Issue : 4 Volume: 1 2022 ISSN : 2652 7987(Online) ISSN : 2652 7995(Print)

THE BLUE PLANET

A MAGAZINE ON SUSTAINABILITY

TOWARDS KNOWLEDGE SHARING

...We pose MAJESTIC ONLY when we are in our NATURAL habitat...

Aspire to attain Sustainability?
Let's understand contemporary.
Sustainability or ESG Frameworks

...and MORE on Carbon Accounting, Sustainable Finance, and how climate change & Biodiversity loss are intertwined...

#biodiversitymatters

I ♡ NATURE

PHOTOGRAPHY SERIES

Photography by Alankar Chandra

Contents

Photography by
Ratnadeep Khan

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Editorial

The Blue Planet is a multi-disciplinary magazine published by ACSDRI – Knowledge Press, a publishing unit of the Australian Centre for Sustainable Development Research & Innovation (ACSDRI) – A Research Foundation.

This magazine aims to disseminate knowledge and propagate dialogue on the sustainability agenda to a mass audience. The magazine accepts topics related to Sustainable Development Goals (SDGs), green innovation relating to SDGs, the circular economy, public policy, green projects, management, environmental science, and other related topics. The magazine has both print (ISSN: 2652-7995) and online (ISSN: 2652-7987) versions. The magazine welcomes scholarly contributions in the form of articles and reports from both academics and professionals.

In this edition, the magazine has eleven chapters covering various topics that contribute to the sustainable development agenda. The cover story introduces a conceptual understanding of carbon accounting and sustainable finance. The article highlights that sustainable investment has grown by 55% between 2016 and 2020. Globally, the cumulative value of sustainable investment is about $35.3 trillion in 2020.

The article by Lotti Fraser and Duncan Power educates readers about how the multi-dimensional approach of Dana Asia helps marginal communities in the Philippines fight poverty and plastic waste. Dr. Ritu Bhati's action research is grounded on the objectives of SDG-7 and provides a model on how to educate youth about energy conservation to bring about behavioural change among the younger generation.

Dr Jacob Deem provides an insightful understanding of the power dynamic between government, citizens, and business. The article educates on the freedoms and rights one can enjoy in a modern democracy. The collective authorship of Tarique Faiyaz, Dr Tari Vinaya Satyawan Savitri, and Nabeela Siddiqui presents how India's National Green Tribunal made a legal intervention to curb the menace of pollution of the rivers Ganga and Yamuna.

Attaining holistic sustainability is an aspiration of all communities of the world. Dr. Kuntal Goswami, Dr. Kazi Islam, and Winton Evers jointly provide insightful comparisons of all major contemporary sustainability frameworks and highlight the extent of sustainability practices among significant organizations worldwide. Dr. Steve Andrews explains how the "Healing Sea Country Program" of Envirotech Education empowers the Moreton Bay Island community to take the environmental initiative into their own hands and create an accredited local environmental workforce.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

sustainable procurement objective motivates its vendors to integrate and implement sustainability practices in its decision-making process and operation. In the article, Biofuels – The Renewable Energy Sector's Sleeping Giant Andrew Ly argues that biofuels are generally made relatively quickly from waste or by-products, thereby eliminating the need for ecosystem destruction due to open-cast mining or drilling kilometres into the Earth's crust for oil.

Mark Parnell, the ex-Green Senator of South Australia, reflects on the erosion of public participation rights as a retired environmental lawyer and member of parliament.

The final chapter is a photo-infographic series complementary to ACSDRI's #biodiversitymatters campaign. In this edition, the theme highlights the interlinkage between climate change and biodiversity loss.

The magazine also illustrates nature photography to promote LOVE for NATURE. In 2022, ACSDRI conducted the #biodiversity matters Nature photography contest in association with VIBGYOR

The contributors of the I LOVE NATURE – Photography Series are as follows:

- ***Mark Freed.***
- ***Alankar Chandra.***
- ***Umar Belo Galadima.***
- ***Enam Elahe Mullick.***
- ***Mark Parnell.***
- ***Sateja Rajwade.***
- ***Dr. Veena Sagar.***
- ***Vinod Shalivahana.***
- ***Jayesh Bhanushali.***
- ***Arvind Ahir.***
- ***Jayesh Bhanushali.***
- ***Bhaskar Nandi.***
- ***Rupesh Chindarkar.***
- ***Ketan Talati.***
- ***Srinivas Mallela.***
- ***Sourav Mahant.***
- ***Sagar Shinde.***
- ***Ashok Manjanath.***
- ***S.V.S Rao.***
- ***Devi Prasad Rao***
- ***Kakuloor Rohith Sai Goud.***
- ***Ashish Makani.***
- ***Ashok Manjanath***
- ***Rupam Bose.***
- ***Nivetha R. S.***
- ***Dr Steve Andrews.***
- ***Ravindranath Srinath Amingad.***
- ***Dr Kuntal Goswami.***
- ***Sivarajan S.***
- ***Hamukuwa Daisy.***

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

conducted the #biodiversity matters Nature photography contest in association with VIBGYOR and GECCI. In addition, some generous photographers were also gifted, or the magazine acquired high-quality nature photography.

We also take this opportunity to thank Mr Indranil Mukherjee from VIBGYOR – Photography & Videography (www.infovibgyor.com) and Abdul Hamid Tahir Hamid from GECCI – for their support and contribution. ACSDRI would also like to thank and acknowledge Kishan Chaniyara, BITNET Infotech, and Arjun Toñacao, for the graphic design of this magazine.

Contact: ***BITNET Infotech, www.bitnetinfotech.com ,***
Arjun Tonacao: ***tonacaoarjun. myportfolio.com/***

Co-editors of the magazine:

- ***Dr. Alison-Jane Hunter.***
- ***Dr Kuntal Gos wami.***

For future publications and collaboration, please contact:
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Registered Climate Active Consultant, Certified IPA Public Accountant, Registered Tax Accountant & ASIC Agent.

A Joint PhD (Australian National University-Charles Darwin University), Australia

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Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

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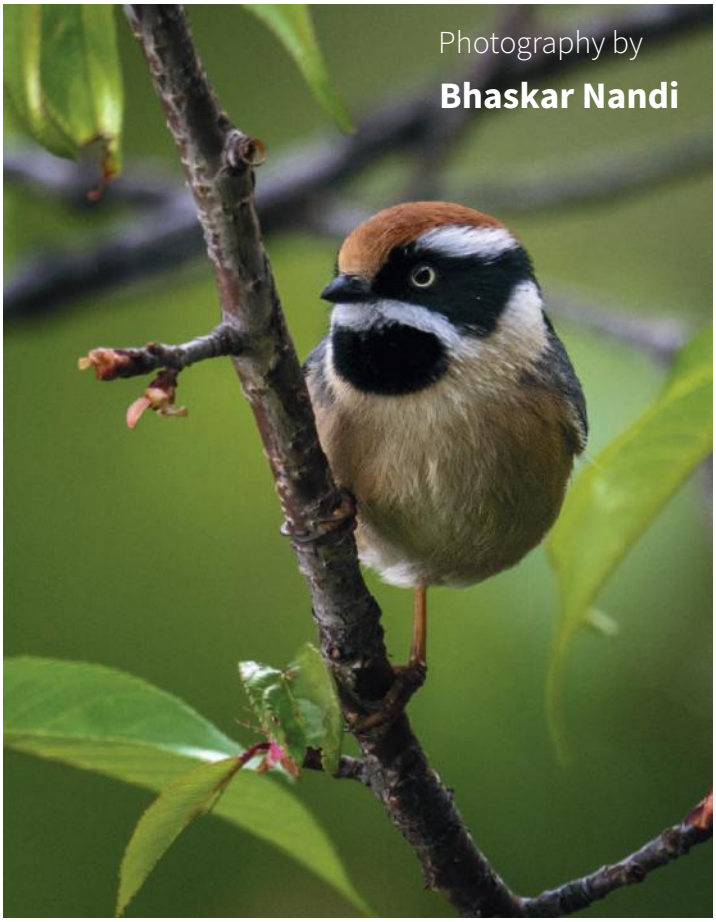

