

## LAPORAN PENELITIAN

PROGRAM RISET KOLABORASI INDONESIA 2023



### JUDUL PENELITIAN

The impact of Waste Pollution On Blue-Green Economy : Multi Regional Extended Environmental I/O and Life Cycle Business Impact Analysis

#### Sub Judul:

**Kontribusi sektor bisnis terhadap ekonomi biru-hijau melalui pengelolaan limbah secara sirkuler di wilayah pesisir**

Peneliti Utama : 1. Dr. Meirani Harsasi, S.E., M.Si.  
(Universitas Terbuka)

Peneliti Mitra : 1. Dr. Mursalim Nohong, S.E., M.Si.  
(Universitas Hasanuddin)  
2. Dr. Fajri Muharja, S.E., M.Si.  
(Universitas Andalas)

UNIVERSITAS TERBUKA  
AGUSTUS 2023

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## LEMBAR PENGESAHAN

1. Judul :  
The impact of Waste Pollution On Blue-Green Economy : Multi Regional Extended Environmental I/O and Life Cycle Business Impact Analysis
2. Pengusul
  - a. Nama Lengkap : Dr. Meirani Harsasi, SE., M.Si
  - b. Jabatan Fungsional/Golongan : Lektor Kepala
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  - f. Alamat Rumah/Telp/HP : 0815-1948-5375
3. Peneliti Mitra

No	Nama Peneliti	E-mail	Fakultas/ Sekolah/ PP/P	Institusi/ Perguruan Tinggi	Bidang Keahlian
1	Dr. Mursalim Nohong, S.E., M.Si.	mursalimnohong@fe .unhas.ac.id	Fakultas Ekonomi dan Bisnis	Universitas Hasanuddin	Corporate finance, public sector finance
2	Dr. Fajri Muharja, SE.M.Si.	fajrimuharja@eb.una nd.ac.id	Ekonomi dan Bisnis	Universitas Andalas	Ilmu Ekonomi

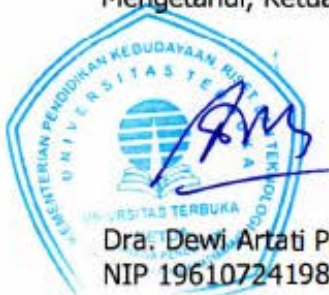
4. Skema : A + B + C
5. Total biaya yang diusulkan : Rp. 250,350,000
6. Target Publikasi Internasional (*Joint Publication*) :

No	Nama Jurnal Internasional	Jumlah Artikel
1.	ABAC Journal	1
2.	Annals Financial Economics	1
3.	Kaseetsart Journal of Social Science (KJSS)	1

Proposal ini belum pernah didanai oleh atau diusulkan ke sumber lain.

Mengetahui, Ketua LPPM UT

Ketua Peneliti,



Dra. Dewi Artati Padmo Putri, M.A., Ph.D.  
NIP 196107241987102003

Dr. Meirani Harsasi, SE., M.Si.  
NIP 197505312001122001

## RINGKASAN EKSEKUTIF

Tujuan dari studi berbasis Komunitas Bisnis tentang pengelolaan limbah ini adalah untuk memeriksa bagaimana praktik ekonomi biru-hijau lokal berhasil mengatasi permasalahan hubungan antara lingkungan bisnis-kesadaran masyarakat-lingkungan-keberlanjutan di wilayah pesisir di Indonesia, untuk mengembangkan kajian terdahulu yang dilakukan oleh (Chen et al., 2020) tentang nexus lingkungan dan sustainability. Perlu diketahui bahwa ekonomi biru adalah integrasi pembangunan berkelanjutan dan pertumbuhan hijau, yang menyoroti perencanaan dan pembangunan yang terkoordinasi secara keseluruhan (ADB, 2022). Konsep triple bottom line dapat dimanfaatkan secara regional oleh masyarakat untuk mendorong pertumbuhan pembangunan ekonomi yang berkelanjutan (Chen et al., 2020). Penelitian ini bertujuan untuk mengeksplorasi bagaimana bisnis dapat berkontribusi pada pengembangan model ekonomi biru-hijau yang mendorong pertumbuhan berkelanjutan sambil mengatasi masalah lingkungan dan sosial. Kebaruan dari penelitian ini adalah menemukan area/sector produk utama yang berkontribusi/mendukung ekonomi biru-hijau di pesisir Indonesia, khususnya di wilayah Jawa Barat-Banten, Sumatera Barat dan Sulawesi Selatan serta mengetahui kesadaran masyarakat dan entitas bisnis di wilayah pesisir terhadap pengelolaan sampah untuk mendukung sistem tersebut. Dimana kedepannya hal ini akan mendukung optimalisasi/minimalisasi pengelolaan sampah, dan memberikan nilai tambah ekonomi bagi pelaku usaha di wilayah pesisir Indonesia. Metode yang digunakan adalah kerangka kerja input-output (I-O) yang diperluas secara lingkungan di mana sebanyak mungkin estimasi ini disertakan, yang memungkinkan estimasi dampak lingkungan dan biaya eksternal dari berbagai kegiatan sektor ekonomi, kegiatan ekonomi/ bisnis, dan konsumsi sumber daya di wilayah pesisir. Dari penelitian tersebut, akan diidentifikasi kontribusi bisnis, dalam hal ini bisnis biru-hijau yang mendukung keberlanjutan melalui pengelolaan limbah bisnis di wilayah pesisir. Zero waste atau bebas sampah adalah sebuah konsep yang mengajak masyarakat untuk menggunakan produk sekali pakai dengan lebih bijak untuk mengurangi jumlah dan dampak buruk dari sampah. Tujuannya adalah agar sampah tidak berakhir di TPA, menjaga sumber daya dan melestarikan alam. Metode zero waste adalah 5R, yaitu Refuse (menolak), Reduce (mengurangi), Reuse (menggunakan kembali), Recycle (mendaur ulang) dan Rot (membusukkan sampah). Karena keterbatasan waktu penelitian, ada satu *locus* riset yang belum terinvestigasi yakni wilayah di Jawa Barat.



KEMENTERIAN PENDIDIKAN, KEBUDAYAAN,  
RISET, DAN TEKNOLOGI  
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**SURAT TUGAS**

NOMOR : B/2043/UN31.LPPM/PT.01.04/2023

Ketua Lembaga Penelitian dan Pengabdian Kepada Masyarakat Universitas Terbuka,  
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No	Nama	NIP	Berangkat dari
1.	Eka Wirajuang Daurohmah, S.E.J., M.Ak.	199408062020132015	Tangerang Selatan
2.	Drs. Andi Sylvana, M.Si.	1965031541992032000	Tangerang Selatan

Mulai : 25/08/2023 Sampai:27/08/2023  
Selama: : 3  
Tujuan : Padang  
Lokasi : UT Daerah Padang

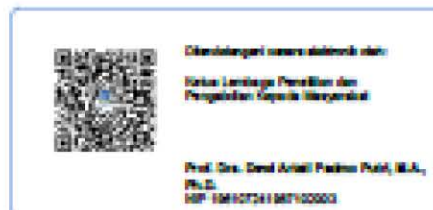
Pengambilan Data Penelitian terkait penelitian yang berjudul The Impact of Waste Pollution On Blue-Green Economy : Multi-Regional Extended Environmental (IO and Life Cycle Business Impact Analysis nomor: yang di ketua oleh Dr. Melani Harsasi, S.E., M.Si..

Surat Tugas ini dibuat untuk dilaksanakan dengan rasa penuh tanggung jawab.

Tangerang Selatan, 21/08/2023

Tembusan:

1. Dekan Fakultas Ekonomi
2. Direktur UT Daerah Padang



Ditulis dari SIMPUSMAS

Dokumen telah diintegrasikan secara elektronik yang diterbitkan oleh Universitas Terbuka sesuai UU (TR No. 11 tahun 2008, Peraturan Menteri Universitas Terbuka no. 108 tahun 2007, dan RR No.16 no. 807 tahun 2021. Informasi dokumen dapat dilihat dengan aplikasi Amdocs Reader dan pembuatan tanda tangan dengan aplikasi ProSign UT.



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E-mail: ppm@ecampus.ut.ac.id, Laman: www.lppm.ut.ac.id

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Ketua Lembaga Penelitian dan Pengabdian Kepada Masyarakat Universitas Terbuka,  
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2.	Dr. Ir. Kasful Anwar, M.Si.	196908171992031007	Tangerang Selatan

Mulai : 25/08/2023

Sampai:28/08/2023

Selama: : 4

Tujuan : Padang

Lokasi : UT Daerah Padang

Pengambilan Data Penelitian terkait penelitian yang berjudul The impact of Waste Pollution On Blue-Green Economy : Multi-Regional Extended Environmental I/O and Life Cycle Business Impact Analysis nomor: yang di ketuai oleh Dr. Meirani Harsasi, S.E., M.Si..

Surat Tugas ini dibuat untuk dilaksanakan dengan rasa penuh tanggung jawab.

Tangerang Selatan, 21/08/2023

Tembusan:

1. Dekan Fakultas Ekonomi
2. Direktur UT Daerah Padang



Ditandatangani secara elektronik oleh:

Ketua Lembaga Penelitian dan  
Pengabdian Kepada Masyarakat

Prof. Dra. Dewi Astuti Padmo Putri, M.A.,  
Ph.D.  
NIP 196107241987102003

Dicetak dari SIMPENMAS

Dokumen telah ditandatangani secara elektronik yang diverifikasi oleh Universitas Terbuka sesuai UU ITE No. 11 tahun 2008, Peraturan Rektor Universitas Terbuka no. 198 tahun 2021, dan SK Rektor no. 601 tahun 2021. Informasi dokumen dapat dilihat dengan Aplikasi Acrobat Reader dan pembuktian keasliannya dengan aplikasi ProDSign UT.

