly complex, it is critical to understand not only where materials originate and end up, but also who is handling them at every stage. Transparency across the full life cycle of materials has become essential to build trust with consumers, regulators, and the market.

INCLUSIV PLATFORM

ASM developed Inclusiv, a digital platform that provides end-to-end traceability in a highly accessible format. Designed to work across different hardware, operating systems, and supply chain levels, Inclusiv is modular, scalable, multilingual, and affordable. The platform captures critical data at each stage of the product's life cycle, recording what happened, when, where, who was involved, and how it was done.

How it works

- Materials are tagged at origin
- A mobile app records each transaction
- AI modules monitor anomalies
- A dashboard displays insights for compliance, reporting, and credit claims

The result is a digital trail that brings transparency and trust to even the most complex circular systems.

IMPACT IN PRACTICE

In the United States, ASM's platform was adopted by 4Ocean, a company focused on marine plastic recovery. By using Inclusiv, they improved their recovery rate by 20%, gained greater trust from stakeholders, and successfully began selling verified ocean plastic credits, ultimately collecting over 14 million pounds of plastic waste. In the Philippines, PrimeWaste also saw significant improvement, increasing both the recovery rate and value of recovered materials.

EMBEDDING DIGITAL TRUST IN CIRCULAR SYSTEMS

Inclusiv is designed not just for functionality, but for long-term adoption at scale. It incorporates digital guardrails such as strong data privacy protections, minimal computational footprint, and system interoperability, ensuring it can work across diverse contexts without excluding smaller players. By making traceability accessible, ASM empowers supply chain actors of all sizes to participate meaningfully in the circular economy: "Circular economy needs digital traceability and must be inclusive".

LINK TO PRESENTATION

Data-driven Decision-making for Circular Economy Strategies
by Surbhi Jore

TRACK 3.2: DIGITALIZATION OF THE PLASTIC VALUE CHAIN: *Piloting Digital Applications*

This session focused on leveraging digital solutions, including developing an open data platform, to enhance plastic circularity.

RESOURCE SPEAKERS

Angela Aquino
Pasig River Plastics Digital Twin Coordinator (Consultant), ADB

Marios Kostis
Project Engineer - Operational Tools and Digital Initiatives Hub, Seureca

Emilio López Cano
Associate Professor,
Rey Juan Carlos University

Moderated by:
Le Roux Cronje
Technical Lead (Data Governance, Security, and Cybersecurity), Learning and Innovation Division, DT Global Inc.

Piloting of Digital Solutions for Plastics Circularity

Marios Kostis, Project Engineer - Operational Tools and Digital Initiatives Hub, Seureca

REVIEWING DIGITAL SOLUTIONS

Under ADB's regional technical assistance (TA) to reduce plastic pollution, over 200 global and regional digital solutions for plastic circularity were screened and analyzed into a database with various parameters. Most of the solutions focused on processing, as well as several awareness-raising solutions in the United States and Europe; whereas solutions concerning payments are found to be mainly deployed in Southeast Asia.

PILOTING SOLUTIONS IN INDONESIA AND VIET NAM

Further to the review, the TA project also tested digital solutions for plastic waste management in Indonesia and Viet Nam. This was to examine the effectiveness, scalability, and areas for improvement of the solutions. Digital applications and platforms such as Duitin, mGreen, and VECA showed varied success and challenges in user adoption. Digital marketing campaigns using social media and local influencers can cost-effectively raise awareness.

LEVERAGING AI AND DATA ANALYTICS

AI models, like pLitter and CircularNet, can improve waste identification and operations of materials recovery facilities. Data analysis and open data platforms can aid in prioritizing plastic leakage risk areas.

LINK TO PRESENTATION

Piloting of Digital Solutions for Plastics Circularity
by Marios Kostis

The Process of Piloting Digital Applications to Transformation

Angela Aquino, Pasig River Plastics Digital Twin Coordinator (Consultant), ADB

DIGITIZATION, DIGITALIZATION, AND DIGITAL TRANSFORMATION

The evolution of digital technology in waste management systems can be categorized into three distinct yet progressive stages:

DIGITIZATION
The foundational stage, primarily involves the conversion of analog data, such as paper records of waste collection, into a digital format. This represents the most basic level of digital adoption, focusing on data capture and storage.

→

DIGITALIZATION
This stage utilizes digital technologies to enhance and improve existing waste management processes. Examples include employing software like Excel or specialized applications for tracking waste volumes and enabling digital submission of reports through standardized templates.

→

DIGITAL TRANSFORMATION
This represents a paradigm shift, characterized by a complete redesign of waste management systems, services, and decision-making processes. This advanced stage incorporates technologies such as digital twins for modelling plastic leakage and blockchain for enhanced waste traceability.

The path to digital transformation illustrates how digital evolution can move from simple data conversion to completely reimagining waste management systems in a way that promotes inclusivity and efficiency.

LINK TO PRESENTATION

The Process of Piloting Digital Applications to Transformation
by Angela Aquino

Plastic Waste Management Open Data Platform

Emilio López Cano, Associate Professor, Rey Juan Carlos University

ABOUT THE OPEN DATA PLATFORM

The Plastic Waste Management Open Data Platform is a comprehensive knowledge archive network or CKAN-based system designed to manage marine plastic waste data for Indonesia. Its core functions include data aggregation, analysis, and sharing among various stakeholders, with a specific focus on enabling scalable data management and aggregating pilot data. While tailored for the country, this pilot showcases the design and implementation of open data platforms for efficient plastic value chain management, including critical success factors and practical recommendations, that could be replicated in other parts of the region.

