



# Bio-Circular Economy in the Asia-Pacific Region

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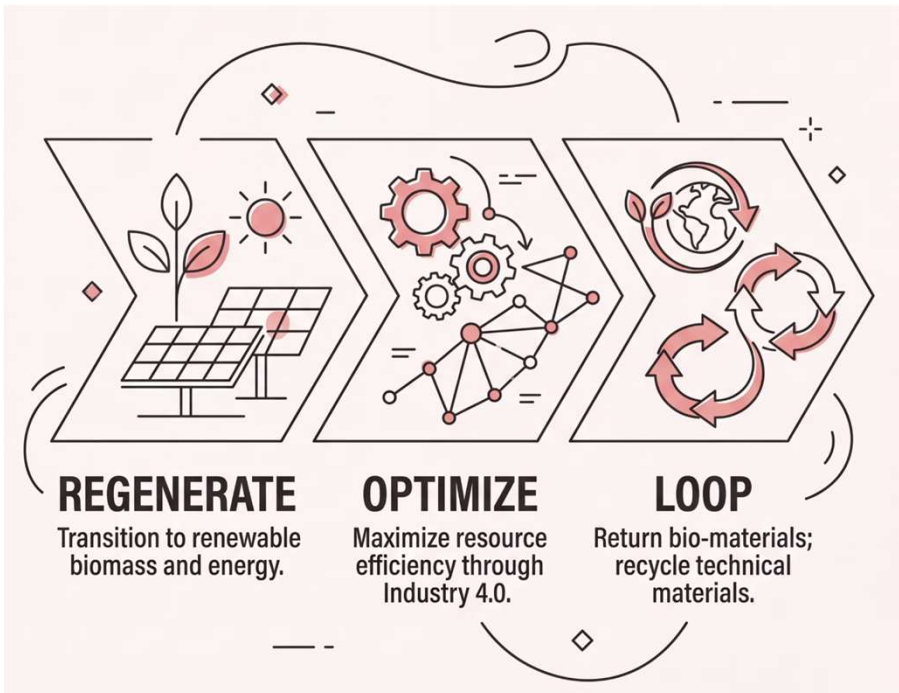
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# Content

- What bio-circular economy means
- Why it matters for Asia-Pacific
- Where the economic opportunities are
- Practical examples across ASEAN

# Defining the Bio-Circular Economy

The bio-circular economy rests on three interlocking pillars — a framework that transforms how we produce, consume, and restore.



## Regenerate

Transition from fossil and virgin inputs to **renewable biomass and clean energy**. Example: replacing coal combustion with rice straw biomass in industrial processes.

## Optimize

Deploy **Industry 4.0 technologies** — sensors, AI, and smart manufacturing — to ensure every unit of input delivers maximum productive value with minimal waste.

## Loop

Return biological materials safely to the biosphere. Recycle technical materials in closed-loop systems so nothing is discarded — only **continuously renewed**.

# Waste Is Outstripping Growth Across Every Sector

## \$2T

**Circular Economy Potential**  
Unrealized value locked in Asia Pacific's waste streams

## 60%

**Global Plastic Leakage**  
Of marine plastic pollution originates from the Asia Pacific region

## 3X

**Waste Growth Rate**  
Waste generation is growing 3× faster than regional GDP in key ASEAN markets

**Table 1: National Waste Collection Coverage and Plastic Recycling Rates in Several ASEAN Member States**

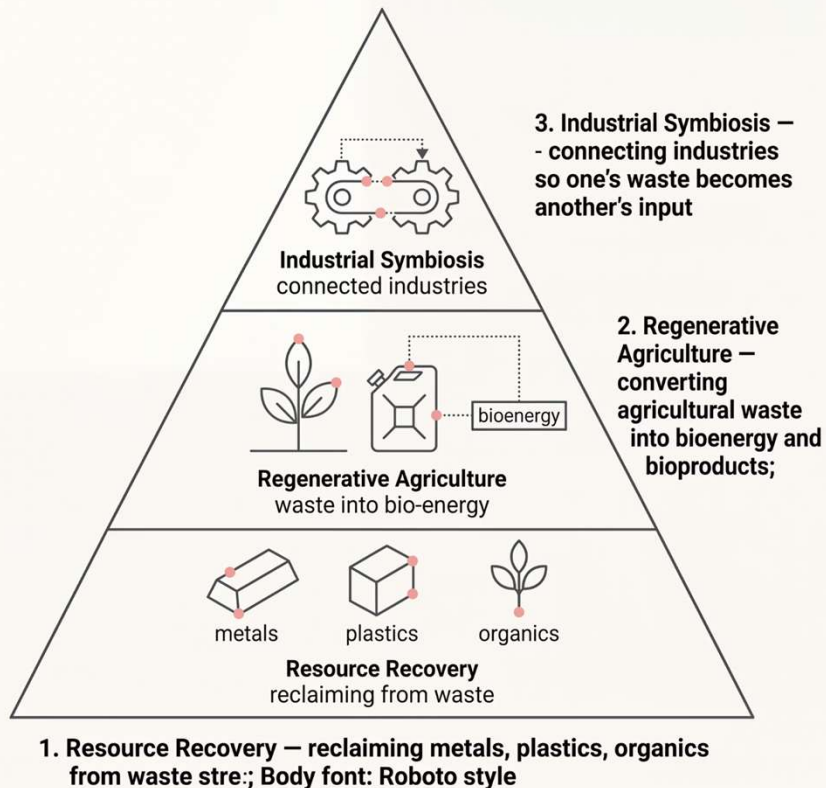
Member State	Waste Collection Coverage		Plastic Recycling Rate	
	(%)	Year	(%)	Year
Indonesia	69	2020	10	2020
Malaysia	80	2020	24*	2019
Philippines	55	2021	28*	2019
Singapore	100	2023	6	2023
Thailand	70	2021	18*	2018
Viet Nam	75	2018	33*	2019