## KEGIATAN YANG SUDAH DILAKUKAN

### 1. Diskusi Rutin

Diskusi 1	Diskusi 2	Diskusi 3
<p>Hari, Tgl: Senin , 29 Mei 2023                      waktu : pukul 19.30 s.d. selesai                      WIB                      acara : Penyamaan Persepsi                      Penelitian RKI dengan                      Team UT, UNAND dan                      UNHAS                      tautan : <a href="https://sl.ut.ac.id/RKI3KAMPUS">https://sl.ut.ac.id/RKI3KAMPUS</a>                      Meeting ID : 910 7608 3992</p>	<p>Hari, tanggal : Senin , 03 Juli 2023                      waktu : pukul 16.00 s.d. selesai                      WIB                      acara : Penyamaan Persepsi                      Penelitian RKI dengan Team UT,                      UNAND dan UNHAS                      tautan : <a href="https://sl.ut.ac.id/RKI3KAMPUS">https://sl.ut.ac.id/RKI3KAMPUS</a>                      Meeting ID : 910 7608 3992                      Pass : 123456</p>	<p>Hari, tanggal : Rabu , 05 Juli 2023                      waktu : pukul 19.30 s.d. selesai                      WIB                      acara : Penyamaan Persepsi                      Penelitian RKI dengan Team UT,                      UNAND dan UNHAS                      tautan : <a href="https://sl.ut.ac.id/RKI3KAMPUS">https://sl.ut.ac.id/RKI3KAMPUS</a>                      Meeting ID : 910 7608 3992                      Pass : 123456</p>
Penyamaan persepsi awal antara peneliti utama dan peneliti mitra		

### 2. Pengambilan Data

	Nama	Data	Sumber Data	PIC	Lokasi	Follow up
1	Ibu Ayu Cahyadi	Jumlah dan tipe bisnis UPI, PHPT, Pasar Grosir Ikan untuk mengetahui bisnis perikanan dan pengolahan sampah secara sirkuler sekitar pelabuhan	-Pelabuhan Perikanan DKI Jakarta -Badan Pusat Statistik DKI -Rekaman hasil wawancara	Ayu, Pelabuhan Muarakarang (No.Hp.087875187872), ibu Asri (Data UPI dan data produksi)	Muarakarang	Menghubungi ibu Ayu untuk berkirim surat kepala unit pelabuhan perikanan provinsi DKI Jakarta ( <a href="mailto:unitpelabuhanperikanan@gmail.com">unitpelabuhanperikanan@gmail.com</a> )
2	Ibu Andi Silvana	Jumlah dan tipe bisnis UPI, PHPT, Pasar	-Pelabuhan Perikanan Makassar	Pak Iswadi (Kepala Pelabuhan)	Makassar	Akan dihubungkan oleh pak Kasful Ahi (MPP), untuk ke pak Iswadi

	Attn. Pak Dr.Mursalim Nohong dan team	Grosir Ikan untuk mengetahui bisnis perikanan dan pengolahan sampah secara sirkuler sekitar pelabuhan	-Badan Pusat Statistik Sulawesi Selatan	Bapak Firman Rahim SE (Kepala TPI Rajawali), adik Prof.Rahman Rahim (Direktur UT Makassar)		Bisa menghubungi Bapak Firman Rahim SE (Kepala TPI Rajawali), adik Prof.Rahman Rahim (Direktur UT Makassar) untuk unit bisnis di dekat TPI Makassar
3	Ibu Eka Wirajuang  Attn to. Pak Dr.Fajri dan Team	Jumlah dan tipe bisnis UPI,PHPT,Pasar Grosir Ikan untuk mengetahui bisnis perikanan dan pengolahan sampah secara sirkuler sekitar pelabuhan	-Pelabuhan Perikanan Bungus -Badan Pusat Statistik Sumatera Barat	pak Widodo(Kalabuh Bungus, Padang)	Bungus, Padang	Akan dihubungkan oleh pak Kasful Ahi (MPP), untuk ke pak Widodo No.Telp Ibu Merly: 082347178808
4.	Bapak Martino Wibowo, Pak Zainur dan team	Jumlah dan tipe bisnis UPI,PHPT,Pasar Grosir Ikan untuk mengetahui bisnis perikanan dan pengolahan sampah secara sirkuler sekitar pelabuhan		Pak Aby (Tokoh masyarakat Tanjung Pasir)	Tanjung Pasir, Pandeglang	Menghubungi Bapak Aby
5	Ibu Sakina dan team	Dijadwalkan untuk melakukan penelitian ke Pulau Seribu				Menghubungi pak Kalabuh



## Kuesioner

### Judul: "Kontribusi Sektor Usaha terhadap Ekonomi Biru-Hijau melalui Pengelolaan Sampah Sirkular di Wilayah Pesisir"

#### Bagian 1: Informasi Demografis

1. Nama (opsional/ bisa diisi dengan inisial, misal "Kartini disingkat Kar") :
2. Nama Kota/ Desa/ Kecamatan tempat tinggal
3. Jika anda memiliki usaha, kategori manakah usaha anda?
  - a) Mikro (Memiliki penghasilan rata-rata kurang dari 25 juta/ bulan)
  - b) Non-Mikro (Memiliki penghasilan rata-rata lebih dari 30 juta/ bulan)
  - c) Tidak memiliki usaha
4. Umur :
  - a) 19-25 tahun
  - b) 26-30 tahun
  - c) 31-35 tahun
  - d) Lebih dari 35 tahun
5. Pendidikan
  - a)SD b)SMP c)SMA d)S1 e)S2 f)S3
6. Jenis kelamin:
  - a)Lelaki b)Perempuan
7. Tahun Pengalaman di Sektor Bisnis: \_\_\_\_\_ tahun
8. Tinggal di wilayah ini: \_\_\_\_\_ tahun

#### Bagian 2: Memahami Pengelolaan Sampah Sirkular dan Ekonomi Biru-Hijau

1. Seberapa sering mendengar Anda dengan konsep pengelolaan sampah sirkular?
  - Sangat sering mendengar
  - Cukup sering mendengar
  - Sedikit sering mendengar

- Tidak pernah sama sekali
2. Seberapa sering mendengar Anda dengan konsep ekonomi biru-hijau?
- Sangat sering mendengar
  - Cukup sering mendengar
  - Sedikit sering mendengar
  - Tidak pernah sama sekali
3. Seberapa efektif menurut Anda pengelolaan sampah sirkular saat ini di wilayah pesisir?
- Sangat Efektif
  - Efektif
  - Kurang Efektif
  - Tidak Efektif Sama Sekali
  - Tidak Tahu
4. Apakah Anda percaya bahwa peningkatan pengelolaan sampah sirkular dapat memberikan dampak positif terhadap ekonomi lokal di wilayah pesisir?
- Sangat Percaya
  - Percaya
  - Kurang Percaya
  - Tidak Percaya
  - Tidak Tahu

5. Dengan kata-kata Anda sendiri, apa yang Anda pahami dengan istilah "pengelolaan sampah sirkular"?

.....

6. Dengan kata-kata Anda sendiri, apa yang Anda pahami dengan istilah "ekonomi biru-hijau"?

.....

7. Apa jenis langkah konkret yang menurut Anda dapat diambil untuk meningkatkan pengelolaan sampah sirkular di wilayah pesisir?

.....

### **Bagian 3: Kontribusi Sektor Bisnis terhadap Pengelolaan Sampah Sirkular di Wilayah Pesisir**

1. Menurut Anda, bagaimana tingkat kesadaran saat ini dalam sektor bisnis mengenai pengelolaan sampah sirkular di wilayah pesisir?
- Kesadaran yang sangat tinggi
  - Kesadaran yang cukup
  - Kesadaran rendah

- Tidak ada kesadaran

2. Bagaimana Anda melihat peran sektor usaha (industri, perusahaan, bisnis) dalam mendukung konsep Ekonomi Biru-Hijau melalui praktik pengelolaan sampah sirkular di wilayah pesisir? (Skala 1-5: 1 = Sangat Tidak Setuju, 5 = Sangat Setuju)

- Menyediakan produk dengan bahan ramah lingkungan
- Menerapkan daur ulang dan pengurangan limbah dalam operasional
- Berinvestasi dalam riset teknologi hijau untuk pengolahan limbah
- Berkolaborasi dengan komunitas lokal untuk inisiatif lingkungan

3. Apakah Anda atau keluarga Anda pernah terlibat dalam kegiatan atau usaha yang mendukung praktik Ekonomi Biru-Hijau di wilayah pesisir? (Contoh: daur ulang, pengelolaan limbah, konservasi laut)

Ya  Tidak

- Jika "Ya", mohon berikan contoh singkat.
- Sejauh mana Anda merasa masyarakat di wilayah pesisir terlibat dalam praktik Ekonomi Biru-Hijau? (Skala 1-5: 1 = Sangat Sedikit, 5 = Sangat Banyak)

4. Sudahkah Anda mengamati inisiatif atau praktik yang diterapkan oleh bisnis untuk mempromosikan pengelolaan sampah sirkular di wilayah pesisir?

- Ya
- Tidak
- Jika ya, berikan contoh inisiatif atau praktik tersebut.

.....  
.....

5. Bagaimana Anda menilai efektivitas kontribusi sektor bisnis terhadap pengelolaan sampah sirkular di wilayah pesisir?

- Sangat efektif
- Cukup efektif
- Efektif
- Tidak berlaku (Tidak ada kontribusi yang diamati)

6. Menurut pendapat Anda, sejauh mana sektor usaha saat ini berkontribusi terhadap pengembangan ekonomi biru-hijau di wilayah pesisir?

- Sangat Berkontribusi
- Berkontribusi
- Sedikit Berkontribusi
- Tidak Berkontribusi Sama Sekali
- Tidak Tahu

7. Apakah Anda memiliki contoh konkret tentang bagaimana sektor usaha telah berkontribusi terhadap pengembangan ekonomi biru-hijau melalui pengelolaan sampah sirkular di wilayah pesisir?

.....

.....

#### **Bagian 4: Manfaat dan Tantangan Pengelolaan Sampah Sirkular di Wilayah Pesisir**

1. Menurut Anda, apa manfaat utama pengelolaan sampah sirkular di wilayah pesisir bagi sektor bisnis? (Silakan buat pilihan urutan peringkat tiga besar yang paling mendekati pilihan anda)

- Penghematan biaya dan efisiensi sumber daya
- Peningkatan tanggung jawab sosial perusahaan
- Peningkatan citra merek dan reputasi
- Kepatuhan terhadap peraturan lingkungan
- Peluang bisnis baru dan inovasi
- Lainnya (Sebutkan: \_\_\_\_\_)

2. Apa tantangan utama yang dihadapi oleh pelaku usaha dalam menerapkan pengelolaan sampah sirkular di wilayah pesisir? (Silakan buat pilihan urutan peringkat tiga besar yang paling mendekati pilihan anda)

- Kurangnya kesadaran dan pengetahuan
- Infrastruktur dan teknologi yang tidak memadai
- Sumber daya keuangan terbatas
- Resistensi terhadap perubahan dalam organisasi
- Hambatan regulasi dan dukungan kebijakan
- Lainnya (Sebutkan: \_\_\_\_\_)

#### **Bagian 5: Perspektif dan Kolaborasi Masa Depan**

1. Menurut Anda, peran apa yang dapat dimainkan bisnis dalam mendorong penerapan praktik pengelolaan sampah sirkular di wilayah pesisir?

- Mempengaruhi kebijakan dan peraturan
- Berinvestasi dalam penelitian dan pengembangan
- Menjalinkan kerjasama dan kemitraan
- Memberikan dukungan keuangan dan insentif
- Meningkatkan kesadaran di antara bisnis dan pemangku kepentingan lainnya
- Lainnya (Sebutkan: \_\_\_\_\_)

2. Menurut Anda, seberapa besar keinginan bisnis untuk berkolaborasi dengan pemangku kepentingan lainnya (misalnya, pemerintah, LSM, masyarakat lokal) untuk pengelolaan sampah sirkular yang efektif di wilayah pesisir?