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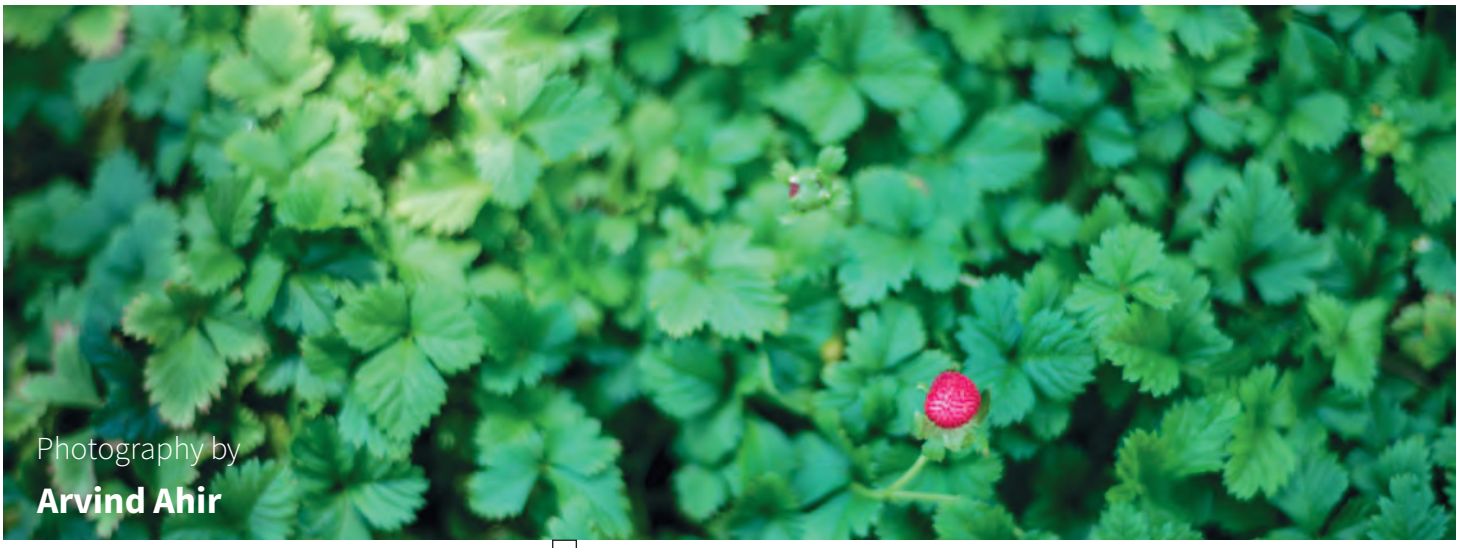

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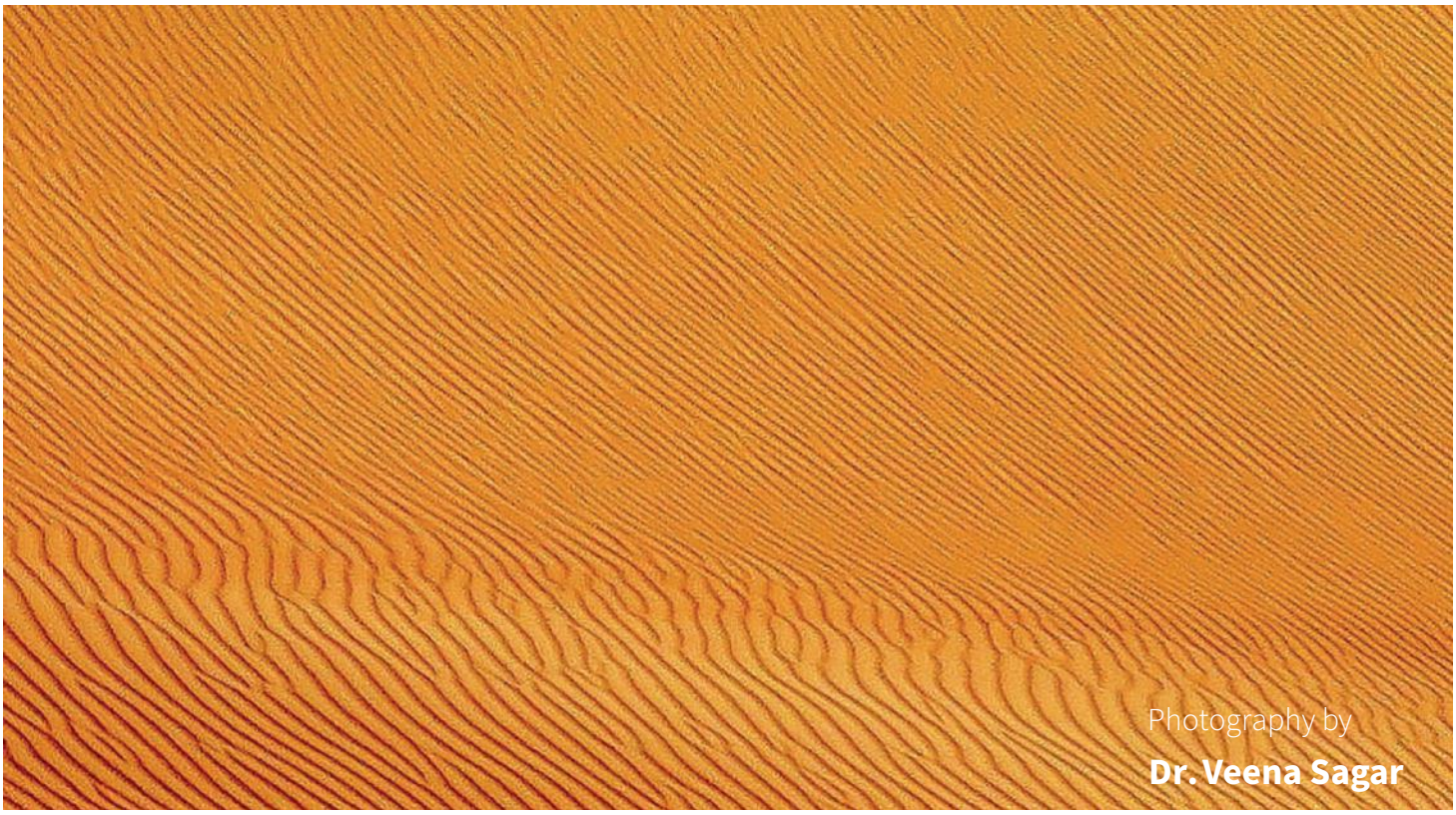
Dr. Veena Sagar



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ACSDRI

AUSTRALIAN
CENTER FOR SUSTAINABLE DEVELOPMENT
RESEARCH & INNOVATION

ABOUT US

The Australian Centre for Sustainable Development Research & Innovation (ACSDRI) is a not-for-profit research foundation with a key objective to promote research and education focusing on seventeen global Sustainable Development Goals

OUR MISSION

To advocate for how to live within the ecological limits of this BLUE PLANET – Our ONLY Home.

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Partner CARBON NEUTRAL ADELAIDE

eco PROFIT

Accounting & Business

CARE

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

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ACSDRI publish research articles, books, and scholarly articles in our multi-disciplinary magazine–THE BLUE PLANET.

Our flagship campaign, #biodiversitymatters, raises awareness to protect, conserve, and enhance the natural environment.

We also regularly conduct research seminars and conferences on various sustainability topics to promote ecologically sustainable development values and principles.

Key highlights of our activities in 2022

•Publication of the book - The Hidden Successes of Three Sustainability Policies Evidence from Three Australian States. They are published by ACSDRI- Knowledge Press. Visit: https://acsdri.com/ the-hidden- successes-of-three-sustainability-policies/

•Conducted the #biodiversitymatters Nature Photography Contest in association with VIBGYOR and GECCI.

•We have conducted a public seminar titled ***"Green Innovation & Sustainable Business Model-Pathway to Sustainable Development Goals"***, in association with EcoProfit, the Conservation Council SA, Carbon Neutral Adelaide, and Accounting & Business Care.

Learning from the 2022 Annual Seminar

Topic: Green Innovation & Sustainable Business Model-Pathway toSustainable Development GoalsModel-Pathway to Sustainable Development Goals

In the seminar, Darren Lutze, CEO of Inconmat (www.inconmat.com.au) showcased INNOVATION FOR SUSTAINABILITY in the construction and infrastructure industry. He mentioned that corrosion of steel reinforcement is one of the biggest problems in the construction industry.

It is estimated that Australia incurs about AU$ 13 billion per year to repair or replace existing infrastructure due to corrosion of steel reinforcement.