THE OPEN DATA PLATFORM COMPRISES THE FOLLOWING KEY FEATURES:

CKAN Platform

An open-source system with web interface for structured/unstructured data; benefits government through transparent data sharing

PostgreSQL Database

Stores structured pilot data (CSV, JSON) with metadata management capabilities, serves private sector for EPR compliance tracking, and helps informal sector through data integration via the Duitin app for waste pickers in Jakarta and Surabaya

Visualization

Provides government with real-time policy insights and raises community awareness; and offers three visualization options: (i) configured visualizations in the platform; (ii) API for data reuse; and (iii) R/Shiny and PowerBI dashboards for generic exploration

Scalability

Features Docker/Linux deployment; supports over 1 million data points with versioning for updates; and is designed to be scalable for national rollout and future IoT/AI integration

LINK TO PRESENTATION

Plastic Waste Management Open Data Platform
by Emilio López Cano

TRACK 1.3: ENABLING CONDITIONS: *Aligning Circular Economy Strategies with Sustainable Development Goals*

This session explores the factors crucial for applying a CE approach that can contribute to achieving the Sustainable Development Goals (SDGs).

RESOURCE SPEAKERS

Eileen Ortega-Gamo
Director (Community Bamboo Development and Carbon Removal), Rizome Philippines

Babur Wasim Arif
Agriculture and Natural Resources Specialist (Consultant), ADB

Karma Yangzom
Principal Environment Specialist, Climate Change, Resilience, and Environment Cluster, ADB

James Baker
Senior Natural Resources and Agriculture Specialist, Agriculture, Food, Nature, and Rural Development Sector Office, ADB

Circular Economy and Decarbonization

Eileen Ortega-Gamo, Director (Community Bamboo Development and Carbon Removal), Rizome Philippines

Rizome Philippines is actively building a holistic bamboo-based value chain across the Philippines. The value chain starts with bamboo propagation and community-managed cultivation that leads to the sustainable harvest of mature bamboo for use as engineered bamboo construction materials.

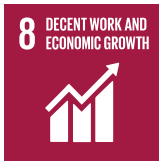
CARBON SEQUESTRATION AND COMMUNITY-LED DIGITAL MEASUREMENT

The project aims to achieve greenhouse gas (GHG) emission reductions as a result of the carbon sequestration attributes of giant bamboo. GHG emission reductions will be calculated based on both aboveground and belowground biomass. Since carbon is an invisible asset, technology-driven data collection is critical for demonstrating impact and generating verifiable carbon credits.

This empowered the Indigenous Peoples (IP) community to lead the digital measurement through precision data collection; measurement, reporting, and verification (MRV) for transparency; and auditability and confidence on the data. The data collected by the community has become the evidence of the work that they do which creates a sense of ownership. It made the community understand the value of carbon sequestrations and taking care of bamboo as an intergenerational responsibility.

CIRCULAR ECONOMY AND DECARBONIZATION

The CE approach presents a means to decouple economic growth from resource depletion and environmental degradation, which can help advance the SDGs. In the case of Rizome, circularity and decarbonization efforts are able to contribute to these SDGs:

	The IP community was able to build their own houses from the salaries they received.
	The IP community can afford food for their families, buying one sack of rice compared to one cup of rice before.
	Children are able to go to school because of road development. Workers were able to invest in motorcycles which they can use to bring their kids to school.
	Through this project, more women are employed compared to men in the factories in this industry.
	The steady and reliable income paid off debts and increased families' purchasing capacities. It also provided employment for the community members (both graduate and undergraduate).
	The planting and maintenance of giant bamboo plants have enabled a significant amount of carbon dioxide sequestration.
	The establishment of the bamboo working forest and native trees has rehabilitated degraded lands, enhancing landscape connectivity, providing habitat to biodiversity, and strengthening ecosystem resilience.

LINK TO PRESENTATION

Circular Economy and Decarbonization
by Eileen Ortega-Gamo

Circular Economy and Air Quality

Karma Yangzom, Principal Environment Specialist, Climate Change, Resilience, and Environment Cluster, ADB; and
Babur Wasim Arif, Agriculture and Natural Resources Specialist (Consultant), ADB

SDGS RELATED TO AIR QUALITY

The link between air quality (AQ) and the SDGs can be seen both directly and indirectly. SDGs 3 (Good Health and Well-Being) and 11 (Sustainable Cities and Communities) are directly linked, while SDGs 7 (Affordable and Clean Energy), 9 (Industry, Innovation, and Infrastructure), 12 (Responsible Consumption and Production), 13 (Climate Action), and 17 (Partnerships for the Goals) are indirectly linked. Air pollution and air quality are mentioned in the indicators of SDGs 3 and 11. Based on current data, none of Asia's megacities have reached the healthy air quality standard or target set by the World Health Organization; however, gradual improvement has been recorded from 2014 to 2022.

Out of the SDGs linked to air quality, SDGs 3 and 11 mention air pollution and air quality in their indicators.

CIRCULAR ECONOMY AND AIR QUALITY

There is a significant relationship between CE and AQ. The more circular the economy is, the better for the air quality. The shift on CE will lower industrial emissions, reduced landfill emission, burning of waste, and transport emissions. The more we reduce waste generation, the more we reduce air pollution and improve the air quality.