- Sangat bersedia
- Cukup bersedia
- Sedikit bersedia
- Tidak mau sama sekali

3. Apa faktor kunci yang dapat mendorong bisnis untuk berkolaborasi dengan pemangku kepentingan lainnya untuk pengelolaan sampah sirkular di wilayah pesisir?

.....  
 .....

### Bagian 6: Kendala dan Potensi

1. Menurut Anda, apa hambatan utama dalam mengembangkan praktik Ekonomi Biru-Hijau di wilayah pesisir? (Pilih maksimal 3 faktor)

- Kurangnya kesadaran masyarakat
- Tidak cukupnya insentif dari pemerintah
- Keterbatasan teknologi hijau
- Keterbatasan akses ke pasar yang mendukung produk ramah lingkungan
- Masalah regulasi atau kebijakan
- Faktor lainnya, sebutkan: \_\_\_\_\_

2. Menurut Anda, apa potensi utama dalam mengembangkan praktik Ekonomi Biru-Hijau di wilayah pesisir? (Pilih maksimal 3 faktor)

- Meningkatnya kesadaran masyarakat tentang lingkungan
- Dukungan pemerintah melalui insentif dan regulasi
- Berkembangnya teknologi hijau yang lebih terjangkau
- Permintaan pasar yang tinggi terhadap produk ramah lingkungan
- Kolaborasi aktif antara sektor usaha, komunitas, dan lembaga terkait
- Faktor lainnya, sebutkan: \_\_\_\_\_

### Bagian 7: Informasi Tambahan

Apakah Anda memiliki pengalaman pribadi atau profesional dalam isu pengelolaan sampah, ekonomi biru-hijau, atau wilayah pesisir yang ingin Anda bagikan?

.....  
 .....

Apakah Anda memiliki komentar atau saran tambahan mengenai kontribusi sektor bisnis terhadap ekonomi biru-hijau melalui pengelolaan sampah sirkular di wilayah pesisir?

.....

❖ *Terima kasih atas partisipasi Anda dalam kuesioner ini! Tanggapan Anda akan memberikan wawasan berharga untuk penelitian kami.*

## DESAIN PENELITIAN DAN DATA-DATA

### 1. PENDAHULUAN

#### 1.1 Latar belakang masalah

1. Pemahaman dan kesadaran masyarakat yang masih kurang tentang bagaimana sistem ekonomi biru-hijau dapat diterapkan dan dipertahankan secara efektif di masyarakat untuk mendukung keberlanjutan.
2. Penelitian terbatas tentang kelayakan model ekonomi biru hijau di daerah yang berbeda dan dampak potensial dari inisiatif tersebut
3. Perlunya pemetaan potensi dan kontribusi setiap daerah terhadap pelaksanaan ekonomi biru-hijau

#### 1.2 Tujuan

(1) Untuk mendapatkan wawasan tentang model insentif pengelolaan sampah yang mendukung ekonomi biru-hijau; (2) Mengeksplorasi bagaimana komunitas bisnis pesisir dapat berkontribusi dalam pengembangan model ekonomi biru-hijau yang mempromosikan pertumbuhan berkelanjutan sekaligus mengatasi masalah lingkungan dan mengukur kesadaran masyarakat pesisir terhadap penerapan ekonomi biru-hijau, (3) Menjelaskan isu-isu sosial-ekonomi tentang bagaimana pencemaran lingkungan yang disebabkan oleh sampah mempengaruhi pendapatan masyarakat pesisir, serta mencoba menemukan area/ sektor produk utama yang berkontribusi dalam mendukung ekonomi biru-hijau di wilayah pesisir Indonesia melalui pengelolaan sampah.

### 2. METODOLOGI

Studi ini menggunakan data runtun waktu (time series) yang diperoleh dari Badan Pusat Statistik Indonesia di wilayah yang menjadi target (Jawa Barat, Sumatera Barat dan Sulawesi Selatan), serta data lain yang relevan dengan studi yang dilakukan. Data tersebut selanjutnya dianalisis dengan menggunakan analisis deskriptif dan kuantitatif (lihat pada *lampiran akhir*). Pendekatan deskriptif dalam penelitian ini dilakukan melalui life cycle assessment (LCA). LCA merupakan metode yang digunakan untuk menganalisis dampak lingkungan yang ditimbulkan dari proses pengadaan bahan baku, proses produksi, hingga pengolahan limbah. Sementara itu, pendekatan kuantitatif dilakukan melalui analisis extended environment input-output (EE I-O) yang dilanjutkan dengan metode location quotient (LQ) dan shift share. Analisis EE I-O menggunakan data I-O Indonesia tahun 2016 dan berupa tabel total transaksi harga produsen dengan klasifikasi 17 sektor usaha. Sementara itu, metode LQ dilakukan untuk melakukan perbandingan antara peranan suatu sektor ekonomi di suatu wilayah terhadap besarnya peranan sektor ekonomi yang sama secara nasional. Metode shift share dilakukan untuk menganalisis struktur perekonomian di suatu wilayah, pergeseran sektor unggulan pada kurun waktu tertentu dan mengetahui posisi sektor ekonomi suatu wilayah terhadap wilayah yang lebih luas (Beylot et al.). Langkah-langkah penelitian yang dilakukan saat ini adalah masih dalam pengambilan data yang akan dilanjutkan dengan tahapan penelitian berikut di akhir September 2023, yaitu:

### 3. PROSES PENELITIAN

#### (a) Pelaksanaan penelitian di PT-host

Penelitian oleh Universitas Terbuka akan dilakukan dibawah koordinasi Dr.Meirani Harsasi, SE.,M.Si. yang akan dilaksanakan pada area pesisir di daerah Jawa Barat-Banten, yakni didaerah pesisir Sukabumi, Bekasi (Gembong), Serang-Cilegon, Indramayu.

Pemilihan wilayah *preferensi* penelitian akan dilakukan setelah mengidentifikasi wilayah yang paling terdampak oleh polusi sampah dan juga berkontribusi pada ekonomi biru-hijau. Dalam pelaksanaan penelitiannya PT.host akan melakukan “*entry to force*” terlebih dahulu dengan melakukan pendekatan pada pemangku kepentingan daerah seperti dinas terkait dan juga aparatur daerah seperti kecamatan sampai tingkat rukun tetangga dan melakukan *outreach* kepada komunitas masyarakat dan bisnis di daerah tersebut bekerjasama dengan pembelajaran jarak jauh (UPBJJ). Adapun untuk kunjungan akan dilakukan secara *ad-hoc* berdasarkan kecukupan (*sufficiency*), ketersediaan (*availability*) dan kebutuhan (*needs*) data yang diperlukan. Selanjutnya untuk pengambilan data primer pada wilayah terdampak dilakukan melalui wawancara, FGD, observasi, dan secara aerial (menggunakan teknologi drone) dan data sekunder pendukung melalui BPS dan penyedia data lingkungan dan kelautan lainnya yang diterbitkan K/L dan institusi lainnya dan big data analytics melalui N-Capture. Selanjutnya hasil karya penelitian akan dilakukan melalui LPPM-Universitas Terbuka dan menjadi hak cipta dari LPPM Universitas Terbuka dan juga PT-Mitra yakni Unhas dan Unand. Untuk PT.Host sendiri akan berfokus pada sektor/industri terdampak polusi sampah dan kontribusi pada ekonomi biru-hijau dan model insentif.

**(b) Pelaksanaan penelitian di PT-mitra**

Penelitian dilakukan oleh Universitas Andalas (UNAND) yang dikoordinasi oleh Dr.Mursalim Nohong, SE.,M.Si. akan dilaksanakan di daerah pesisir pantai Padang, Sumatera Barat dan Univeristas Hassanuddin (UNHAS) yang dikoordinasikan oleh Dr. Fajri Muharja akan dilakukan di daerah pesisir Makassar, Sulawesi Selatan dimana pemilihan daerah juga didasarkan pada wilayah terdampak sampah yang berakibat pada keberlangsungan keberlanjutan lingkungan dan ekonomi biru-hijau. Untuk pelaksanaan penelitian akan melibatkan stakeholder yang berkaitan dengan lingkungan dan pengelolaan wilayah pesisir yang akan berkoordinasi dengan pemerintah daerah Sumatera Barat (UNAND) dan Sulawesi Selatan (UNHAS), melakukan komunikasi intensif (FGD, Dialog, dll) dengan Pemda dan Pemangku Kepentingan Lokal (Masyarakat, Asosiasi Bisnis, LSM, dll). Sejak awal memberikan pemahaman pada pemangku kepentingan sepenuhnya tentang penelitian yang akan dilakukan dan peneliti juga akan melakukan *probing* awal untuk memahami situasi lokal, visi/aspirasi, komitmen dan kapasitas komunitas masyarakat dan entitas bisnis pada wilayah pesisir tersebut. Untuk selanjutnya PT-Mitra yakni UNHAS dan UNAND akan berkoordinasi dengan PT-host yakni UT untuk melakukan kunjungan bersama pada lokasi target. Diskusi pada saat proses penelitian akan dilakukan secara off-line maupun on-line maupun secara desk to desk. Saat ini antara PT Mitra dan PT Host sudah membentuk group pada Whatsapp (WAG) untuk melakukan koordinasi. WAG dan Zoom saat ini adalah sarana komunikasi yang paling efektif. Untuk alat kolaborasi penulisan laporan maupun artikel akan digunakan Microsoft Teams. Adapun untuk penulisan hasil laporan penelitian akan dilakukan dalam empat tahap yakni pembuatan initial report, interim report, final report dan publikasi penelitian pada jurnal ilmiah bereputasi dengan index tinggi (Scopus/ WoS). Proses penelitian akan dilakukan secara ad-hoc sesuai dengan berdasarkan pada prinsip kecukupan (*sufficiency*), ketersediaan (*availability*) dan kebutuhan (*needs*) yang diperlukan dan dilakukan penyesuaian-penyesuaian (*adjustment*) dengan kesepakatan dan musyawarah jika diperlukan. Mitra sepakat untuk menyediakan pendanaan secara in-kind maupun in-cash. Adapun fokus pada penelitian di Universitas Andalas adalah studi mengenai kesadaran masyarakat pesisir dan pelaku usaha terhadap pengelolaan sampah dan ekonomi biru-hijau dan fokus penelitian pada Universitas Hasanudin adalah pada penelitian wilayah terdampak polusi sampah dan bagaimana pengelolaan sampah yang mendukung ekonomi biru-hijau dilaksanakan oleh

komunitas masyarakat dan industri di wilayah pesisir.

**(c)Data dan Angka**

**Data Lingkungan:**

Mengumpulkan data terkait pengelolaan sampah sirkular, seperti timbulan sampah, tingkat daur ulang, kontribusi ekonomi sektor bisnis, dan dampak lingkungan yang relevan.