The risk of corrosion is likely to be aggravated further due to climate change.
Darren Lutze educated the audience about Fibe Reinforced Polymer (FRP) Bars and Geopolymer Concrete, a couple of innovations in the construction and infrastructure industry.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Darren Lutze

Glimpses of the seminar

We also had a four-member ***panel discussion*** on the Green Innovation Sustainable Business Model moderated by ***Matthew Wright-Simon.*** The panel members were ***Allys Todd*** (ValAi www.valai.com.au), ***Fiona Hancock*** (EY www.ey.com), ***Jacob Pickering*** (Bourkehood www.bourkehood.com), and ***Associate Professor Ashish Malik*** (University of Newcastle www.newcastle.edu.au).

All panel members put forward their intellectual arguments on how we can advance the Green Innovation & Sustainable Business Model – Pathway to Sustainable Development Goals.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Allys Todd advocated to encourage the spirit of start-ups and innovators because they are self-motivated, nimble, flexible, new, lack the burden of experience, and, most importantly, are not averse to risk and failure. Hence, large corporates need to support multiple start-ups and innovators to create an ecosystem of green innovators.

Fiona Hancock highlighted the lack of policy certainty in sustainability over the past decade or so. She mentioned that there is a need for more financial options to fund the sustainability agenda. Fiona also urged more transparency, disclosure, and standardization of sustainability reporting frameworks.

Jacob Pickering explained about innovation funding and tax incentives for R&D. Jacob elaborated on what constitutes R&D. It is not necessarily one needs to build a spacecraft or to invent a new drug to constitute R&D. It can be as simple as a company creating a new way to handle their waste products or a new way to save costs. R & D incentive is designed to help businesses to undertake this challenging work.

Associate Professor Ashish Malik educated the audience on how to bring about "Societal policy change" in general and in the context of how to move away from the business-as-usual situation towards sustainability. Assoc. Prof. Ashish mentioned that, in general, we need to address three key stakeholders to bring about any societal change: academia, industry, and government – which make a triple helix structure.

We must also figure out how to make these three stakeholders work together. The issue is that these stakeholders often cannot decode each other's communication.

As a solution, Assoc. Prof Malik elaborated on a theoretical term called the "Quadruple Helix," which means creating a community of practice or facilitators. These fourth-dimension groups can engage with the community to create a network and a sense of trust so that people can work together.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Alls Todd

Jacob Pickering

Fiona Hancock

The full video can be accessed from the link below
https://www.youtube.com/watch?v=rCBbFNs1zEs&t=1588s

Associate Professor Ashish Malik

Matthew Wright-Simon

We also had the opportunity to listen to ***Councillor Franz Knoll,*** City of Adelaide, ***Craig Wilkins,*** Conservation Council of South Australia, ***Mark Parnell,*** Ex-Senator of Parliament of South Australia, and ***Winton Evers,*** EcoProfit.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

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CARBON ACCOUNTING AND SUSTAINABLE FINANCE: THE NEW WAY FORWARD

Authors **Dr. Kuntal Goswami,** *Australian Centre for Sustainable Development Research & Innovation (ACSDRI)*
&
Winton Evers, *Eco Profit*

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Photography by
Mohamed Mazher Y

Strategizing to reduce Greenhouse Gas emissions is A global objective.

The Paris Agreement is the first legally binding international treaty to limit greenhouse gas emissions and combat climate change.

To successfully reduce greenhouse gas emissions and combat climate change, carbon accounting and sustainable finance are new ways forward.

Keywords: Carbon Accounting; Sustainable Finance; Paris Agreement; Greenhouse Gases (GHG); Scope 1 – Emissions; Scope 2 – Emissions; Scope 3 – Emissions; Carbon Neutrality; Steps to ZERO EMISSION; Carbon Offsets; Carbon Capture and Storage (CCS); Frameworks for Sustainable Finance System; Principles for Responsible Investment (PRI); Sustainable Bonds; Principles for Sustainable Insurance (PSI); Equator Principles; Principles for Responsible Banking; Task Force on Climate-related Financial Disclosures (TCFD);Sustainable Investment

Human-induced Climate Change

Palaeontological evidence suggests that about 66 million years ago, a catastrophic asteroid impacted Earth in the Yucatan Peninsula on the Gulf of Mexico, leading to more than a decade-long global climate change and environmental disaster. This catastrophic event resulted in a mass extinction of plants and animals, including dinosaurs.

Let us travel hypothetically to the distant future and a mythical alien planet. Now think of an intelligent being from another habitable planet reading an article or two intelligent beings are discussing – **"Why Homo sapiens became extinct on the Blue Planet or the Planet Earth?".** The answer is that they may read or discuss **– "Homo sapiens were themselves responsible for the destruction of the own and other species of their time."**

Earth's climate has gone through many roller -coaster peaks and declines.

However, about 7,000 to 5,000 years ago, the climate stabilized, and over the past 7,000 years, the temperature only changed by 0.5 degrees centigrade.

Because of this incredibly stable Earth's temperature and climatic conditions, human civilizations were able to blossom.

Scientific evidence shows that between 8,000 to 6,000 years ago, greenhouse gas levels remained stable or declined. However, greenhouse gases have risen slowly over the last 6,000 years as humans have begun clearing forests and burning fuels. It is believed that early human activities reversed the decline of greenhouse gases and stopped the eventuality of another ice age. In that respect, human-induced climate change started much earlier than we currently believed

Economic development, energy consumption, and carbon emissions have a direct nexus. Historically, human activities were fuelled by biomass, such as fallen wood from trees. In addition to that, we have also used animal fat and plant oils. These biomasses were extremely inefficient fuels as most embodied energy was lost during combustion. As a result, the intensity of economic activities and wealth creation could have been higher. However, there was enough available biomass to support the level of economic activities of those times.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

The Industrial Revolution was primarily fuelled by biomass between 1850 and 1900. Following that happened the expansion of global and local transport systems between 1900 - 1950. This expansion of the mass transport network was fuelled by fossil fuels such as coal and oil.

However, an unprecedented appetite for fossil fuels started around1950. Globally, we have started adopting high consumption based Western-style living standards. Further, this process was exacerbated by rapid industrialization in China and other emerging economiessince 2000.

An estimate highlights that we have released over 600 billion tonnes of trapped carbon into the atmosphere due to burning these fossil fuels.

With ever-increasing concentrations of anthropogenic greenhouse gases **(Carbon dioxide, Methane, Nitrous oxide, Hydrofluorocarbons, Sulphur hexafluoride, and Nitrogen Trifluoride)** in the atmosphere, the global average temperature increased by 1 degree Celsius in 2015 above pre-industrial temperatures (as recorded between 1880-1899).

In this context, the Paris Agreement in 2015 urged the community to limit global warming to well below 2 degrees Celsius, preferably to 1.5 degrees Celsius, compared with pre-industrial levels.

The current rise in the global average temperature by 1 degree Celsius above pre-industrial levels is already similar to or warmer than the peak temperature of the earlier Holocene epoch, which was around 8,000 to 7,000 years ago.

Hence, further concentrations of greenhouse gases in the atmosphere will only exacerbate the existential threat to humanity and other life on Earth.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Carbon Accounting: A step to combat Climate Change

The Paris Agreement is the first legally binding international treaty to limit the emission of greenhouse gases and to combat climate change.

Under this agreement, countries must submit their **Nationally Determined Contributions (NDCs)** – a plan for climate actionby 2020. By 2024, counties need to establish an **Enhanced Transparency Framework (ETF)** to report transparently on actions to advance climate change mitigation processes, adaption measures, and support for climate change.

The individual country's **ETF** report will be collated to track a global stocktake on the progress toward long-term action against climate change. Sustainable Development Goal 13 on Climate Action is also a significant global commitment.

In addition, the **Task Force on Climate-related Financial Disclosures (TCFD)** also recommended reporting on climate-related financial information. These three formal institutional pressures created a global obligation and commitment to measure our greenhouse gas emissions and to account for how much we are releasing previously trapped carbon into the atmosphere.

Over the decades, fossil fuel-based energy consumption has led to economic growth, facilitated rapid transportation, and improved the social conditions of humanity. However, at the same time, consumption of non-renewable fossil fuel-based energy also leads to greenhouse gas emissions, which results in significant adverse impacts on the environment, human life, destroyed infrastructure, and economic growth.

Ironically, we need even more energy to recover from the adverse impacts, to rebuild destroyed infrastructures, and to reinstate economic growth. Carbon emission is one of the most destructive outcomes of total greenhouse gas emissions.