Achieving the necessary scale to significantly reduce plastic pollution in ASEAN remains challenging. This is reflected in the limited waste collection coverage and relatively low plastic recycling rates in several Southeast Asian nations

\* Key plastic resin.

Source: ERIA (2024); Global Recycling (n.d.); JICA (2018); National Environment Agency (n.d.); Siahaan (2023); Siddharta (2022); The Incubation Network (2021); UN-Habitat (2022).

# \$2 Trillion Is Waiting to Be Unlocked



## Where the Value Lives

The \$2 trillion opportunity is not theoretical. It is distributed across three interconnected systems — each investable, each policy-ready, and each capable of generating jobs while reducing environmental pressure.

- **Resource Recovery:** Reclaiming materials before they become pollution
- **Regenerative Agriculture:** Turning crop waste into energy and inputs
- **Industrial Symbiosis:** One industry's waste is another's raw material

# Why Asia Pacific? The Regional Edge

A unique convergence of agricultural abundance, industrial infrastructure, and untapped biomass potential positions Asia Pacific as the world's most promising frontier for circular economy transformation.

90%

Rice Production

Asia Pacific's share of global rice output

90%

Palm Oil Output

Asia Pacific's share of global palm oil production

~1B

Tonnes Residue

Estimated annual agricultural biomass generated regionally

## Bio-Plastics Potential

Rice husk silica and straw cellulose can replace petroleum-derived polymers in packaging and construction materials, offering biodegradable, locally sourced alternatives at competitive cost.

## Bioenergy Conversion

Through gasification and anaerobic digestion, rice residues can generate clean energy for rural communities and industrial zones — reducing grid dependency and fossil fuel reliance.

## Haze Reduction

Redirecting residues from open burning to productive use directly addresses transboundary haze — a public health and diplomatic priority across ASEAN member states.

# Bio- Circular Economy: good practices - Thailand

CIRCULAR ECONOMY BUSINESS CASE STUDIES IN SOUTHEAST ASIA



## Pinmisa

- Samut Sakhon Province, Thailand
- Cosmetic
- [www.facebook.com/pinmisa](https://www.facebook.com/pinmisa)
- Analysis period: 2019-2023

Circular Economy in Skin Care Products

- ✓ Development and manufacturing of skin care products using hyaluronic acid extracted from fish bone waste

CIRCULAR ECONOMY BUSINESS CASE STUDIES IN SOUTHEAST ASIA



## Sivatel Bangkok Hotel

- Bangkok, Thailand
- Tourism and Hospitality
- [www.sivatelbangkok.com](https://www.sivatelbangkok.com)
- Analysis period: 2016-2023

Service Design and Waste Recovery in Sustainable Boutique Hotel

- ✓ Comprehensive food waste reduction programme in back-of-the-house and food service areas,
- ✓ Onsite Black Soldier Fly insect farming and composting with reuse in onsite garden and by food suppliers.
- ✓ Local and organic sourcing of food items. Single use plastics eliminated. Improved operations management for energy and water conservation.