Untuk menganalisis lebih lanjut maka dilakukan analisis data awal pada tingkat pencemaran pada pesisir laut dengan mempertimbangkan kegiatan pengelolaan sampah sebagai berikut:

- 1) Jasa Pendampingan Pengelolaan Sampah
- 2) Optimalisasi TPS 3R di wilayah
- 3) Peningkatan Pengolahan Sampah di TPS
- 4) Perbaikan/Rehabilitasi TPS
- 5) Pemantauan Kinerja Pengelolaan Sampah di DKI Jakarta
- 6) Penyusunan Kebijakan Pengelolaan Sampah
- 7) Perencanaan Pembangunan Fasilitas Pengelolaan Sampah
- 8) Perencanaan Pemeliharaan Alat Pemusnah Sampah (L-Box)
- 9) Pembentukan dan Peningkatan Kapasitas Bank Sampah
- 10) Pemberdayaan Usaha dan Produk Daur Ulang Ramah Lingkungan
- 11) Pembinaan dan pengadaan sarana prasarana composting
- 12) Pembinaan Masyarakat Peduli Lingkungan
- 13) Penanganan Kebersihan Dengan Pekerja Kontrak Perorangan
- 14) Pendampingan Persiapan Pembangunan ITF
- 15) Pemeliharaan Saringan Sampah
- 16) Pemeliharaan Prasarana dan Sarana TPST Bantar gebang
- 17) Pembangunan saringan sampah di pesisir
- 18) Pemeliharaan Fasilitas Pengolahan Sampah di Pesisir
- 19) Pemeliharaan Saringan Sampah
- 20) Pengadaan Alat Biopori dan Kelengkapannya
- 21) Pengadaan Dermaga Sampah
- 22) Pengadaan Lahan untuk Perluasan Area Pembangunan TPS
- 23) Pengadaan Penyekat Sampah
- 24) Pengadaan Mesin Kapal Tempel



- 25) Pengadaan Penunjang Penanganan Sampah
- 26) Pemeliharaan Kendaraan Bermotor Truck ( ATPM)
- 27) Pemeliharaan Kendaraan Operasional Road Sweeper (ATPM)
- 28) Pemeliharaan Kendaraan Operasional Gerobak Motor
- 29) Pengadaan Ponton Sampah Sungai/Kali
- 30) Pengadaan Tempat Sampah Pilah
- 31) Pengadaan Truck Compactor
- 32) Pengambilan Sampah Bawah Laut
- 33) Pengelolaan Fasilitas Jembatan Timbang
- 34) Pengadaan Perahu Karet
- 35) Pengadaan Ponton Sampah Sungai/Kali
- 36) Peningkatan TPS Limbah B3 Skala Kecamatan
- 37) Peningkatan TPS Limbah B3 Skala Kota
- 38) Penyediaan BBM KDO/KDO Khusus
- 39) Perbaikan Emplasemen Perintis Kemerdekaan, BKT Marunda,

Adapun pencemaran air laut di Jakarta diukur dalam kadar zat kimiawi dan biologis sebagai berikut:

- BOD (Biochemical Oxygen Demand): Menunjukkan jumlah oksigen yang diperlukan oleh mikroorganisme untuk menguraikan bahan organik dalam air. Diukur dalam miligram per liter (mg/L).
- COD (Chemical Oxygen Demand): Menunjukkan jumlah oksigen yang dibutuhkan untuk mengoksidasi bahan kimia dalam air. Diukur dalam miligram per liter (mg/L).
- TSS (Total Suspended Solids): Menunjukkan total partikel padat yang terlarut dalam air. Diukur dalam miligram per liter (mg/L).
- pH: Menunjukkan tingkat keasaman atau kebasaan dalam air.
- DO (Dissolved Oxygen): Menunjukkan jumlah oksigen yang terlarut dalam air. Diukur dalam miligram per liter (mg/L).

Data ini dapat digunakan untuk memantau dan mengukur tingkat pencemaran air laut di Jakarta berdasarkan parameter-parameter tersebut. Pastikan untuk mengumpulkan data yang aktual dan akurat dari sumber yang sah jika ingin melakukan analisis lebih lanjut.

Tahun	Kuartal	BOD (mg/L)	COD (mg/L)	TSS (mg/L)	pH	DO (mg/L)
2018	Pertama	8,5	22,1	14,3	7,2	6,7
	Kedua	9,2	23,5	15,2	7,0	6,5
	Ketiga	10,1	24,8	16,5	7,3	6,8
	Keempat	8,9	22,7	14,9	7,1	6,6
2019	Pertama	8,3	21,5	13,8	7,2	6,6
	Kedua	9,6	23,8	15,6	7,1	6,4
	Ketiga	10,5	25,2	16,8	7,4	6,7
	Keempat	9,2	22,9	15,2	7,0	6,5
2020	Pertama	7,9	20,8	12,5	7,3	6,7
	Kedua	8,8	22,1	14,0	7,2	6,6

Tahun	Kuartal	BOD (mg/L)	COD (mg/L)	TSS (mg/L)	pH	DO (mg/L)
	Ketiga	9,9	23,5	15,3	7,1	6,5
	Keempat	8,6	21,9	13,8	7,4	6,8
2021	Pertama	8,2	21,3	12,9	7,2	6,7
	Kedua	9,1	22,7	14,4	7,1	6,6
	Ketiga	10,0	24,1	15,8	7,3	6,8
	Keempat	9,0	22,3	14,6	7,0	6,5
2022	Pertama	7,8	20,6	12,3	7,2	6,6
	Kedua	8,7	21,9	13,7	7,1	6,4
	Ketiga	9,8	23,3	15,1	7,4	6,7
	Keempat	8,5	21,6	13,5	7,0	6,5
2023	Pertama	8,1	21,0	12,6	7,3	6,7
	Kedua	9,4	22,4	14,2	7,2	6,6
	Ketiga	10,3	23,8	15,5	7,1	6,5
	Keempat	9,1	22,1	14,0	7,4	6,8

Dari data tersebut diperoleh beberapa informasi antara lain:

Stabilitas Seiring Waktu: Semua parameter — BOD (Biochemical Oxygen Demand), COD (Chemical Oxygen Demand), TSS (Total Suspended Solids), pH, dan DO (Dissolved Oxygen) — tetap relatif stabil selama bertahun-tahun, hanya menunjukkan fluktuasi kecil.

Tidak Ada Pola Musiman yang Kuat: Data tidak menunjukkan pola musiman yang signifikan, menunjukkan bahwa kuartal dalam setahun tidak memiliki dampak yang kuat pada salah satu parameter yang diukur.

Ringkasan Statistik:

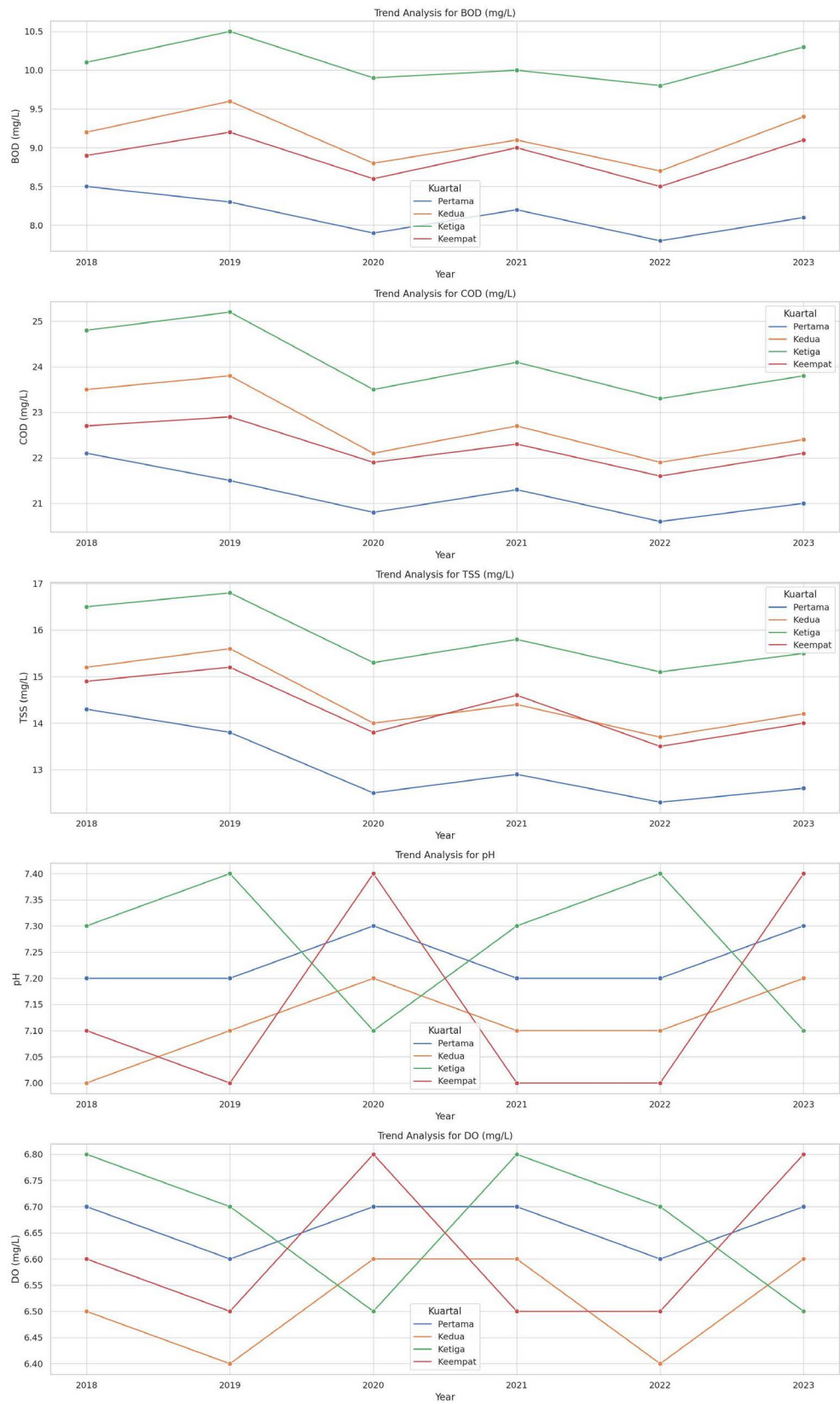
Tingkat BOD berkisar antara 7,8-10,5 mg / L, dengan rata-rata 9,06 mg / L.

Tingkat COD berkisar antara 20,6-25,2 mg / L, dengan rata-rata 22,58 mg / L.

Tingkat TSS berkisar antara 12,3-16,8 mg / L, dengan rata-rata 14,44 mg / L.

Tingkat pH relatif stabil, berkisar antara 7,0 hingga 7,4, dengan rata-rata 7,19.

Tingkat DO berkisar antara 6,4 hingga 6,8 mg / L, dengan rata-rata 6,62 mg / L.