Hence, there is a direct nexus between economic growth, fossil fuel-based energy consumption, and carbon emission. Studies have overwhelmingly confirmed that this nexus can be both unidirectional **(higher economic growth leads to an increase in carbon emission) and bidirectional (increase [or decrease] in economic growth causes increases [or decreases] in carbon emissions).**

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

The main reasons for this unidirectional relationship are:

a) a higher proportion of dependency on non-renewable fossil fuels in the total energy mix,
b) fossil fuel-based oil dependency for transportation and
c) higher energy demands for rapid industrialization, urbanization, and farming.

Hence, because of this concerningly unidirectional relationship between energy consumption and carbon emissions, there is a need to account for the amount of emissions we emit in our economic activities.

However, the magnitude may differ from country to country. For example, developing countries require higher, cheaper-cost fossil fuel-based energy instead of renewable sources. In the case of developed countries, the situation can be different, as these countries might be taking active policy action to combat climate change by shifting to alternative renewable energy. Germany is an excellent example of this shift.

The evidence suggests that higher energy consumption is necessary for economic growth; however, this growth will happen at the cost of environmental degradation. Therefore, intervention is required in the form of carbon taxes, carbon capture installations, reductions in the consumption of fossil fuels in the energy mix, and shifting to energy-efficient and environmentally friendly technologies.

These steps will reduce energy consumption and reduce the cost of production, leading to a green economy wherein governments can maintain economic growth with a less negative impact on the environment. In this process of transition and in the process of monitoring the level of emissions, carbon accounting is essential.

The evidence suggests that higher energy consumption is necessary for economic growth; however, this growth will happen at the cost of environmental degradation. Therefore, intervention is required in the form of carbon taxes, carbon capture installations, reductions in the consumption of fossil fuels in the energy mix, and shifting to energy-efficient and environmentally friendly technologies.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Counting Greenhouse Gases (GHG) Emissions

Carbon emissions can be both direct and indirect. Emissions that are produced from sources within the reporting organization's boundary or as a result of an organization's activities are called **Direct Emissions.**

Example: Emissions due to the heating of a boiler, energy generation, transportation of materials, manufacturing, onsite landfill, methane release from coal mines, and gas leaks from joints and seals.

On the other hand, if emissions happen because of a reporting organization's demand for goods and services or due to upstream and downstream value chain activities, those are called indirect emissions.

Hence, indirect emissions are all embedded in goods and services or the value chain of the reporting entity. For example, the consumption of electricity, upstream emissions from extraction and production of fossil fuels, downstream emissions during transportation of an organization's product to customers, and emissions from contracted/outsourced activities.

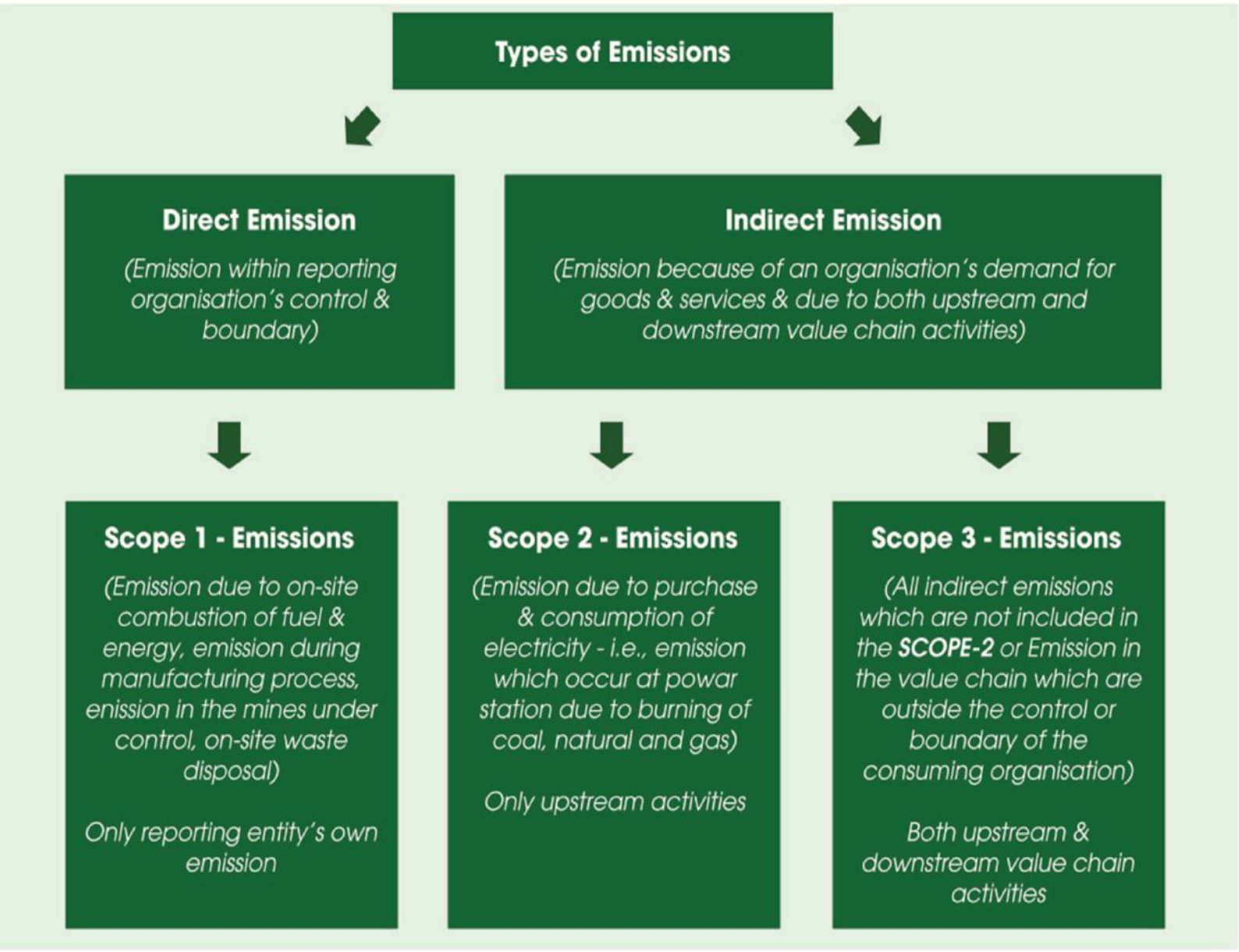
In the next step, it is essential to understand the proportion of ownership of emissions in the value chain. In this regard, the scope of emissions explains who 'owns' emissions and the level of control in the emissions process.

The **GHG Protocol** categorized emissions into three levels. **Scope-1 emissions** are the direct emissions of the reporting entity. The reporting organization wholly owned or controlled these emissions (examples: company-owned vehicles or emissions due to fuel consumption in the company's factory).

Scope-2 emissions are the indirect upstream emissions, especially those to purchase and consume electricity. **Scope-3 emissions are all the indirect upstream and downstream emissions in the value chain which are not included in scope-2.**

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Figure -1: Types of Emissions



Accounting for Scope 1, 2, and 3 emissions is governed by the Greenhouse Gas Protocol (GHG Protocol). The GHG Protocol is a multi-stakeholder-based standard for greenhouse gas accounting and reporting. In 1998, the GHG Protocol was launched as an initiative of **the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD).** Since then, several standards, guidelines, and protocols have been published, such as the GHG Protocol Corporate Accounting and Reporting Standard and the GHG Protocol Scope 3 Standard.

Under the GHG Protocol, Corporate Standard reporting on Scopes 1 and 2 is mandatory and reporting on Scope 3 is optional.
However, after the publication of the GHG Protocol Scope 3 Standard, reporting on all three scopes are mandatory.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Understanding Emission Factors

To identify and calculate GHG emissions, an organization needs to know the extent of its activity and emissions factors. An emission factor is a representative value that attempts to relate the quantity of a pollutant (e.g., kilograms of particulate emitted per megagram of coal burned).

Hence, emissions factors are activity-based values and provide estimated average emission rates of a given pollutant for a given source relative to activity units. An organization needs to use an emission factor to estimate GHG emissions per unit of specific activities.

The general equation for emissions estimation is:

E = A x EF x (1-ER/100)

where:

- **E = emissions.**
- **A = activity rate;**
- **EF = emission factor, and**
- **ER = overall emission reduction efficiency,**

Emissions are expressed in CO2 equivalents, making comparing the effects of different GHGs easier. It also facilitates the express required carbon offset credits in units of CO2-equivalent.

Human economic activities produce various greenhouse gases (GHGs) with different **Global Warming Potential (GWP)** levels. Greenhouse gases (GHGs) keep the Earth warm by absorbing energy and slowing the rate of energy escaping to space.

The greenhouse gases act as an insulating blanket. Each greenhouse gas has a different ability to absorb infrared energy and how long it stays in the atmosphere.