CASE STUDY
Crop Residue Management in Punjab Province, Pakistan

- According to data, harvesting months in Punjab showed increased incidents of burning crop residues contributing to a thick particulate matter (PM) filled smog that affects the air quality of the province.
- The main reasons for farmers burning crop residues are: (i) harvest methods leaving extra stalks in fields, (ii) poor access to equipment and/or machinery, (iii) tight seeding schedule, and (iv) lack of resources and high labor costs.
- ADB invests in this system to minimize crop waste burning. ADB worked with the government to upgrade the harvesting equipment and machines, which led to reduced harvest loss and prompted farmers to burn the stalks less. There is still a need to develop the value chain of these straws and use advanced equipment for a more efficient process. Supportive policies and financing to shift from conventional fuels to biomass-based energy are required.

LINK TO PRESENTATION

Circular Economy and Air Quality
by Karma Yangzom and Babur Wasim Arif

Applying Circular Economy Approaches for Responsible Consumption and Production

James Baker, Senior Natural Resources and Agriculture Specialist, ADB

REGIONAL SDG PROGRESS SINCE 2015

Nature is a critical part of the SDGs. Data showed that SDG 13 has regressed and SDG 12 has made little progress. This is attributed to the pandemic. In the indicators of SDG 12, most of the indicators are flagged to accelerate progress to achieve targets. This calls for a more holistic and multi-sectoral approach in addressing the issues in conjunction with circular economy. It should balance economic, social, and environmental values.

HOLISTIC APPROACH FOR RESPONSIBLE CONSUMPTION AND PRODUCTION

Long-term results, projects, and programs must consider social, economic, technological, and environmental perspectives. At the micro or project level, CE provides design approaches through which projects and activities can deliver local, city, and provincial sustainability improvements. At the macro or program level, CE provides a framework through which multiple projects and sectoral activities can be effectively linked to deliver national and regional sustainability improvements.

CE ENTRY POINTS ACROSS ADB SECTORS

The systems thinking embedded in CE provides the framework, language, and metrics to design, articulate, and deliver multi-sectoral solutions through ADB's sector groups, which support the larger national, regional, and global systems. By applying this framework, the One ADB approach is strengthened and ensures integrated solutions in ADB investments and programs.

Marine Plastics Pollution

CE is often associated with plastics, from avoidance and substitution to waste management and recycling. ADB's Promoting Action on Plastic Pollution technical assistance works across ADB sectors to address marine plastic pollution and support developing member countries as the Global Plastics Treaty is ratified.

Yangtze River Economic Belt

The Yangtze River Economic Belt Jiangxi Ecological Civilization and Circular Economy Project is an example of an ADB investment that facilitates circularity, specifically through the entry point of agricultural plastics. This project capitalizes on multi-sectoral solutions for sustainable rural development and climate-adapted food supply.

LINK TO PRESENTATION

Applying Circular Economy Approaches for Responsible Consumption and Production
by James Baker

TRACK 2.3: DIGITALIZATION AND INNOVATION:
Urban and Rural Development

The session explored how circular economy principles are applied to waste management, food systems, and the fashion industry to support urban and rural development.

RESOURCE SPEAKERS

Joanna Mae Norcio-Ricafort
Public Services Officer IV, Department of Public Services, City Government of Manila (Philippines)

Toko Kato
Senior Food and Nutrition Specialist, Agriculture, Food, Nature, and Rural Development Sector Office, ADB

Jamie Naval
Circularity Manager, Anthill Fabric Gallery

City of Manila's Best Practices in Promoting Circular Economy

Joanna Mae Norcio-Ricafort, Public Services Officer IV, Department of Public Services, City Government of Manila

ABOUT THE CITY OF MANILA

The City of Manila has a population of 1,846,513 and is the most densely populated city in the world. According to a Waste Analysis and Characterization Study in 2024, 0.938 kilograms of waste is generated per person daily. Out of the total waste, nearly half is biodegradable waste.

ADDRESSING THE WASTE PROBLEM

The City of Manila has been implementing several CE initiatives addressing different sectors. For public awareness and education, the city has actively conducted information, education, and communication campaigns on Republic Act 9003 (Ecological Solid Waste Management Act) targeting barangays, schools, and businesses to promote waste segregation, proper waste disposal, and recycling practices.

For waste management infrastructure, Manila established its first City Materials Recovery Facility (CMRF) in 2022, located inside the Manila Zoological and Botanical Garden. The CMRF includes composting facilities that process biodegradable waste, as well as a recycling facility that can produce various items out of recycled and upcycled plastics, such as bags, plant pots, and benches. A mobile materials recovery facility, donated by the United Nations Development Programme, allows waste processing in different areas and expands access to recycling solutions to reach more barangays in the city.

CIRCULARITY IN PRACTICE

In support of small enterprises and community-based circular programs, the City of Manila launched initiatives such as *"Kolek, Kilo, Kita Para sa Walastik na Maynila," "Aling Tindera: A Waste to Cash* Program", and the *"ALASKAlikasan* Wrapper Redemption Program". These programs incentivize residents to collect and sell plastic waste, turning waste into income. Collectively, these efforts diverted significant amounts of plastic waste: 800 metric tons of flexible plastics from Kolek, Kilo, Kita; 834,404 kilograms (kg) of plastics from Aling Tindera; and 80,101 kg of flexible plastics from ALASKAlikasan.

CHALLENGES AND OPPORTUNITIES

Despite these successes, the city government still faces challenges, such as the sheer volume of waste generated by nearly 2 million individuals, as well as ensuring consistent community participation in the above programs, and the sustainability of waste-to-cash programs. Additionally, scaling technical infrastructure and securing continuous funding for operations and expansion are ongoing hurdles.