Dalam segi kebijakan pemerintah pesisir Jakarta menggerakkan program tahunan sebagai ajang kampanye bersih seperti:

Tahun	Fasilitas Pemrosesan	Program Edukasi
2018	2 TPST, 5 TPS	Kampanye "Jakarta Bersih"
2019	3 TPST, 6 TPS	"Sekolah Hijau"
2020	3 TPST, 7 TPS	"3R: Reduce, Reuse, Recycle" Workshop
2021	4 TPST, 8 TPS	Pekan Lingkungan
2022	4 TPST, 9 TPS	Eco-Fair

Dimana program ini efektif dalam menggerakkan entitas bisnis dalam ikut serta berpartisipasi dalam kampanye untuk mereduksi sampah pesisir.

Jumlah dari desa pada tepi laut atau pesisir pantai pada lokasi penelitian adalah seperti yang terdapat dalam tabel dibawah ini:

Provinsi	Panjang Garis Pantai (km)	Desa Tepi Laut	% Desa Tepi Laut	Pencemaran Industri Dari Sampah Pabrik (Jumlah Desa)		
				Air	Tanah	Udara
Sumatera Barat	2,312.71	133	10.33	2	n/a	3
DKI Jakarta	275.5	17	6.37	n/a	n/a	1
Banten	896.06	146	9.41	15	4	34
Sulawesi Selatan	1,937.00	520	17.04	16	1	15

Disamping itu, data pendukung lainnya berkenaan dengan kontribusi industri bisnis ditampilkan dengan data berikut:

Bisnis dan Industri Pesisir Yang Berkontribusi Dalam Sampah	Sumatera Barat	DKI Jakarta	Banten	Sulawesi Selatan
Industri Kulit	13	6	3	3
Industri Furniture	99	7	104	363
Industri Logam	44	4	28	167
Kerajinan	24	4	12	35
Industri Tekstil	30	7	24	57
Industri Pakaian	76	9	52	211
Industri Galian	44	-	33	102
Industri Kayu	53	1	86	195
Industri Makanan	91	10	115	375
Industri Minuman	91	8	103	313
Industri Tembakau	2	-	-	5

Bisnis dan Industri Pesisir Yang Berkontribusi Dalam Sampah	Sumatera Barat	DKI Jakarta	Banten	Sulawesi Selatan
Industri Kertas	-	-	-	2
Industri Percetakan	28	1	18	94
Industri Angkutan	14	2	10	91
Industri Reparasi	30	2	26	90
Industri Lainnya	6	1	8	33
Mini Market	42	9	73	116
Restoran/ Rumah Makan	61	7	64	95
Warung/ Kedai Makanan Minuman	111	15	104	378
Toko/Warung Kelontongan	130	15	123	516
Hotel	20	7	30	42
Penginapan	43	7	40	67
Perikanan Tangkap (termasuk biota lainnya)	27	4	13	99
Perikanan Budidaya	1	1	1	58

Selain itu ditam

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PENULISAN ARTIKEL PADA JURNAL:

**Business sector's contribution to the blue-green economy through circular waste management in coastal areas**

**Abstract**

The objective of this Business Community-based study on waste management to examine how localized blue-green economy practices successfully address the business-environment-awareness-sustainability nexus in the coastal region in Indonesia. Note that the blue economy is an integration of sustainable development and green growth, which highlights overall coordinated planning and development (ADB, 2022). The triple bottom line concept can be utilized regionally by communities to drive sustainable economic development growth (Chen et al., 2020). This research aims to explore how businesses can contribute to the development of a blue-green economy model that promotes sustainable growth while addressing environmental and social issues. The novelty of the research is finding the main product areas/ sectors that contribute/ support the blue-green economy in coastal Indonesia, especially in the regions of West Java, West Sumatra and South Sulawesi, and knowing the awareness of the society towards the waste management to support the system. Where in the future this will support the optimization/minimization of waste management, and provide economically added value to businesses in coastal areas of Indonesia. The method used is an environmentally extended input-output (I-O) framework in which as many of these estimates as possible are included, allowing the estimation of environmental impacts and costs of different economic sector activities, final consumption activities and resource consumption in coastal areas. From the research, the contribution of businesses, in this case, businesses in blue-green businesses that support sustainability through business waste management in coastal areas will be identified.

**INTRODUCTION**

The research problem of a business-related study on the development of blue-green economic models is not explicitly mentioned in the search results provided. However, the articles suggest that the blue economy is an economic model that aims to eliminate waste, use resources efficiently, and encourage recycling and recovery (Martínez-Vázquez et al., 2021; Wenhai et al., 2019). Moreover, most management research on the Blue Economy is based on a sustainable development perspective. Keen et al. (2018) designed a conceptual framework for the Blue Economy that can be used to assess sustainable marine management (Wenhai et al., 2019). Sarker et al. (2018) also developed a management framework of blue growth emphasizing the transformation of economic development models.

The significance of this research is to promote sustainable development by integrating the blue economy (marine and coastal resources) with the green economy (renewable energy, sustainable agriculture, etc.).



However, there are several challenges to implementing this model. One of the challenges is designing standards of waste handling model for blue-green infrastructure (Nandy et al., 2022; Oliveira Neto et al., 2021; Santeramo, 2022). There is a need for certification systems that can ensure that new developments meet environmental standards. Another challenge is regulatory pathways. Regulations must be put in place to ensure that businesses operate sustainably. This requires cooperation between governments, businesses, and civil society. Socio-economic challenges are also a significant obstacle to implementing the blue-green economic model (Ahmed et al., 2022). The transition to a sustainable economy may require significant changes in employment patterns and social structures. It may also require investment in education and training programs. Finance ability is another challenge (ADB, 2022; Thompson, 2022; Tirumala & Tiwari, 2022). The transition to a sustainable economy requires significant investment in infrastructure and technology. Therefore, governments must provide incentives for businesses to invest in sustainable practices.

In connection with this study, numerous studies have used environmentally extended input-output analysis (EEIOA) to assess the impact of trade on the environment. Recently, process-based life cycle assessment (LCA) has been used to supplement EEIOA in studying the environmental impacts of trade. This study aims to compare the results of EEIOA and process-based LCA in assessing the environmental impacts of EU trade, with a focus on trends, products, emissions, and resources used. The study brings two key novelties: a common characterization framework is used for both modeling approaches, and converging conclusions are identified for policy-makers while also highlighting drivers for discrepancies between the results. A part from that, the study by (Weidema & Wesnæs, 1996) explain about the procedure for data quality management in life cycle inventory applied to energy inventory and (Merciai & Heijungs, 2014) discussing about environmental policy analysis, and several others such as the accounting of waste management accordingly supporting the explanation about the topics in blue-green economy. However, there are very limited studies on waste management linked to blue-green economy utilizing life cycle extended input-output applied in the ASEAN context, especially in Indonesia.

Since the blue economy is an integration of sustainable development and green growth, highlighting overall coordinated planning and development (ADB, 2022), the triple bottom line concept can be utilized regionally by communities to promote sustainable growth of economic development (Chen et al., 2020). In general, the debate in research on community-based blue-green economy is in understanding how this type of economic system can be effectively implemented and sustained in local communities. There is limited research on the feasibility of blue-green economy models at a local level and the potential impacts of such initiatives (Chen et al., 2020).

A closer look to the literature, reveals a number of gaps and shortcomings, there is a lack of research exploring the potential for local stakeholders to develop and benefit from these types of economies. Furthermore, there is a need for more research into the potential for blue-green economy initiatives to create a more equitable distribution of resources and to reduce the effects of waste pollution on local communities and their business (Bergen, 2023; Spaniol & Rowland, 2022).

Subsequently, there was some evidence from the study Kontovas et al. (2022); Martínez-Vázquez et al. (2021); Tucci et al. (2021) supporting to gain insight into waste management incentive models that support a blue-green economy, explore how the coastal business community can contribute to the development of a blue-green economy model that promotes sustainable growth while addressing environmental, socio-economic issues on how environmental pollution caused by waste affects the income of coastal communities, as well as try to find key product areas/sectors that contribute to supporting a blue-green economy in Indonesia's coastal areas through waste management.

## **LITERATURE REVIEW**

### **Community-Based Blue-Green Economy**

According to (Chen et al., 2020) Stakeholders who directly earned their livelihood from local ecosystem

services, such as fishers, were also engaged when they could see tangible benefits and practices of conservation actions, such as improved biodiversity and more aquatic species, or an increase in high value. fish stocks.

The demonstration of some good local blue economy practices that successfully reconcile the protection of local oceans and seafarers with safeguarding the livelihoods of and addressing the aforementioned challenges related to the link in coastal communities(Oliveira Neto et al., 2021; Pace et al., 2023).

In addition, the application of the concept of the blue economy in society will be measured in several ways depending on the challenges and needs faced by these communities and the local environment, so no one-size-fits-all approach can be proposed(Reynolds et al., 2022).

However, these cases also share some cross-cutting experiences and lessons learned (Merciai, 2019; Merciai & Heijungs, 2014). A more updated study by (Santeramo, 2022; Tucci et al., 2021) identified that the poverty-environment is multi-dimensionally interrelated. It was governed by complex factors, greater attention is now being given to how marginalized communities could maintain measures that can minimize the negative impact of degradation on their ecosystems and the means of subsistence associated with collective action(Pace et al., 2023).

As shown in the cases studied by Chen et al.( 2020); Louey, (2022), community practice or implementation of a blue-green economy is manifested differently in different local contexts; in the three different countries, a variety of approaches and activities were developed to address the common challenge of protecting the ocean and its resources and securing human economic welfare The issues featured in this article elucidate how vulnerable coastal communities can be in a position to care for the environment, and how community and community intervention in these communities helps to preserve the resources on which their livelihoods depend(Chen et al., 2020).

H1: The contribution of the coastal business community to the blue-green economy through waste management

### **The Coastal Waste Management and Blue-Green Economy**

Nandy et al., (2022) participated in research on plastic and electronic waste. Both pose immense threats to the health of wildlife and the environment, which ultimately end up in societal and economic structures, as evidenced by the Covid crisis. The proper management of these wastes and innovation ideas for new sustainable technologies are the need of the hour.

The Circular Economy Act with green technology is the way to meet this predicament. The current perspective presents an overview of the scenario concerning problems in full swing and shows some measures that have been taken or that are planned to depend on in order to study a subset of these blue entrepreneurs have focused on marine plastic pollution mitigation, as much is known about the deployed business models and their associated barriers and in this emerging industry.(Black et al., 2020; Dijkstra et al., 2022).