The GWP value of a particular GHG denotes the physical characteristic of a GHG and its level of impact on the greenhouse effect. The GWP values are a standard measurement unit that allows us tocompare the global warming impact of different gases.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

The value tells us how much energy the emission of 1 ton of a GHG will absorb over 100 years relative to the emission of 1 ton of Carbon dioxide on an equal basis. Hence, it is expressed as CO2 equivalent. When the quality of greenhouse gas is multiplied by GWP, it gives us the CO2 equivalent.

For example,
1 tonnes of CO2 x 1 = 1 tonne CO2 equivalent and,
1 tonnes methane x 28 = 28 tonne CO2 equivalent.

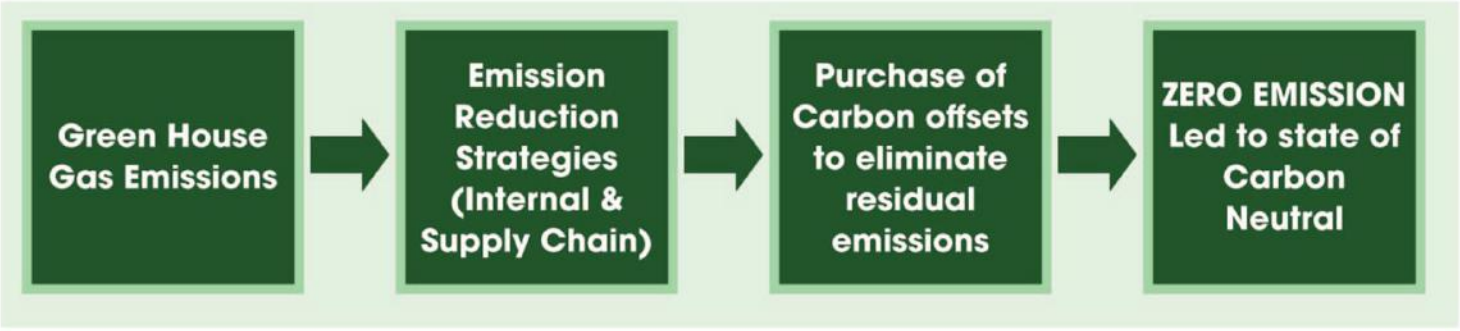
Table 1: Global Warming Potentials

Green House Gases	Global Warming Potential
Carbon dioxide	1
Methane	28
Nitrous oxide	265
Perfluoro methane (tetrafluoromethane)	6,630
Perfluoro methane (hexafluoroethane)	11,100
Hydrofluorocar-bons (HFCs)	Dependent on HFC type (HFC-23 => 12,400 Highest range)
Sulphur hexafluoride	*23,500*

The table shows that a small amount of **methane, nitrous oxide, sulphur hexafluoride, hydrofluorocarbon, and perfluoro methane** have much more capacity to create greenhouse effects in the atmosphere.
The larger the GWP of a particular GHG, the more it can warm up the Earth.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Figure 2: Steps to ZERO EMISSION



Road to Carbon Neutrality

Carbon neutrality includes emission reduction actions and buying carbon offsets to eliminate residual emissions. The first steps to achieving carbon neutrality include adopting strategies to reduce emissions from internal activities and from the supply chain.

The internal emissions reduction strategies include:

- Inventory of GHG emissions.
- Implementing internal mitigation strategies aligns with global goals to reduce CO_2 emissions by half by 2030 and achieve net-zero emissions by 2050.

  Steps include:
  - Investing in low-carbon capital projects,
  - Shifting to lower-emitting equipment, materials, and fuels,
  - Investing in energy efficiency measures and renewable onsite power.

Emission reduction strategies for the supply chain include:

- Estimate supply chain emissions,
- Estimate emissions embedded in the products,
- Implement mitigation strategies such as:
- Choosing low GHG emitting suppliers.
- Incentivizing suppliers to reduce GHG emissions.
- Re-designing products and services to reduce the GHG footprint.

The final step in the emissions reduction initiative is to purchase carbon offset credits to eliminate any residual emissions from the direct (scope-1) and indirect (scope-2 & 3) sources.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Understanding Carbon Offsets

A **carbon offset** or **carbon offset credit,** as called interchangeably, refers to reductions in GHG emissions or increases in carbon storage – which are happening elsewhere, and the benefits are passed on to other organizations through a transferable instrument certified by governments or independent certification bodies.
Carbon offsets arise out of projects which involve:

- Switching to renewable energy development from conventional power generation, thus ending fossil-fuel emissions,
- Capture of highly potent GHGs like methane, N2O, or HFCs,
- Avoiding deforestation.

Carbon offset programs are governed by international agencies (such as the United Nations **Clean Development Mechanism (CDM)** Executive Board, which oversees carbon offsets under the Kyoto Protocol), governmental regulatory bodies, or independent non-governmental organizations (NGOs). Carbon offset programs can have both environmental and social benefits and have three functions:

- Develop standards and criteria to set the quality of carbon offset credits.
- Review offsets projects against standards with the help of third-party verifiers.
- Maintain registry systems to keep records of issues, transfers, and retirement of offset credits.

The **Kyoto Protocol** has established project-based offset mechanisms:

- The Clean Development Mechanism (CDM), and
- Joint Implementation (JI).

The **Clean Development Mechanism (CDM)** is part of the United Nations Framework Convention on Climate Change (UNFCCC). It offers the opportunity to purchase carbon credits from offset projects in low- or middle-income nations to high-income countries' public and private sectors.

The CDM advances the sustainable development agenda in the host country. CDM projects generated emissions credits called **Certified Emission Reductions (CERs),** which are bought and traded**. Joint Implementation operates in** developed countries, and tradable units from JI projects are called **Emissions Reduction Units (ERUs).**

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Criteria for a high-quality carbon offset

The carbon offset scheme can be considered high-quality only if the following characteristics are there, such as:

- **Additionality:** In the context of emission reduction projects, the additionality of a project means that the only way the Project exists is because of the funding from carbon credits.

In other words, emission reductions or removals from a mitigation activity are additional if the mitigation activity has yet to take place without the added incentive created by the carbon credits.

- Not overestimated
- Permanent or permanent: Sequestration projects need to ensure that emissions are kept out of the atmosphere for a reasonable length of time. The longer the guarantee, the higher the relative quality of the offset credits.
- Not claimed by another entity.
- Not associated with significant social or environmental harms.

Road to address the Paris Agreement objectives.

Post the Paris Agreement, countries, regions, cities, and companies must invest intechnology and capacity building to meet carbon-neutral targets and zero-carbon solutions.

In the race to limit global warming below or up to 1.5 degrees centigrade, Carbon Capture and Storage (CCS) can play a vital role. The Carbon Capture and Storage technology prevents the release of carbon dioxide (CO2) into the atmosphere by capturing CO2 produced during the industrial production process, compressing it for transportation, and injecting it in carefully selected secure and deep geological sites for permanent storage. The technology has been used in industrial settings to purify natural gas, hydrogen, and other gases since 1930.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

A report published by The Nature Conservancy prescribed six pathways to a green energy build-up:

- Identify and approve low-environmental impact zones for renewable energy development.
- Develop renewable energy plants and transmission with a low impact on wildlife and habitats.
- Develop science-based guidelines and standards for green energy plant developers and lenders on identifying or what constitutes low-impact project siting and design.
- Incentivize the development of renewable energy projects in brownfields (former closed mine sites, former industrial sites, already contaminated unusable and degraded lands) over greenfield sites.
- To make buying low-impact renewable energy a corporate commitment to address their sustainability goals (social equity, environmental consideration, and financial profit) for both climate and nature.
- Incorporate environmental and social performance standards into financial institutions' lending criteria to ensure renewable energy investments are undertaken in low-impact zones and avoid impacts to nature and communities.

Hence, to combat climate change, both for adaptation and mitigation, we require green technology and infrastructure and new financial instruments in the form of sustainable finance.

Sustainable Finance: To finance the future

Sustainable Development Goals (SDGs) and the Paris Agreement are the two most urgent global commitments we must address by 2030 and beyond. However, we need technology and finance to speed up the transition towards a sustainable economy.

An estimate of the United Nations Environment Programme Finance Initiative (UNEP FI) mentioned that globally, we need to invest about US $ 5 to 7 trillion a year in infrastructure, clean energy technology, water, and sanitation to meet SDGs and Paris Agreement objectives.