Manila plans to further scale up its efforts through the Plastic Smart Cities Project and the official adoption of the Manila City Plan of Action on Marine Litter. The city also launched the Manila City Action Plan for Plastic Circularity, aiming to further institutionalize plastic circularity by improving waste infrastructure, data collection and monitoring, and institutionalizing informal waste sector groups. Together, these efforts will expand collection systems, streamline policies, and most notably, establish a City Environment and Natural Resources Office.

LINK TO PRESENTATION

City of Manila's Best Practices in Promoting Circular Economy
by Joanna Mae Norcio-Ricafort

Circular Economy for Better Nutrition and Sustainability

Toko Kato, Senior Food Security and Nutrition Specialist, ADB

CHANGING THE CURRENT LINEAR FOOD SYSTEMS

There is an urgent need to transform food systems in Asia and the Pacific by linking CE, biodiversity, and nutrition. The region faces severe food insecurity, affecting 418 million people. Food systems with linear production models are a major driver for global challenges such as climate change, biodiversity loss, and health disparities. Nutrition is not a standalone issue but a crosscutting outcome that is critical for human capital development, climate resilience, and gender equality.

PROMOTING CIRCULARITY IN AGRICULTURE

To address these challenges, ADB has introduced integrating CE principles into both rural and urban food systems, through regenerative agriculture, local nutrient recycling (through composting and water reuse), and using technologies such as apps and smart cold chains to reduce food loss and waste. Community-centered solutions like backyard livestock, women- and youth-led food enterprises, and digitized food distribution help strengthen resilience while improving livelihoods and nutrition.

Some examples of CE solutions for better nutrition outcomes are found in India, Nepal, and Sri Lanka, where there have been initiatives on regenerative agriculture to restore soil health and improve dietary diversity, developing cold chain and logistics for minimizing food waste and nutrient preservation, and closing loops for sustainable, nutrition-sensitive food systems. These interventions not only promote healthy diets and reduce environmental impact, but also improve livelihoods for women and marginalized groups.

ADB's commitment involves scaling up nutrition-sensitive investments, incorporating nutrition into country programs, developing tracking systems, and leveraging blended financing models. These CE-aligned investments serve as a critical tool to transform food systems, support local economies, and realize healthier and more resilient communities. Nutrition is not just central to tackling food insecurity but also drives sustainability in the region.

LINK TO PRESENTATION

Circular Economy for Better Nutrition and Sustainability
by Toko Kato

Weaving Textile Waste Towards Circularity

Jamie Naval, Circularity Manager, ANTHILL Fabric Gallery

FASHION AND POLLUTION

The fashion industry is the second largest polluter in the world. Globally, 92 million metric tons of textile waste are generated annually, and yet only 1% is recycled. About 60% of all new clothing is made from plastics, and 500,000 metric tons of microplastics from textile waste enter the oceans. In the Philippines, 267,111 tons of textile waste are produced each year.

267,111 tons of textile waste equate to 427.4 Olympic-size pools.

ABOUT ANTHILL FABRIC GALLERY

ANTHILL, which stands for Alternative Nest and Trading /Training Hub for Indigenous or Ingenious Little Livelihood seekers, is a social and cultural enterprise in the Philippines committed to preserving local weaving traditions and creating sustainable livelihoods by providing communities fair trade pricing, and access to market and training programs.

Their circularity program started in 2016 when they recognized the need to address textile waste within their own supply chain. What began as an effort to manage scrap fabrics from production evolved into a zero-waste program, called Zero Waste Weaves, that incorporates both post-industrial and post-consumer textile waste as weft in their weaves. Since then, ANTHILL has diverted more than 24,000 kilograms of textile waste from landfills.

ANTHILL's circularity program operates in collaboration with various stakeholders.

One circular community partner, *Hablonan ni Lauriana* in Argao, Cebu, is engaged in turning textile waste into zero-waste weaves, and has seen a 275% increase in their income. These weaves are made by incorporating fabric scraps into traditional handwoven textiles, providing both economic benefits and cultural preservation.

RESPONSIBLE RESOURCE USE

For ANTHILL, their circularity approach helps to safeguard the planet for future generations, while preserving weaving and cultural heritage. By gathering textile donations and fabric scraps, both post-industrial and post-consumer textile waste, they are able to create unique fabrics that are crafted into creative garments, household items, and corporate giveaways. Their different circular programs combine into a sustainable supply chain where waste becomes a resource, rather than a problem.

ANTHILL is also developing scalable community-driven models like the Barrio Circularity Hub, a closed loop system where waste is reclaimed, recycled, and reimagined. Along with circularity, the hub will emphasize collaboration (with other businesses) and community (uplifting women and artisans). This will help divert waste from landfills, support income generation, encourage environmental responsibility, and empower communities.

LINK TO PRESENTATION

Weaving Textile Waste Towards Circularity
by Jamie Naval

TRACK 3.3: DIGITALIZATION OF THE PLASTIC VALUE CHAIN: *Data Governance Framework*

This session explored the "what" and "how" of data governance to facilitate smarter decisions, stronger compliance, and scalable impact, featuring insights from case studies in Indonesia and Viet Nam.

RESOURCE SPEAKERS

Le Roux Cronje
Technical Lead (Data Governance, Security, and Cybersecurity), Learning and Innovation Division, DT Global Inc.