# Bio- Circular Economy: good practices - Indonesia

CIRCULAR ECONOMY BUSINESS CASE STUDIES IN SOUTHEAST ASIA

**Great Giant Foods**

- Indonesia (Lampung, Sumatra)
- Manufacturing
- www.greatgiantfoods.com
- Analysis period: 2010-2023

**Integrated Operations for Sustainable Agriculture**

- ✓ Reuse of fruit processing waste as animal feed and bromelain production
- ✓ Recovery and use of biogas and organic fertilizer from manure
- ✓ Improved efficiency of use of water and farm chemicals
- ✓ Packaging with recycled materials

CIRCULAR ECONOMY BUSINESS CASE STUDIES IN SOUTHEAST ASIA

**Mycotech Lab (MYCL)**

- Bandung, West Java, Indonesia
- Biotechnology
- mycl.bio
- Analysis period: 2016-2023

**Using Mushrooms to Produce Sustainable Material from Agricultural Waste**

- ✓ Produces sustainable leather-like materials (mycelium leather) derived from organic raw material through fermentation-like processing using different mushroom varieties (uses waste from mushroom cultivation) .
- ✓ Less water use and less GHG production in comparison with bovine leather processes

# Bio-Circular Economy: good practices – Cambodia

CIRCULAR ECONOMY BUSINESS CASE STUDIES IN SOUTHEAST ASIA

**Husk Ventures Cambodia**

- 📍 Phnom Penh, Cambodia
- 🌱 Agriculture/Rice/Carbon based fertilizers
- 🌐 [www.huskventures.com](http://www.huskventures.com)
- ★ Analysis period: 2019-2024

**Biochar Innovation in Agriculture**

- ✓ Customising the known pyrolysis technology for the specific characteristics of rice husk as raw material → maximising the char output.
- ✓ The water released during pyrolysis recovered and marketed separately as a natural insect repellent.
- ✓ Succeeded in obtaining carbon removal credits

CIRCULAR ECONOMY BUSINESS CASE STUDIES IN SOUTHEAST ASIA

**Khmer Green Charcoal (KGC)**

- 📍 Phnom Penh, Cambodia
- 🔪 Char briquettes
- 🌐 [kgc-cambodia.com](http://kgc-cambodia.com)
- ★ Analysis period: 2012-2023

**Char Briquettes from Coconut Shells**

- ✓ Transforming, through pyrolysis, waste coconut shells into high quality char briquettes (coconut shells lose about 80% of the original mass in conversion to charcoal)
- ✓ GHG emission reductions from preventing deforestation, capturing and using methane emissions during the process, and gaining efficiency in the production and use of charcoal.

# Bio-Circular Economy: good practices - Philippines

CIRCULAR ECONOMY BUSINESS CASE STUDIES IN SOUTHEAST ASIA



**Axel Integrated Farm**

- 📍 Samar, Philippines
- 🌿 Agrifood, coconut farming
- 🌐 [www.facebook.com/farmni Axel](https://www.facebook.com/farmni Axel)
- ★ Analysis period: 2021-2023

**Organic Coconut Farming with Commercialization of Co-products**

- ✓ Optimization of coconut production using appropriate agronomy practices with soil and water analysis and intercropping with banana, taro and sweet potato.
- ✓ Product diversification through comprehensive utilization of previously discarded byproducts into coconut sap wine, nectar syrup, nectar aminos, nectar instant drink and coconut vinegar.

CIRCULAR ECONOMY BUSINESS CASE STUDIES IN SOUTHEAST ASIA



**Precious Plastics Philippines**

- 📍 Antipolo Rizal, Philippines
- ♻️ Plastics Recycling
- 🌐 [preciousplasticph.com](https://preciousplasticph.com)
- 👤 Butte Ivan Metz, Founder
- ★ Analysis period: 2017

**Appropriate Technology for Small Scale Recycling**

- ✓ Developer and supplier of low cost, small scale appropriate mechanical recycling equipment for plastics and developer of network of grassroots plastic waste collection and recycling initiatives that produce and sell recycled plastic board-based furniture and decorative items.

# Bio-Circular Economy: good practices – Vietnam/Philippines

CIRCULAR ECONOMY BUSINESS CASE STUDIES IN SOUTHEAST ASIA



## An Dinh Co. Ltd.

- Thai Binh province, Vietnam
- Agriculture
- [www.andinh.com.vn](http://www.andinh.com.vn)
- Analysis period: 2017-2023

**New Rice Farming Practices to Reduce Climate Emissions and Improve Yields**

- ✓ Reduce GHG emissions from rice cultivation and reduce the use of fertilizers through halving of rice planting density, application of alternative wetting and drying irrigation system, improved fertilizer management and enzyme accelerated decomposition of crop residue, while regenerating soil health and maintaining yields.

CIRCULAR ECONOMY BUSINESS CASE STUDIES IN SOUTHEAST ASIA



## Pico Sands Hotel and Pico de Loro Beach and Country Club

- Batangas, Philippines
- Hotel and tourism
- [www.picosandshotel.com](http://www.picosandshotel.com)
- Analysis period: 2018-2023

**Sustainable Resort Operations**

- ✓ 60% food waste reduction per guest meal (savings of EUR125,000 in first 4 years)
- ✓ Food waste composting and use in onsite garden
- ✓ Replacement of single use plastics (bottles etc)
- ✓ 36% reduction in water use through efficiency and reuse measures
- ✓ Energy efficiency, enabling cost saving of EUR 225,000 over 4 years

Thank you

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