The conclusion of this article strongly stated that the majority of marine litter in Indonesia is derived from land-based waste or often called marine plastic litter so the increased effort is needed to stop the inappropriate disposal of waste plastics through a combination of education, economic-based instruments such as incentives/disincentives, adequate legislation, and strong law enforcement. Hermawan (2019) recommended that regulators/policymakers should understand more deeply the issues of marine plastic litter from various points of view so that the solution is not solely based on the legal aspects approach. Keywords-Law and economic approach, marine plastic litter

In the meantime, Mmereki (2018) and Dijkstra et al.(2022) investigates effective waste management practices and noted that not all about legislative solutions, but a combination of environmental, social, technical, and technically skilled human resources, financial and technological resources, resource recycling, environmental pollution awareness programs and public participation. As a result of insufficient resources, municipal solid waste (MSW) in transition and development remains a challenge, and it is often not yet given the highest priority. The study by Mmereki(2018) also finds that waste management practices in Botswana are affected by: a lack of effective implementation of national waste policy, fragmented tasks and overlapping

mandates among relevant institutions; lack of clear guidelines on the responsibilities of the generators and public authorities and the associated economic incentives; and lack of consistent and comprehensive solid waste management policies; lack of intent by decision-makers to prepare national waste management plans and systems, and design and implement an integrated sustainable municipal solid waste management system. Due to these challenges, Abila(2018); Bergen(2023); Mmereki (2018) reveals that there are concerns over the growing trend of the illegal dumping of waste, creating mini dumping sites all over the country, and such actions jeopardize the efforts of lobbying investors and the tourism business. Insight from those research is the recommendations for concerted efforts are made to support decision-makers to re-organize a sustainable waste management system, and this paper provides a reference to other emerging economies in the region and the world.

Business actors' role in creating a contribution to the Blue Economy by developing new technologies, services, and products that can simultaneously stimulate economic growth and deliver environmental benefits. A study by (Black et al., 2020; Mmereki, 2018; Voyer & van Leeuwen, 2019) regarding a subset of this blue-green focused on sea waste pollution mitigation since little is known about the business models deployed and their associated drivers and barriers in this emerging industry. Mishra et al., (2022) utilize a multiple case study approaches to analyze the business models of 96 startups working to manage marine plastic and identify four business model categories: 1) consumer-targeted solutions, 2) government and business solutions, 3) companies focused on value chain development, and 4) startups that generate revenue to fund plastic waste recovery. These distinctions in how they create environmental benefits, as well as their economic value capture or revenue models.

In addition, the investigation of the blue-green economy is designed in three stages: scanning, scenario-building, and strategic orientation, and uses a combination of foresight methods to encourage creative thinking and exploration(Pace et al., 2023). The scenarios developed in the various studies describe alternative future worlds built on the establishment of self-sustaining communities and engaged societies; the diffusion of growth of blue ecosystem services and open and collaborative research infrastructures that impact different sectors of the blue economy. Foresight can be used to complement decision support systems and other quantitative approaches for setting the research agenda and for decision-making on sustainability strategies in marine sciences. The process contributes to the development of future competencies on an institutional level and helps to establish a future-oriented mindset for strategic planning(Bidstrup et al., 2015; Groen & Heijungs, 2017).

H2:Waste pollution affects the income of the coastal business

### **Incentive Model of Sustainability**

The strategies for promoting this incentive-based source separation model are also discussed in the study by Xu et al. (2015) expounds that municipal solid waste management (MSWM) is most important and challenging in large urban communities. Sound community-based waste management systems normally include waste reduction and material recycling elements, often entailing the separation of recyclable materials by the residents. Moreover, (Li et al., 2021; Zhou et al., 2021) commented that an incentive-based source separation model was designed to increase the efficiency of source separation and recycling. This model embraced the concepts of rewarding households for sorting organic waste, government funds for waste reduction, and introducing recycling enterprises for promoting source separation. Results show that after one year of operation, the waste reduction rate was increased and the comprehensive net benefit under the incentive-based source separation model also grow, compared to that under the normal model. The stakeholder analysis (SA) shows that the centralized MSW disposal enterprises had minimum interest and may oppose the start-up of a new recycling system while recycling enterprises had a primary interest in promoting the incentive-based source separation model, but they had the least ability to make any change to the current recycling system.

According to Xu et al., (2015), particularly in the case of a pilot community, the recyclable waste collection amount increased by 229.3%, but the weekly pattern analysis suggested adjusting the amount of

cardboard, strawboard, plastic bottles of old clothes among the six items identified for the amount of collection and better allocate them to waste collection operations.

Current research by Abila, (2018); Bergen, (2023) also covers drivers for household willingness to recycle municipal solid waste on environmental risk, behavioral economics, resource value, economic benefit, convenience, knowledge, legislation, and belief. The result of the study asserts the hypothesis that financial incentives for recycling are vital for reducing and managing municipal solid waste sustainably. The most important driver for household willingness to recycle municipal solid waste is the detrimental environmental impacts. A moderate to positive relationship exists between households' perception of financial incentives for recycling and drivers for household willingness to recycle municipal solid waste. Besides that, Abila, (2018), recommends adopting the extended producer responsibility (EPR) model, and reverse vending options, amongst other approaches, to promote a recycling culture among citizens and residents in Nigeria

### Identifying Socio-Geographical Dimensions of The Blue-Green Economy

The absence of key geographical concepts has the potential to lead to uneven development processes and regional differentiation. Previous research has sought to clarify the ontological separation of land and sea or has conceptualized the blue economy as a complex governmental project that opens up new governable spaces and rationalizes particular ways of managing marine and coastal regions (Garland et al., 2019; Graziano et al., 2022). More recently, geographers have called for a critical—and practical—engagement with the blue economy.(Tsiouvalas et al., 2022) articulates a comparative study of the status quo, challenges, and opportunities of fisheries and aquaculture in Alaska and northern Norway and seeks to explore the potential for cross-sectoral synergies between the two regions in the context of the blue economy. (Graziano et al., 2022)uses graphical representations to highlight the differences in conceptualizing the Blue Economy in ways that affect its weight and contribution to regional economies. Further, it analyses how each definition has fared in the post-2007/2011 crisis, assessing their resilience. This novel work tackles the emerging discourse around the Blue Economy by highlighting its regional character, and by problematizing the divergent definitions of the concept. In another way, for example, (Louey, 2022) maps the construction and mobilization of the blue economy concept in the Pacific Islands over the last ten years through case studies of three regional bodies in the pacific islands. On the other hand, (Black et al., 2020) have reviewed the geography of marine plastics research, and the pervasive and persistent effects of plastic on the marine system to aid the discussions of comprehensive mitigation measures. The discussion points raised in this paper highlight the need for a global systems perspective that considers geography, environmental impacts, and sources to develop effective mitigation responses to marine litter.

(Lee et al., 2021) also adds comments on the mapping of the interface on the blue economy that in specific dimensions of the total environment, clusters of growth and sustainable development, spatial planning and environmental management, and environmental sustainability and the blue economy are presented. The analysis outcomes show that specific areas from the total environment (growth, spatial planning, environmental management, and environmental sustainability) are directly linked to the blue economy where a call for a wider range of studies in the future is identified.

Table 1 Summary of Systematic Literature Review

<b>Paper title</b>	<b>Summary</b>	<b>Authors</b>	<b>Year</b>	<b>Region</b>	<b>Outcomes measured</b>	<b>Detailed study design</b>
Development of a Protocol for a Sustainable Blue Economy	The Gulf of Elefsis is characterized by a developed coastal zone.	A. Pournara, F. Sakellariadou	2022	Greece	The protocol for a sustainable blue economy in the coastal	a case study

<b>Paper title</b>	<b>Summary</b>	<b>Authors</b>	<b>Year</b>	<b>Region</b>	<b>Outcomes measured</b>	<b>Detailed study design</b>
in the Coastal Zone: Case Study and Preliminary Results in a Coastal Industrial Area in the Eastern Mediterranean					zones	
The Analysis of the Conceptual Framework of Green Port Implementation in Indonesia Using Circular Economy: The Case Study of Benoa Public and Fishing Terminals	The integration model has the potential to generate new energy by recycling waste from all related entities in the production of a few main fishing products such as tuna, sardine, and squid.	R. O. S. Gurning, Daniel Imanuel Tangkau	2022	Indonesia	Application of Green Port using the circular economy approach and mixed linear programming model	a case study
Coastal City Environmental Protection and Governance: Reviewing Residents' Recycling of Renewable Resources for Waste Management in China	The rational use of waste can not only solve the environmental problems in their daily life.	Sheng-feng Shih, Meng-chen Lin, Li-Fen Lin	2021	China	Residents' awareness and daily behavior of renewable resources utilization	a survey
Zero Waste Pattern for Small and Medium Enterprises (SMEs) in Indonesia, Using the Concept of Blue Economy	The implementation of the Blue Economy concept in community empowerment in coastal areas is carried out by revitalizing sustainable	Muhamad Mujahidin, B. Paramita	2021	Indonesia	The implementation of the Blue Economy concept in community empowerment in coastal areas is carried out by revitalizing sustainable	descriptive and qualitative stusy

<b>Paper title</b>	<b>Summary</b>	<b>Authors</b>	<b>Year</b>	<b>Region</b>	<b>Outcomes measured</b>	<b>Detailed study design</b>
	development.				development.	
Quantitative Selection of Leading Industries of Green Economy in Coastal Cities Based on Industrial Relevance	The leading industries of green economy in coastal cities are selected quantitatively.	Zhiyu Li, Shao Ju, Meng Duan, Songfeng Cai	2020	Shandong Province, China	• leading industries of green economy in coastal cities	a quantitative selection model of industrial relevance to the level of economic development
Turning waste management into a carbon neutral activity: Practical demonstration in a medium-sized European city.	By using an adequate combination of several treatment options and increasing the separate collection of recyclable materials it is possible to turn municipal solid waste management into a carbon neutral activity as well as improve its economic balance.	A. Fernández-Braña, Gumersindo Feijoo, Celia Dias-Ferreira	2020	a medium sized European city	• carbon footprint • environmental impacts • economic sustainability	a Life Cycle Assessment (LCA) with focus on carbon footprint, followed by Life Cycle Costing (LCC) of municipal solid waste (MSW) management
A Study on Green Taxation and its Impact on Economic Development: A Mini-Review	Green taxation policies have faced many challenges mainly due to their negative	H. Al-Alawi, Haitham Nobanee	2020	Abu Dhabi	The green taxation implementation	a mini review

<b>Paper title</b>	<b>Summary</b>	<b>Authors</b>	<b>Year</b>	<b>Region</b>	<b>Outcomes measured</b>	<b>Detailed study design</b>
	impact on the economy such as an increased rate of unemployment.					
Evaluating Green City Development in Coastal Regions of East China	The construction of green cities is an important aspect of green economic development and its connotations.	Jianling Li	2019	China	• degree of low carbon green development in Shanghai	a case study
Towards a sustainable and equitable blue economy	Bold policies and actions are urgently needed to chart a course towards an environmentally sustainable and socially equitable blue economy.	Nathan J. Bennett, Andrés M. Cisneros-Montemayor, Jessica Blythe, Jennifer J. Silver, Gerald Singh, Nathan Andrews, Antonio Calò, Patrick Christie, Antonio Di Franco, Elena M. Finkbeiner, Stefan Gelcich, Paolo Guidetti, Sarah Harper, Ngaio Hotte, John N. Kittinger, Philippe Le Billon, Jane Lister, Rocío	2019		The risks of developing blue economy and its risks	The blue economy is growing rapidly and has the potential to be a major contributor to global economic growth.