Hyunjeong Jin
Associate Program Officer on Marine Pollution, Coordinating Body on the Seas of East Asia

Moderated by: Vincent Aloysius
Team Leader and Circular Economy Specialist, Seureca-Veolia

Data Governance Framework for Plastic Waste Management

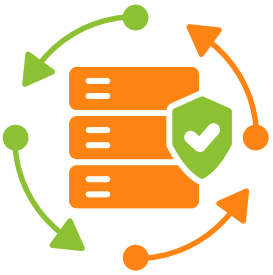
Le Roux Cronje, Technical Lead (Data Governance, Security, and Cybersecurity), DT Global Inc.

WHAT IS GOVERNANCE?

Governance is a means to achieving your objectives. Data governance is not an end in itself but a means to enable better decision-making, compliance, and operational efficiency in plastic waste management. Without proper governance, data becomes fragmented, inconsistent, and unreliable.

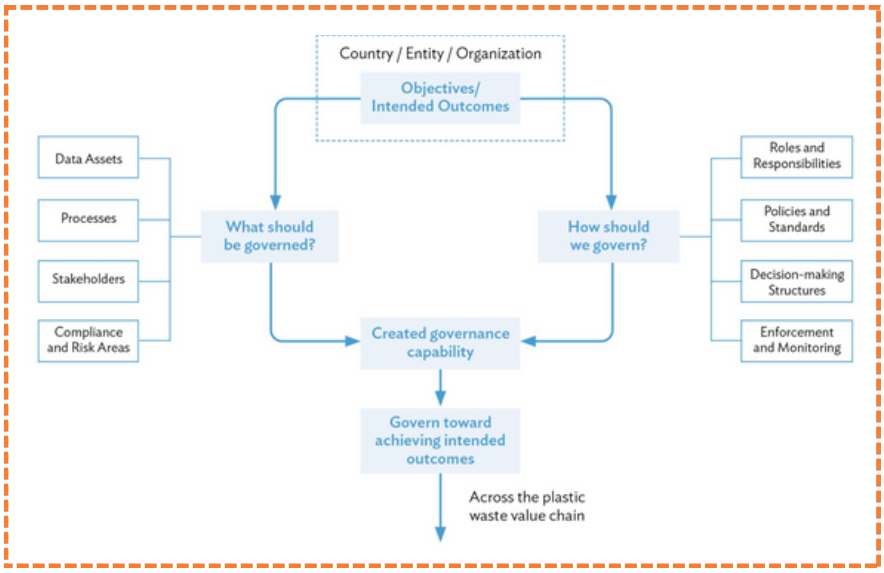
CURRENT DATA GOVERNANCE CHALLENGES

- Fragmentation across different legal frameworks, data methods, and reporting formats
- Interoperability issues with siloed national systems
- Capacity gaps in agencies, with regards to tools and training
- Limited data sharing due to trust and transparency concerns



ESTABLISHING A DATA GOVERNANCE FRAMEWORK

To manage plastic waste effectively, data collection processes and practices must be set in place. This enables governance that ultimately improves operations and addresses pollution. A data governance framework has two fundamental questions: (i) What should be governed? Identifying the scope, assets, or domains that require oversight, and (ii) How should it be governed? Putting the mechanisms and policies for oversight and control.



A MODEL FOR INDONESIA AND VIET NAM

From the framework, a data governance operating model was developed under ADB's regional technical assistance for plastic pollution reduction. This model defines clear roles and responsibilities among key stakeholders, such as the national and regional government agencies, industry representatives, and communities. It also establishes mechanisms for setting objectives, managing risks, and monitoring performance. The model is guided by the following:

Governance principles

The data governance framework is comprised of eight key governance principles: consistency, accountability, transparency, security, compliance, data quality, interoperability, and sustainability. These are aligned with COBIT (Control Objectives for Information and Related Technologies) and DAMA (Data Management Body of Knowledge) frameworks, integrating global best practices with country-specific requirements.

Operating model structure

The operating model is structured across three distinct levels: (i) a strategic level ensures alignment with national policy and facilitates high-level decision-making, (ii) the tactical level is responsible for regional coordination, and (iii) the operational level focuses on local data collection and management.

LINK TO PRESENTATION

Data Governance Framework for Plastic Waste Management
by Le Roux Cronje

Strengthening Data Governance to Support Regional Action on Marine Litter in the East Asian Seas

Hyunjeong Jin, Associate Program Officer on Marine Pollution, Coordinating Body on the Seas of East Asia (COBSEA)

SOLUTIONS AND FRAMEWORKS

Marine litter is a transboundary issue that cannot be solved by individual countries alone—it requires coordinated regional actions. COBSEA has developed several solutions and frameworks to address marine litter. These include the Regional Action Plan on Marine Litter, which seeks to prevent and reduce marine litter from land- and sea-based sources, and the Regional Guidance on Harmonized National Marine Litter Monitoring Programmes. Additionally, a Regional Assessment of Marine Litter initiative is underway, encompassing various East Asian countries.

Marine litter is a transboundary issue that cannot be solved by individual countries alone.

DATA SYSTEM REQUIREMENTS

Key areas of focus include standardizing data collection through defined taxonomies and quality standards, ensuring data security and regulatory compliance via encryption and privacy frameworks, and enabling data integration and sharing through standardized protocols and API-driven integration. Integration with the Global Plastics Hub (under the United Nations Environment Programme) will ensure alignment of regional efforts with broader global initiatives.

FUTURE DIRECTION

The focus moving forward will be on strengthening regional data frameworks that are aligned with global efforts. This includes developing shared dashboards and metadata standards, while also supporting national innovations among member countries. The ultimate goal is to build interoperable and transparent data ecosystems, transitioning from fragmented reporting to coordinated action.