As a result, banks, insurers, and investors across the globe have pledged to integrate sustainability into their operations. It is estimated that the global market for sustainable finance has grown manifold from USD 11.3 billion in 2013 to USD 183 billion in 2018. Hence, sustainable finance will play a vital role, alongside sustainable technology, in accelerating the transition towards a sustainable global economy.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

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In 1992, the **United Nations Environment Programme Finance Initiative (UNEP FI)** was set up, and in the same year, the Convention on Biological Diversity was organized.

Since the 2000s, many international frameworks have been published, such as

- The Equator Principles (2003),
- Principles of Responsible Investment (2006),
- Principles UNEP Inquiry into a Sustainable Financial System (2014),
- Addis Ababa Action Agenda,
- Sustainable Development Goals (SDGs) (2015),
- The Paris Agreement on Climate Change (2015)

Following the publication of these frameworks, policymakers and regulators have focused on developing sustainable finance markets

For example, some of the initiatives are:

- Issue of Climate Awareness Bond by the European Union in 2007,
- Issue of the first Green Bond in 2008 by the World Bank,
- Task Force on Climate-related Disclosures (TCFD) in 2015,
- The Chinese Green Bond Project catalogue in 2015,
- French Energy Transition Law and Article 173 in 2015,
- The Network for Greening for Financial Systems (NGFS) in 2017,
- The EU Action Plan on Sustainable Finance in 2018,
- The Principle for Responsible Banking in 2019,
- EU Taxonomy for Sustainable Activities (2020),
- Finance for Biodiversity Pledge (2020)

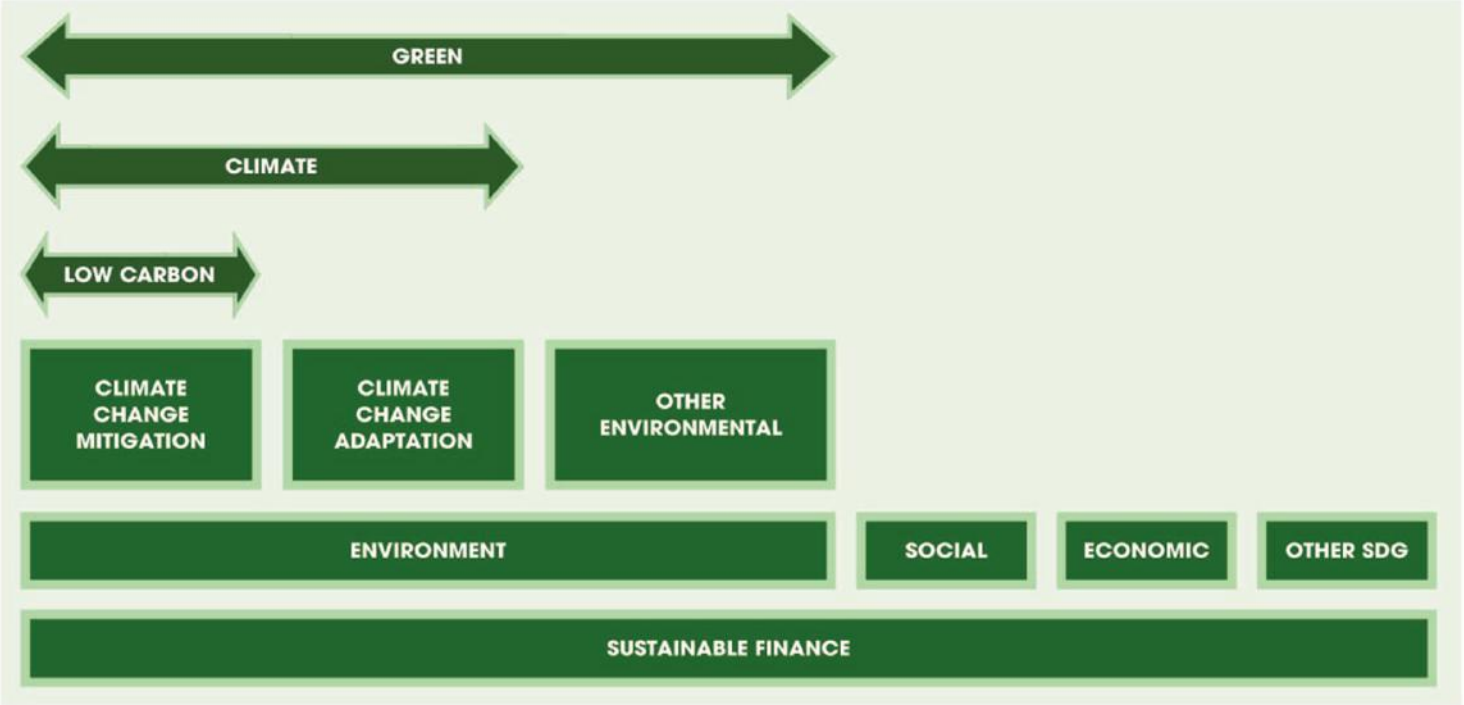
Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Sustainable finance provides desired financial returns and positive social and environmental outcomes, where both traditional finance and investment (primarily focus on financial performance) and ethical or philanthropic donation operate at a sub-optimal level (only focusing on social and environmental performance).

Why Sustainable Finance and Key Elements of Sustainable Finance?

The finance sector has an essential catalytic role in addressing economic, social, and environmental challenges. It can influence the future of business decision processes and business operations. It can motivate investors to embed holistic sustainability values in new investments.

Figure 3: The Anatomy of Sustainable Finance



The Finance sector encourages potential borrowers to present their social and environmental risks and impact assessments before approving their loan proposals. Sustainable finance will reduce the risk of loss, strengthen brand reputations, support the transition to a low-carbon economy, meet stakeholders' and regulators' expectations, and facilitate the advancement of sustainable development goals.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Sustainable Finance has four key elements:

1) Finance focuses on **expected returns and associated risks.**
2) **Governance** focuses on systems, processes, and oversights that ensure an organization and its products deliver on its financial, social, and environmental goals.
3) **Social focuses** on the positive social impact of investments.
4) **Environmental focuses** on green investment, such as investment in climate change mitigation, investments in adaptation to the physical impacts of climate change, and investments in biodiversity conservation.

Four key Frameworks for sustainable finance systems

Over the decades, several initiatives have been undertaken to develop systems and markets for sustainable finance.

The Principles for Responsible Investment (PRI), Principles for Sustainable Insurance (PSI), Equator Principles (EI), and Principles for Responsible Banking are four fundamental pillars of the sustainable finance ecosystem.

Principles for Responsible Investment (PRI): This was launched in 2006 as a joint initiative of the UNEP Finance Initiative and the **UN Global Compact,** in partnership with investors. PRI advocates for responsible investment and provides principles to incorporate environmental, social, and governance (ESG) factors into investment and ownership decision-making processes.

The PRI is a framework for the institutional investment industry, including insurance and non-insurance institutions (e.g., insurance companies, pension funds,government reserve funds, foundations, endowments, depository organizations, and investment management companies).

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

The six Principles for Responsible Investment are:

1) To incorporate ESG issues into investment analysis and decision-making processes.
2) To be active owners and incorporate ESG issues into policies and practices.
3) To Seek appropriate disclosure on ESG issues by the entity's investment.
4) To Promote acceptance and implementation of the Principles within the investment industry.
5) To work together to enhance our effectiveness in implementing the principles.
6) To report on our activities and progress towards implementing the principles.

To advance sustainable investment policies and regulations in any jurisdiction, policymakers need to define five areas in their policy documents:

- Corporate ESG Disclosures define the issuer's obligation to publish relevant corporate strategies, operations, and performance on key ESG issues so that investors get material ESG performance information on the investee's investment proposal before making investment decisions and lending engagement. The prescribed regulatory guidelines on corporate ESG disclosures need to be aligned with the Task Force on Climate-related Financial Disclosures (TCFD) recommendations.

- Stewardship is the long-term value of economic, social, and environmental assets on which returns and clients' and beneficiaries' interests depend.