Paper title	Summary	Authors	Year	Region	Outcomes measured	Detailed study design
		López de la Lama, Emma McKinley, Joeri Scholtens, Ann- Magnhild Solås, Merle Sowman, Nicolás Talloni-Álvarez, Lydia C. L. Teh, Michelle Voyer, U. Rashid Sumaila				
Environmental upgrading in global value chains: The potential and limitations of ports in the greening of maritime transport	Ports can intervene in two main ways to improve the environmental performance of maritime transport beyond their organizational and physical boundaries.	René Taudal Poulsen, Stefano Ponte, Henrik Sornn-Friese	2018		• "low 'tool implementation complexity' and high 'issue visibility' concerning emissions"	a examination of the results, limitations, and future potential of voluntary initiatives by selected port authorities

## METHODS

### Research Methods

The study uses time series data obtained from the Indonesian Central Statistics Agency in the targeted regions (West Java, Central Java and South Sulawesi), as well as other data relevant to the study conducted. The data was further analyzed using descriptive and quantitative analysis. The descriptive approach in this study was carried out through a life cycle assessment (LCA). LCA is a method used to analyze the environmental impacts caused by the raw material procurement process, production process, to waste treatment. Meanwhile, the quantitative approach is carried out through input-output (I-O) analysis which is continued by the location quotient (LQ) method and shift share. The I-O analysis used is Indonesia's 2016 I-O data and is a table of total producer price transactions with a classification of 17 business sectors. Meanwhile, the LQ method is carried out to make a comparison between the role of an economic sector in an area to the magnitude of the role of the same economic sector nationally. The shift-share method is carried out to analyze the structure of the economy in an area, leading sectors shift at a certain period and find out the position of the economic sector of a region towards a wider area (Beylot et al., 2020; Tukker & Heijungs, 2008).



### **Life Cycle Assessment (LCA)**

The LCA method is carried out through the life cycle inventory (LCI) stage. LCI is a life cycle assessment phase that involves the compilation and qualification of inputs and outputs for products throughout the life cycle within the range specified in the research objectives. Then the next stage is the classification of the impact of selection, classification, characterization, normalization, grouping, and weighting, as well as evaluation, documentation, and determining the results of the LCA.

### **Location Quotient (LQ) Method**

The LQ method is a method used to determine the base sector and non-base sector by comparing the percentage of contributions of each sector in PDRB in several regions in Indonesia with the same percentage of sector contribution to Indonesia's GDP. The LQ method has the following form of the equation:

$$LQ = \frac{v_i/v_t}{V_i/V_t} \quad (i)$$

Where:

- LQ = location quotient
- $v_i$  = sector i output in an area
- $V_i$  = national sector i output
- $v_t$  = total output of the area
- $V_t$  = national total output

There are 3 criteria for the LQ calculation results, namely if  $LQ > 1$  then the commodity becomes a base or becomes a source of growth; if  $LQ = 1$  then the commodity is classified as non-base which means it has no comparative advantage; and if  $LQ < 1$  then the commodity belongs to non-base.

### **Shift-Share Method**

Analysis using the shift share method is carried out to analyze the economic structure of an area. The formula of the shift share method is as follows:

$$g_i = G + (G_i - G) + (g_i - G_i) \quad (ii)$$

Where:

- $g_i$  = regional economic growth of sector i
- $G_i$  = national economic growth sector i
- $G$  = national economic growth
- $g_i$  = regional economic growth

Shift share analysis provides data on the performance of regional economies in 3 parts that relate to each other, namely national share ( $G$ ) which is measured by analyzing changes in the aggregate work of the economy as a whole. Then the industry mix ( $G_i - G$ ) which measures relative change. Finally, the regional shift ( $g_i - G_i$ ) which determines how far the competitiveness of the regional (local) industry is with the national economy that is used as a reference.

### **Input-Output Method**

The basic framework of the I-O model consists of four quadrants. The first quadrant shows the flow of goods and services produced and used by sectors in an economy. The second quadrant indicates full demand or the use of goods and services not for the production process which usually consists of household consumption, government spending, inventory, investment, and exports. The third quadrant shows the primary impact of the production sectors. The last quadrant shows primary inputs that are directly distributed to the final demand sectors. Figure 1 shows the basic framework of the I-O model.

Quadrant I: Transactions between activities (nxn)	Quadrant II: Final request (nxm)
Quadrant III: Primary inputs of the production sector (pxn)	Quadrant IV: Final request primary input (pxm)

Figure 1. Basic Framework of the I-O Model

Table 1 shows the simplification of the I-O table. Based on the simplification, two balanced balance equations can be made:

Line:

$$\sum_{j=1}^n x_{ij} + f_i = x_i; \forall i = 1, 2, 3, \dots, n \quad (\text{iii})$$

Column:

$$\sum_{i=1}^n x_{ij} + v_j + m_j = x_j; \forall i = 1, 2, 3, \dots, n \quad (\text{iv})$$

Where:

$x_{ij}$  = flow of value of goods and services from sector i to sector j

$f_i$  = total final consumption

$v_j$  = value added

$M_j$  = import

Table 1. Simplification of I-O Table

Seller Sector	Buyer Sector				Final Request	Total Production
	1	2	...	n		
1	X11	X12	...	X1n	F1	X1
2	X21	X22	...	X2n	F2	X2
...	...	...	...	...	...	...
N	Xn1	Xn2	...	Xnn	Fn	Xn
Added Value	V1	V2	...	Vn		
Import	M1	M2	...	Mn		
Total Input	X1	X2	...	Xn		

Source: Subanti dan Hakim (2009)

A balanced balance sheet means that the amount of production is equal to the number of inputs. Flows can be transformed into coefficients by assuming that the amount of various purchases is fixed for a total level of output and there is no possibility of substitution between an input raw material and other input raw materials. These coefficients are:

$$a_{ij} = x_{ij} / x_j \quad (\text{v})$$

or

$$x_{ij} = a_{ij} x_j \quad (\text{vi})$$

By substituting equation (vi) to equation (III), it can be obtained:

$$\sum_{j=1}^n a_{ij} x_j + f_i = x_i; \forall i = 1, 2, 3, \dots, n \quad (\text{vii})$$

In equation notation (vii), it can be written as follows:

$$AX + f = X \quad (\text{viii})$$

Where  $a_{ij} \in A_{n \times n}$ ;  $f_i \in f$ ; dan  $x_i \in x_{n \times 1}$

By parameterizing the equation (viii), the basic relationship of the I-O table is obtained as follows:

$$(I - A)^{-1} f = x \quad (ix)$$

The notation  $(I - A)^{-1} f = x$  is named as the Leontief inverse matrix (input multiplier matrix). This matrix contains important information about how an increase in production from one sector will lead to the development of another sector.

### Multiplier Effect and Inter-Sectoral Linkage Analysis

1. The output multiplier is carried out to see the impact of changes in the final demand of a sector on all existing sectors per unit of change in the type of multiplier. The measurement procedure begins with formulating the income impact as follows:

$$O_j = \sum_i^n \alpha_{ij} \quad (x)$$

Where  $O_j$  is the output multiplier of sector  $j$ ;  $\alpha_{ij}$  is an element of Leontief's inverse matrix.

2. The income multiplier effect is used to see the magnitude of the increase in people's total income for each increase in one unit of output produced by a sector. The measurement procedure begins with formulating the income impact as follows:

$$M = \hat{V}(1 - A^d)^{-1} \quad (xi)$$

Where  $M$  is an  $n \times n$ -sized revenue impact matrix;  $\hat{V}$  is an  $n \times n$ -sized income coefficient matrix;  $(1 - A^d)^{-1}$  is the matrix of the total output multiplier.

The matrix is a diagonal matrix  $\hat{V}$ , therefore the impact of income is the multiplication of the diagonal matrix of the income coefficient by the output multiplier. The impact of the change in revenue to:

$$\Delta M = \hat{V}(1 - A)^{-1} \Delta F \quad (xii)$$

The income multiplier figure for sector  $j$  is formulated:

$$y_j = \frac{\sum_{i=1}^n m_{ij}}{v_j} \quad (xiii)$$

Where  $y_j$  is the income multiplier,  $m_{ij}$  is the element of the income matrix row  $i$  column  $j$ ,  $v_j$  is the income coefficient of sector  $j$ .

3. The multiplier effect of employment opportunities is used to see the role of a sector in terms of the increasing number of workers that can be absorbed by an economy. The impact of employment opportunities can be formulated as follows:

$$E = \hat{L}(1 - A^d)^{-1} \quad (xiv)$$

Where  $E$  is the employment opportunity impact matrix,  $\hat{L}$  is the labor coefficient matrix. This matrix is a diagonal matrix with its components obtained by:

$$l_j = \frac{TK_j}{X_j} \quad (xv)$$

Where  $TK_j$  is the number of workers of sector  $j$  and  $X_j$  is the total input of sector  $j$ . Change in the number of workers required due to changes in the final domestic demand of each sector is formulated by:

$$\Delta E = \hat{L}(1 - A^d) \Delta F^d \quad (xvi)$$

The multiplier of employment opportunities of sector  $j$  is formulated as follows:

$$z_j = \frac{\sum_{i=1}^n e_{ij}}{l_j} \quad (xvii)$$

Where  $z_j$  is the job opportunity multiplier;  $e_{ij}$  is an element of the employment opportunity impact matrix ( $E$ ) row  $i$  column  $j$ ; and  $l_j$  is the labor coefficient  $j$ .

4. The analysis of direct linkages going forward is the ability of a sector to drive the production growth of other sectors that use inputs from this sector. The calculation of the analysis of direct linkages ahead is as follows:

$$IKDL_i = \frac{n \sum_{j=1}^n a_{ij}}{\sum_{i=1}^n \sum_{j=1}^n a_{ij}} \quad (xviii)$$

Where  $IKDL_i$  is the index of direct linkage to the future of sector  $i$  and  $a_{ij}$  is the input coefficient between sector  $j$  coming from sector  $i$ .

5. An analysis of the direct linkage backwards is the ability of a sector to increase the growth of its upstream industry. This index measurement uses the following formula:

$$IKBL_j = \frac{n \sum_{j=1}^n a_{ij}}{\sum_{i=1}^n \sum_{j=1}^n a_{ij}} \quad (\text{xix})$$

Where  $IKBL_j$  is an index of direct linkage to the back of sector  $j$  and  $a_{ij}$  is the input coefficient between sector  $j$  originating from sector  $i$ .