SUMMARY OF OUTCOMES FROM THE TABLE DISCUSSIONS

The discussion highlighted several key barriers and potential solutions for harmonizing plastic waste data across countries and sectors in Southeast Asia:

MAJOR BARRIERS

- Stakeholders interpret data differently, leading to varied understanding of needs.
- Lack of standardized data formats and collection methods across municipalities and the responsibility for organizing data harmonization is undefined.
- Fragmented data systems across agencies and organizations working in the same locations. A wide diversity exists in data infrastructure, frameworks, and governance.
- Challenges in collecting data from the informal sector and households (e.g., given the 1,488 municipalities in the Philippines).
- Limited infrastructure and capacity for data collection, especially at the grassroots level.
- Low implementation rates of existing systems (below 50% in some cases).

POTENTIAL SOLUTIONS

- Development of harmonized policy frameworks for data governance
- Implementation of simplified initial approaches (e.g., Indonesia's SIPSN platform)
- Standardization of reporting cycles and frequencies
- Focus on high-frequency data collection rather than point-in-time data
- Starting with simple categorizations (e.g., EPR implementation with just rigid and flexible plastics)
- Building on successful pilot projects and centers of excellence
- Capacity-building initiatives (e.g., Viet Nam's partnership model)

LINK TO PRESENTATION

Strengthening Data Governance to Support Regional Action on Marine Litter in the East Asian Seas
by Hyunjeong Jin

SIDE EVENT: Community-Driven Circular Solutions: The Eco-Ikot Center Model

Hosted by the Communities Organized for Resource Allocation or CORA, this session spotlighted their Eco-Ikot Center (EIC) as a community-based CE solution that empowers women, promotes waste reduction, and creates livelihood opportunities.

SEGMENT 1: THE PROBLEM WITH PLASTICS

- April Relox, Women Champion from Barangay 128, shared that improper plastic disposal and lack of awareness were major concerns in her community. Since the EIC was launched, visible reduction in plastic waste has been observed due to education and behavior change.
- Barangay Councilor Wendy Cañeda noted that past waste programs often failed because these were externally imposed and unsustainable. The EIC stood out because it was integrated into community life.
- Hannah Dela Cruz, Sangguniang Kabataan (youth council) Chairperson from Barangay La Huerta, stressed the disconnect between awareness (especially online) and real-world action. She emphasized the need for infrastructure, such as materials recovery facilities and collaboration with city governments to enable youth to act effectively.
- Jonathan Co, Managing Director of Sentinel Upcycling Technologies Inc., added that punitive approaches do not lead to real systems change; instead, a mix of incentives and accessibility is key to circularity.

WHAT IS AN ECO-IKOT CENTER?

CORA's Eco-Ikot Center (EIC) is a replicable, community-based model for scaling up circular economy initiatives in high-risk, low-resource communities. As plastic pollution continues to threaten the environment, public health, and local economies in Asia and the Pacific, the EIC stands as an innovative, people-powered approach to waste reduction, inclusive development, and behavioral change.

SEGMENT 2: ECO-IKOT CENTER — CIRCULAR ECONOMY DEFINED

- Aiyan Montoya, EIC Project Manager, shared that the model is built on collaboration, not competition. Its circular approach is driven by strong community engagement, partnering with end-of-life processors, junk shops, livelihood groups, and local stakeholders. The center also serves as a hub for learning through social and behavior change (SBC) campaigns and community activation initiatives.
- April and Hannah both highlighted how residents, especially women and youth, now see waste as valuable and are more proactive in segregating and reducing plastic.

SEGMENT 3: FUTURE FORWARD, CALL TO ACTION

- Jonathan encouraged future partners to consider green procurement policies, localized education, and understanding context before introducing technologies like bioplastics.
- Wendy advocated for local government units to integrate EIC-like models into their barangay development plans to ensure continuity.
- Aiyan closed with a vision for growth: expansion of Eco-Ikot Centers, investing in training and SBC campaigns, and strengthening community-powered infrastructure. Strong commitment and investments from partners, donors, and local government units—financially, technically, and institutionally—are key to maximizing shared resources and achieving sustainable impact.

INTERACTIVE ENGAGEMENT: "RACE TO RECYCLE" GAME

Participants took part in a fast-paced recycling game facilitated by CORA's Circular Center Women Champions. Volunteers were challenged to sort waste correctly under time pressure, with women auditors inspecting accuracy—highlighting real-life roles of EIC women in segregation and quality control.

CALL TO ACTION

- ***Build EIC across cities and barangays in the Philippines, and Asia and the Pacific.***
- ***Integrate EIC into corporate social responsibility; environment, social, governance; and Extented Producer Responsibility initiatives to meet waste recovery and social impact goals.***
- ***Collaborate on SBC campaigns that promote proper waste management, especially among youth and informal sectors.***
- ***Support technology integration, such as the upcoming Eco-Ikot mobile app and scaling toward a self-sustaining social enterprise model.***

LINK TO PRESENTATION

CORA and the Eco-Ikot Center Journey
by Antoinette Taus

PLENARY SESSION 2:
Pathways to Circular Resilience

The closing panel highlighted the importance of mobilizing different stakeholders for a resilient circular economy.

Gender Equality in Circularity

Jinha Kim, Gender Specialist (Climate Change), ADB

DOWNLOAD PRESENTATION HERE

CLIMATE IS NOT GENDER-NEUTRAL

Climate impacts are experienced differently based on gender. In many countries and sectors, women and girls are the ones who sort household waste, reuse goods, collect water, and care for dependents, especially during extreme heat or extreme weather events.