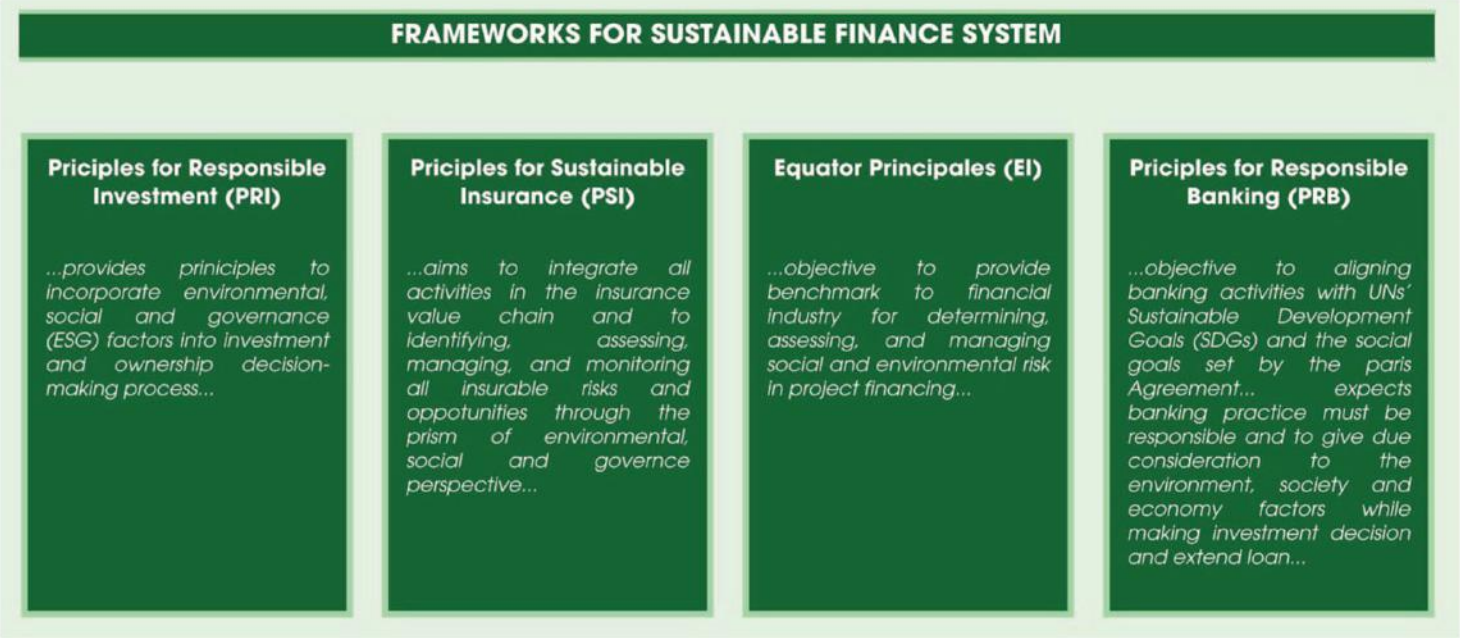
- Investor ESG Regulations demand better ESG disclosures so that disclosing and incorporating ESG information in decision-making becomes a fiduciary duty and obligation of the asset owners and investment managers.

- Taxonomies creating a common language between investors, issuers, project promoters, and policymakers so that investors can assess whether a particular economic activity is environmentally and socially sustainable (e.g., what constitutes green or sustainable activities or projects or helps to measure the level of sustainability of investments), whether projects follow robust ESG standards and have the potential to navigate the transition to a low-carbon, inclusive, sustainable economy.

- National Sustainable Strategies prescribing a framework so that the financial sector transits towards or supports goals of sustainable and inclusive growth by aligning economic and financial goals with the Paris Agreement and the SDGs.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Figure-4: Four Governing Frameworks for Sustainable Finance System



Principles for Sustainable Insurance (PSI): The growing environmental, social, and governance challenges changed the global risk landscape and led to the launch of PSI in 2012 via the United Nations Environment Programme Finance.

Sustainable insurance aims to integrate all activities in the insurance value chain and to identify, assess, manage, and monitor all insurable risks and opportunities through the prism of the environmental, social, and governance perspectives.
The PSI Principles are a framework for the insurance industry.

Principles for Sustainable Insurance has four principles:

- To embed environmental, social, and governance issues in decision-making relevant to business (including company strategy, risk management, underwriting, product and service development, chain management, sales and marketing, and investment.

- To work with insurance clients and business partners to raise awareness of environmental, social, and governance issues, manage risk, and develop solutions (including client suppliers, insurers, reinsurers, and intermediaries).

- To work with governments, regulators, and other key stakeholders to promote widespread societal action on environmental, social, and governance issues.

- To demonstrate accountability and Transparency by regularly and publicly disclosing insurance companies' progress in implementing the Principles.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Equator Principles (EI): In 2003, the Equator Principles for Financial Institutions (EPFIs) adopted the Equator Principles (EI), intending to provide benchmarks to the financial industry for determining, assessing, and managing social and environmental risks in project financing. Often, large and complex capital-intensive projects encounter social and environmental issues, and applying EI in a project ensures the development of internal social and environmental policies, procedures, and standards so that negative impacts on the ecosystem and community can be avoided.

The Equator Principles apply to financial products relating to all industry sectors, such as project finance advisory services, project finance, project-related corporate loans, bridge loans, project-related refinance, and project-related acquisition finance. Equator Principles apply to any projects whose capital cost is US$10 million or more.

Equator Principles has ten principles.

1. **Review & Categorisation –** Review and categorize projects into three categories, A, B, C, based on the magnitude of potential impacts and risks, following the environmental and social screening criteria of the **International Finance Corporation (IFC).**

Category A: Projects have potentially significant adverse social or environmental impacts that are diverse, irreversible, or unprecedented.

Category B: Projects have potentially limited adverse social or environmental impacts that are few, generally site-specific, reversible, and readily addressed through mitigation measures and

Category C: Projects have minimal or no social or environmental impacts.

2. **E&S Assessment-** where the borrower must conduct a Social and Environmental Assessment of the Project and propose mitigation and management measures relevant and appropriate to the nature and scale of he proposed Project.

3. **Applicable E&S Standards-** need to apply IFC Performance Standards and Industry Specific EHS Guidelines.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

4. **E&S Management System & EP Action Plan-** establish a Social and Environmental Management System that addresses the management of impacts, risks, and corrective actions required to comply with the applicable host country's social and environmental laws and regulations.

5. **Stakeholder Engagement-** The borrower or third-party expert must consult with the affected communities of the Project in a structured and culturally appropriate manner, and the Project must adequately incorporate any affected communities' concerns.

6. **Grievance Mechanism-** The borrower must inform any affected communities about the mechanism during its community engagement process and ensure that the mechanism addresses concerns promptly and transparently, in a culturally appropriate manner, and is readily accessible to all segments of the affected communities.

7. **Independent Review-** An independent social or environmental expert not directly associated with the borrower will review the Assessment.

8) **Covenants-** An essential strength of the Principles is the incorporation of covenants linked to compliance. Where a borrower is not in compliance with its social and environmental covenants, EPFIs will work with the borrower to bring it back into compliance to the extent feasible. If the borrower fails to re-establish compliance within an agreed grace period, EPFIs reserve the right to exercise remedies as they consider appropriate.

9) **Independent Monitoring & Reporting-** require the appointment of an independent environmental and social expert or require that the borrower retain qualified and experienced external experts to verify its monitoring information, which would be shared with EPFIs.

10) **Reporting & Transparency-** commits to publicly reporting annually about its Equator Principles implementation processes and experience, considering appropriate confidentiality considerations.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Principles for Responsible Banking (PRB): Banking systems can directly and indirectly impact environmental and social issues. Banks may not directly impact their ownoperations, but their profitability can be impacted due to the Project they lendor select to lend. As a result, the bank's core business of lending capital, risk assessment and pricing of risk, and recovery of money are exposed to environmental and social issues.

Hence, the banking industry is becoming more aware of the environmental issues. The banking industry also recognizes that they are laggard when it comes to its own human resource policies, as the banking industry has traditionally under-represented minorities, notably women and ethnic minorities.

Considering these factors, in 2019, UNEP FI launched the Principles for Responsible Banking to align banking activities with the UN's Sustainable Development Goals (SDGs) and the social goals set by the Paris Agreement.

Under the PRB framework, signatory banks are required to contribute towards social goals and report on positive and negative impacts on society and the environment through the banking business. PRB expects banking practice to be responsible and consider the environment, society, and economic factors while making investment decisions and extending loans.

The Principles for Responsible Banking (PRB) are as follows:

- **Principle 1 Alignment:** Align business strategies to individual needs and social goals set in the SDGs and the Paris Agreement and contribute to them.

- **Principle 2 Impact & Target setting:** Evaluate the increase in positive and decrease in negative impacts caused by banking operations and set and publish targets for that purpose.

- **Principle 3 Clients & Customers:** Work with customers to encourage sustainable practices and enable economic activity with shared prosperity for current and future generations.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

- **Principle 4 Stakeholders:** Actively work with relevant stakeholders to further promote the objectives of the principles.