### Results and Discussion

Permasalahan sampah umum dihadapi pada daerah perkotaan di negara Asia Tenggara, seiring meningkatnya jumlah penduduk, diikuti oleh peningkatan pendapatan, perubahan pola konsumsi, pertumbuhan ekonomi, serta urbanisasi dan industrialisasi sehingga mengakibatkan meningkatnya potensi timbulan sampah perkapita dan beragamnya jenis sampah yang dihasilkan (Nguyen & Schnitzer, 2009).

Laut secara langsung maupun tidak langsung adalah tempat pembuangan sampah dan limbah dari berbagai aktivitas manusia. Dengan demikian maka di laut akan dijumpai berbagai jenis sampah dan bahan pencemar lainnya (Siahainenia, 2001). Menurut Greenpeace (2006), sampah laut atau marine debris adalah semua material berbentuk padatan yang tidak dijumpai secara alami (merupakan produk kegiatan manusia) di wilayah perairan (Samudra, Lautan, Pantai) dan dapat memberikan ancaman secara langsung terhadap kondisi dan produktivitas wilayah perairan serta memerlukan aksi spesifik tertentu untuk mencegah dan meminimalisir efek negatifnya. Sampah lautan bisa mencapai tempat lain oleh arus laut dan angin dan bisa menempuh jarak yang sangat jauh dari sumbernya.

Sampah Laut adalah sampah yang berasal dari daratan, badan air, dan pesisir yang mengalir ke laut atau sampah yang berasal dari kegiatan di laut (KKP, 2022). Berdasarkan data KLHK tahun 2019, jenis sampah yang banyak ditemukan di perairan laut di Indonesia adalah sampah plastik sebesar 42 persen, kayu 24 persen, dan karet 13 persen. Jenis plastik yang terbanyak adalah plastik jenis Poly Propilene (PP), High Density Poly Ethylene (HDPE), dan Styrofoam. Diketahui bahwa timbulan plastik meningkat dari 6,7 juta ton di tahun 2013 menjadi 7,4 juta ton di tahun 2019. Persentase rata-rata peningkatan timbulan sampah berbanding lurus dengan persentase peningkatan jumlah penduduk dengan rata-rata agregat di kota dan desa yaitu 1,96 persen per tahun (KLHK, 2020).

Pencemaran laut oleh sampah plastik membawa dampak buruk bagi biota laut dan keanekaragaman hayati Indonesia. Sampah plastik menimbulkan risiko kesehatan hewan air secara langsung termasuk ikan, penyu, burung, karena salah konsumsi, yaitu pendarahan internal dan bisul serta penyumbatan pada saluran pencernaan (Wright, et al dalam Cordova, 2017). Tidak hanya dampak langsung pada hewan air. Kuantitas sampah plastik yang berukuran besar juga dapat menutup permukaan sedimen laut dan mencegah pertumbuhan benih mangrove. Sedangkan sampah plastik yang berukuran kecil atau mikroplastik kemungkinan menjadi makanan bagi biota laut kecil lain misalnya ikan- ikan kecil, plankton, kepiting, dan kerang (Cordova, 2017). Secara tidak langsung, hal ini dapat membahayakan kesehatan manusia karena biota laut tersebut juga menjadi sumber pangan bagi manusia.

Sampah dari industri pengolahan ikan yang dibuang dapat dijadikan tepung atau kerajinan bunga. Untuk usaha rajungan tersebut terindikasi zero waste. Zero Waste secara sederhana juga diartikan menghilangkan sampah yang tidak perlu dan tidak diinginkan dari setiap produk dan setiap tahap daur hidupnya. Zero Waste terdiri dari banyak konsep yang dapat dikembangkan untuk system pengelolaan sampah berkelanjutan termasuk menghindari, mengurangi, menggunakan kembali, mendesain ulang, menghasilkan kembali, daur ulang, memperbaiki, pabrikasi kembali, menjual kembali dan mendistribusi ulang sumber daya sampah. Konsep Zero Waste terus berkembang, tidak berhenti sebatas daur ulang tetapi juga restrukturisasi desain produk untuk mencegah timbulnya sampah di tahap awal (United Nations Economic Commission for Europe, 2011). Gambar 6.4. Memperlihatkan prinsip-prinsip kota Zero Waste yang jika diimplementasi dengan baik maka kota dapat berubah menjadi kota Zero Waste. Pada saat ini sampah merupakan salah satu masalah terbesar di Indonesia. Setiap hari jumlah sampah semakin

bertambah tidak hanya berasal dari sampah rumah tangga, sampah rumah sakit dan sampah ditempat umum jumlahnya semakin tidak terkendali jika dibiarkan sampah tersebut akan menimbulkan permasalahan seperti mendatangkan penyakit, memberikan dampak negatif terhadap lingkungan dan menyebabkan banjir.

Berdasarkan jenisnya, sampah terdiri dari dua yakni sampah organik dan sampah anorganik (KLHK, 2019). Sampah organik jika diolah dengan benar bisa dijadikan pupuk kompos dan bisa menggantikan pupuk kimia. Sampah Anorganik jika diolah dengan baik dan benar, dengan cara 3R, Reduce, Reuse dan Recycle. Sampah anorganik tersebut dapat di daur ulang menjadi kerajinan tangan, hiasan rumah ataupun barang yang dapat digunakan kembali (Setianingrum, 2018; Sekarningrum et al., 2020) Sampah kaca dapat dimanfaatkan untuk pembuatan batu tiruan ataupun manik-manik. Data Timbulan Sampah pada tahun 2021 menurut Kementerian Lingkungan Hidup dan Kehutanan (KLHK) secara nasional sebesar 84.607 ton per hari atau setara 30,88 juta ton per tahun. Komposisi jenis sampah yang dihasilkan adalah 39,81% berasal dari sampah organik (sisa makanan dan tumbuhan), 17,7% berasal dari sampah plastik, 12,97% berasal dari kayu atau ranting, 12,09% berasal dari kertas/karton kemudian sisa sampah lainnya berasal dari logam, karet, kain, kaca dan lainnya. Diperlukan kebijakan dan upaya yang luar biasa oleh pemerintah dan masyarakat agar permasalahan sampah ini bisa teratasi dan tidak terus meningkat. Diperkirakan pada tahun 2050 komposisi sampah akan lebih dari dua kali lipat.

Dari permasalahan diatas sebenarnya sampah memiliki potensi ekonomis dan dapat menciptakan peluang lapangan pekerjaan baru dengan penerapan 6R yaitu rethink (memikirkan kembali), refuse (menolak), reduce (mengurangi), reuse (menggunakan kembali), recycle (mendaur ulang), dan repair (memperbaiki). Stable Water Quality: The data indicates that water quality has been fairly consistent over the years in terms of BOD, COD, TSS, pH, and DO. This could be seen as a positive sign, assuming that the levels are within acceptable limits for the intended use of the water.

Lack of Seasonal Impact: The absence of strong seasonal trends suggests that external factors linked to different seasons (e.g., rainfall, agricultural runoff) may not be significantly affecting the water quality, at least based on these parameters.

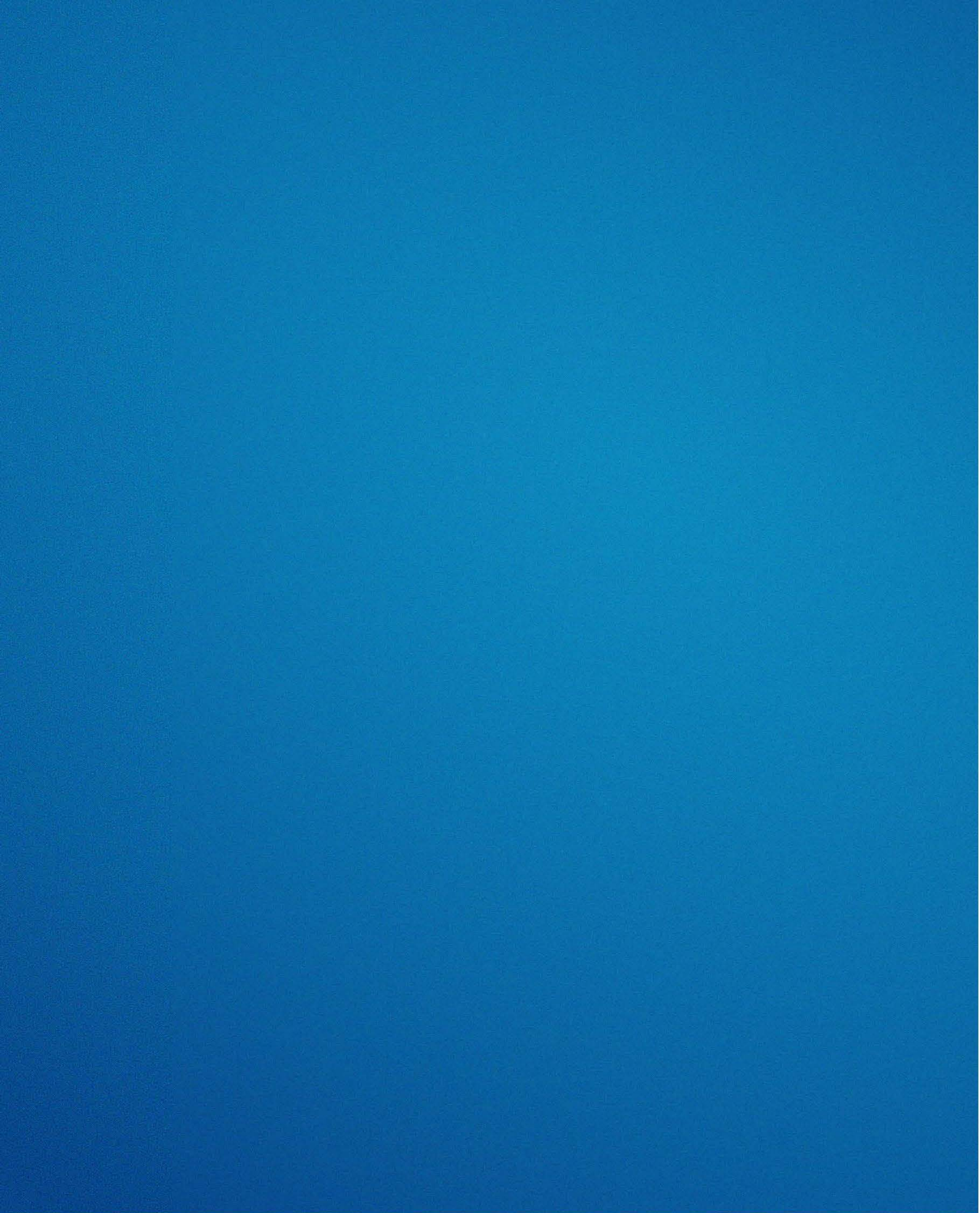
Further Investigation: While stability is generally good, it's crucial to compare these levels to regulatory standards or guidelines to assess whether they are within acceptable limits. If not, even stable but out-of-range values could be problematic.

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