GENDERED DIMENSIONS OF RESILIENCE

Women are more exposed to climate-related shocks due to their high representation in frontline and informal sectors. Women have limited access to resources as they often face barriers to land, finance, technology, services, and decision-making. Women-led enterprises tend to lack social protection, increasing vulnerability during disruptions.

WOMEN IN THE CIRCULAR ECONOMY

Women are often excluded from decision-making and their contributions are overlooked, particularly as sectors formalize. Existing policies are frequently gender-blind, missing opportunities to address these disparities.

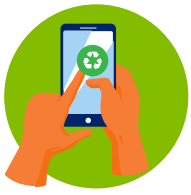
SOLUTIONS TO BRIDGE GAPS AND UNLOCK POTENTIAL

Address existing barriers to women's participation

Women are already contributing significantly to circular practices, particularly within the household. These contributions, such as sorting waste, preserving food, and managing water, often go unrecognized. A key step is to formalize this work and acknowledge the value it brings to community resilience and circular systems.

Increase women's involvement in green and circular jobs

Designing inclusive training means accounting for the needs of mothers and caregivers. There is also a need to highlight and support women-led startups, particularly in areas like eco-textiles, food systems, and recycling innovations.



Unlock new opportunities through digital transformation

Digital tools offer pathways for women to access new opportunities, but many still lack the skills or access needed to participate fully. Strengthening digital literacy, such as using mobile apps and digital platforms, can help women build and grow businesses.

SECTORS OF IMPACT FOR WOMEN IN THE CIRCULAR ECONOMY

Several sectors offer strong potential for women's leadership in the circular economy. In recycling, repair, and reuse, women can lead businesses focused on reducing waste and remanufacturing materials. In garments and textiles, women-led enterprises can drive the adoption of sustainable and recyclable materials. In waste management, women entrepreneurs can play a key role in developing effective systems for reduction, collection, and recycling. These sectors not only present economic opportunities but also reinforce the importance of inclusive climate action.

> **Building resilience means placing women at the center of solutions.**

Informal Waste Workers

Dian Kurniawati, Founder of PT Tridi Oasis Group, and Vice President and Director of PT Alba Tridi Plastics Recycling Indonesia

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WHO'S LEADING THE CIRCULAR ECONOMY?

The informal sector is the true backbone of the circular economy. In Indonesia, more than 60% of recyclable plastic waste is collected by informal workers, yet they remain the most vulnerable and least recognized actors in the value chain.

ABOUT ALBA TRIDI

Alba Tridi Plastics Recycling Indonesia operates a plastic recycling plant in Kendal Industrial Park, producing 36,000 tons of recycled PET bottles annually, sourced exclusively from within Indonesia. The company oversees the full cycle: sourcing, washing, extrusion, and sales. The business is supported through capital investment from the Alba Group, financing via ADB's blue loan, and local government partnerships in permitting and community awareness. A core part of the model includes engaging informal waste workers across the value chain.

Workers recycle PET plastic bottles at Tridi Oasis. The plastic bottles will be processed into PET flakes that can be used to manufacture packaging and textiles (photo by PT Tridi Oasis Group).

UNDERSTANDING THE INFORMAL SECTOR

The recycling chain begins with household waste, when waste pickers collect materials (Tier 5) and sell them to junk shops (Tier 4), who separate and prepare them for aggregators (Tier 3). These aggregators sort by material type and sell to recyclers (Tier 2), who then supply post-consumer recycler plastics providers (Tier 1). Tiers 3 to 5 are largely informal—workers lack access to health and social protections and legal recognition.

WHY INFORMAL WORKERS MATTER

Globally, an estimated 20 million informal workers, including 3.7 million in Indonesia, contribute to the collection of recyclable materials. Their labor sustains circular systems, yet they operate under unsafe, low-income conditions, without health insurance or income security. Many face gender-based disparities, with women often occupying unpaid or underrecognized roles in sorting and cleaning. Most brands do not trace the origins of recycled plastics, further obscuring the labor conditions behind supply chains.

Key challenges faced:

- Low and unstable income
- No access to health insurance or social security
- High exposure to pollution and unsafe work conditions
- Gender imbalance, many women in sorting/cleaning, unpaid, or invisible roles
- Exclusion from formal frameworks like the Extended Producer Responsibility (EPR) scheme, where informal workers are not recognized as eligible participants

What governments and institutions can prioritize:

- Access to social protection: Enable mobile-based enrollment into national health insurance schemes.
- Financial literacy and inclusion: Partner with fintech companies to offer micro-savings and emergency fund options.
- Fair pricing and income security: Establish baseline pricing mechanisms for key recyclable materials and use tech to support price-tracking tools.
- Policy recognition in EPR: Formally register waste workers as eligible collectors in EPR systems.
- Occupational health and safety: Invest in PPE kits, sorting tools, and sanitation infrastructure.
- Capacity building and organizing: Support training on sorting standards, material quality, and microenterprise skills.

“Informal waste workers have helped advance the circular economy. We need to prioritize them more in investment and build policies that are not just inclusive, but empowering.

Indigenous Peoples and the Circular Economy

Maria Cleto, Senior Safeguards Specialist (Social), ADB

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WHO ARE INDIGENOUS PEOPLES?

Indigenous Peoples (IPs) self-identify as distinct cultural and social groups with strong connections to geographically specific areas and natural resources. They uphold customary institutions, cultural practices, economic and political systems, unique laws and regulations, and often speak a distinct language or dialect.

Indigenous Peoples and the circular economy framework

Indigenous communities have long embodied CE principles through traditional knowledge systems. These include a deep respect for resource cycles and natural regeneration limits, along with practices that maintain ecological balance. Many communities live by zero-waste principles such as returning animal bones to the land, and participate in communal, non-extractive, and community-based economies. As custodians of biodiversity, IPs contribute to the maintenance of diverse ecosystems through land management and other sustainable practices. Their worldviews are shaped by a responsibility to future generations and an awareness of ecosystem-wide impacts. There is also a growing space for cultural revitalization and innovation, where Indigenous entrepreneurs integrate traditional knowledge into modern circular business models, including reviving food systems.

EXAMPLES OF INDIGENOUS PRACTICES RELATED TO CIRCULARITY

Apatani (India):
Manage gravity-fed irrigation systems and integrated rice-fish farming, promoting soil fertility and protein-rich food security

Santal (Bangladesh):
Maintain seed banks (rice, millet, vegetables), practice collective farming, and use organic inputs such as compost, ash, and cow dung to improve soil fertility

Kankanaey (Philippines):
Raise livestock to consume kitchen waste and provide fertilizer for farming

INDIGENOUS ENGAGEMENT

Meaningful Indigenous engagement requires more than participation, it requires collaboration grounded in the 4Rs:

- ***Respect: Understand history and accept the possibility of hearing "no"***
- ***Relevance: Ensure the project aligns with community perspectives***
- ***Reciprocity: Projects must benefit the community***
- ***Responsibility: Consider potential harm and protect the community's well-being***

MEANINGFUL AND EFFECTIVE ENGAGEMENT

Engagement must include regular consultation and the continuous seeking of feedback. Projects must secure free, prior, and informed consent and be guided by cultural competency. Engagement should include all segments of the community and begin at the earliest stages of project development. Relationship-building is critical and takes time. Support for capacity building is also necessary; this includes providing resources, training, and conflict resolution mechanisms.

MOVING FORWARD WITH THE ADB ENVIRONMENTAL AND SOCIAL FRAMEWORK

Environmental and Social Standard 3: Resource Conservation and Pollution Prevention
This requires resource conservation, pollution prevention, and circular economy integration.

Environmental and Social Standard 7: Indigenous Peoples
Projects must uphold full respect for Indigenous identity, dignity, human rights, livelihood systems, and cultural uniqueness, as defined by Indigenous Peoples themselves.

Indigenous communities have long embodied CE principles through traditional knowledge systems. These include a deep respect for resource cycles and natural regeneration limits, along with practices that maintain ecological balance.

Moderated by: James Baker

Senior Natural Resources and Agriculture Specialist, ADB

How do we go beyond [surface-level] details of women, Indigenous Peoples, and informal workers?

- For women, this means inviting them into conversations and listening carefully, with an emphasis on co-designing projects alongside them.
- For informal workers, the approach must include direct engagement: visiting their work environments, seeing their day-to-day life, understanding their challenges, and recognizing that waste work is often a last resort, taken because of a lack of job opportunities in their communities.
- For Indigenous Peoples, there needs to be a fundamental shift in mindset, moving past the fear that engagement will delay processes and instead recognizing the value added by working with these marginalized groups.

How can Indigenous knowledge be captured and applied to sustainability?

Capturing Indigenous knowledge must be done with consent. Communicate the risks and benefits of sharing knowledge and ensure Indigenous communities fully understand and agree to how their practices are integrated into projects.

Describe a scenario where you can create a process that could empower women to provide better feedback.

Creating safe and meaningful feedback channels requires understanding women's daily routines, including caregiving responsibilities. Schedule activities at times they are available and to be intentional in choosing interviewers as some women may not feel comfortable speaking with certain individuals, especially in male-dominated spaces.

What does the future of inclusivity look like?

There is great potential for women to lead in digitalization and innovation, especially among the younger generation. Many are eager to contribute but lack the tools and funding needed to scale their efforts. Policies such as EPR must recognize and include informal workers to truly uplift them. For Indigenous communities, frameworks like the ADB Environmental and Social Framework will support collaboration while ensuring safeguards are in place. Ongoing engagement with IPs is necessary, as they have significant contributions to offer.

CLOSING REMARKS

Yoko Watanabe
Director, Environment, ADB

- Circular economy is not driven by technology alone; it is driven by people. The call is to take the momentum from this forum to the next level.
- Since launching the ADB Healthy Oceans Action Plan in 2019, ADB has started addressing circular economy issues more systematically. Today, circular economy is institutionalized under the Environment Action Plan, particularly within the Pollution Control and Circular Economy pillar.
- Moving forward requires a focus on better resource use and efficiency, as well as on recycling and regeneration. It is also essential to revisit and mobilize the financial systems supporting circularity. This includes tools like bonds and public-private partnerships, which ADB aims to nurture, implement, and scale. There is clear interest in investment and financing, and ADB can leverage its existing experience from climate-related work to support circular economy initiatives.
- An integrated approach is necessary. Promoting a circular economy must involve not only the environment sector, but also other sectors such as water, urban development, and agriculture. The goal is to work and learn together across countries, and build a common strategy that creates broader, more sustainable impact.
- This forum has shown that governments, civil society, women's groups, Indigenous Peoples, and communities are all coming together to collectively address the circular economy.

"...Even with the many solutions that are out there, we must come full circle and start with ourselves. Action on the circular economy begins with each and every one of us."