- **Principle 5 Governance & Culture:** Carry out commitments to these rules through effective governance and corporate culture as a responsible bank.

- **Principle 6 Transparency & Accountability:** Appropriately review the implementation of these principles to remain transparent and accountable for positive and negative impacts.

Sustainable Finance Product Categories:

1) Sustainable Bonds (Green, Social, and Sustainability Bonds).
2) Sustainable Loans.
3) Sustainability Equity and Index Funds.

Sustainable Bonds are tradable debt instruments with specific risk, interest, and maturity. Sustainable bonds are mainly categorized as green, social, and sustainability bonds. In addition, there are further subcategories: Blue Bonds (focusing on marine conservation) and transition bonds (to finance transition to low carbon transition). Sustainable loans are provided by banks and borrowers and are supposed to be used to fund green projects as specified and defined in the lender's Green Loan Framework.

Sustainable Equity: Investors choose specific companies whose practices, processes, and products align with invertors' sustainability goals, or investors interested in sustainability related issues choose to invest in green or sustainability funds. Index funds are a portfolio of securities that allow investors to invest in sustainable, green, or socially responsible companies.

Sustainable Bonds are essential for transitioning to a sustainable global economy. Issues of sustainable bonds are governed by the Green Bond Principles (GBP), Social Bond Principles (SBP), Sustainability Bond Guidelines (SBG), and Sustainability-Linked Bond Principles (SLBP).

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Collectively, these frameworks are called the 'Principles'. As of 2020, the total value of sustainable bond issuance is USD 594 billion, and 97% of all sustainable bonds issued globally are aligned with GBP, SBP, SBG, and SLBP.

Green Bonds are any bond instrument where the proceeds will be exclusively applied to finance or refinance projects with clear environmental benefits and which are aligned with the Core Components of the GBP.

Eligible Green Project categories include renewable energy, energy efficiency, pollution prevention and control, environmentally sustainable management of living natural resources and land use, terrestrial and aquatic biodiversity conservation, clean transportation, sustainable water and wastewater management, climate change adaptation, the circular economy and or eco-efficient projects, and Green buildings.

Social Bonds finance projects that directly aim to address or mitigate a specific social issue and or seek to achieve positive social outcomes, especially but not exclusively for a target population(s), and are aligned with the Core Components of the SBP.

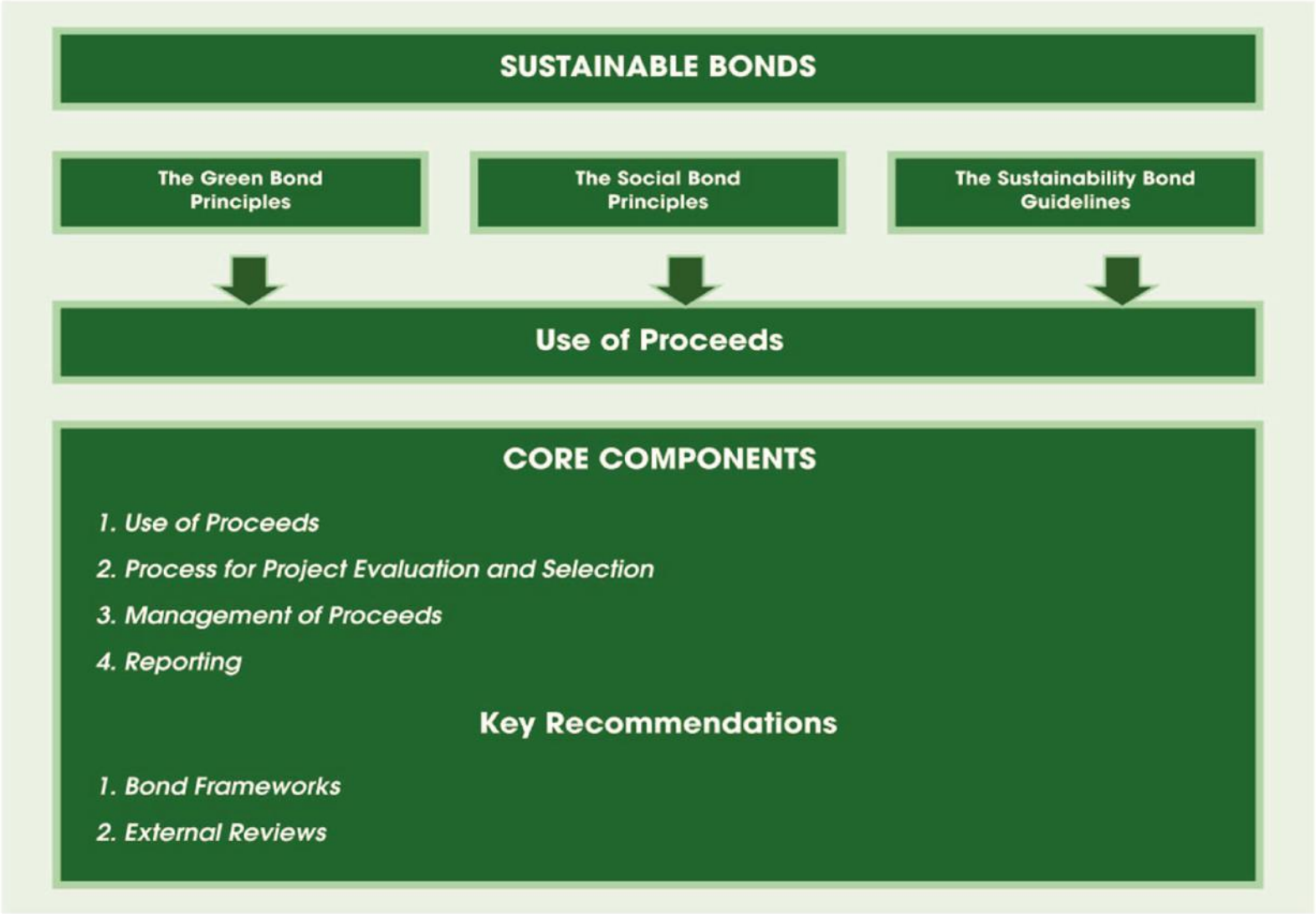
Social Project categories include providing and or promoting affordable basic infrastructure, access to essential services, affordable housing, employment generation, food security, or socioeconomic advancement and empowerment.

Sustainability Bonds are any bond instrument where the proceeds will be exclusively applied to finance or refinance a combination of Green and Social Projects and which are aligned with the Core Components of the GBP and SBP.

Sustainability-linked bonds are any bond instrument for which the financial and or structural characteristics (i.e., coupon, maturity, or repayment amount) can vary depending on whether the issuer achieves predefined Sustainability/Environmental and or Social and or Governance (ESG) objectives within a predefined timeline, and which are aligned with the Core Components on the SLBP.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Figure-5: Types & Components of Sustainable Bond



It is possible to combine a **"use of proceeds"** approach with a Sustainability-Linked Bond approachbonds simultaneously with all the Core Components of the GBP/SBP/SLBP.

Green, Social, Sustainability, and Sustainability-Linked Bonds are regulated instruments subject to the same capital market and financial regulation as other listed fixed-income securities. Subject to any applicable law or regulation, all types of issuers in the debt capital markets can issue a Green, Social, Sustainability, or Sustainability-Linked Bond as long as it is aligned with the Core Components of the GBP/ SBP/SLBP.

Sustainable Bonds [(Green Bond Principles (GBP), Social Bond Principles (SBP), Sustainability Bond Guidelines (SBG)] Principles concepts

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Use of Proceeds – Utilisation of the bond proceeds for eligible Green or Social Projects should be appropriately described in the security's legal documentation. All or a proportion of the proceeds may be used for refinancing. In short, a legal document states that the use of proceeds' is utilized for green or social benefits.

Process for Project Evaluation and Selection – the issuer of a Green or Social Bond should communicate to investors:

- The environmental or social sustainability objectives of the Projects
  The process by which the issuer determines how the projects fit within the eligible Green or Social Project categories and

- Complementary information on the processes by which the issuer identifies and manages perceived social and environmental risks associated with the relevant Project (s)

Management of Proceeds –The net proceeds of the Green or Social Bond, or an amount equal to these net proceeds, should be credited to a sub-account, moved to a sub-portfolio, or otherwise appropriately tracked by the issuer, and attested to by the issuer in a formal internal process linked to the issuer's lending and investment operations for eligible Green or Social Projects.

So long as the Green or Social Bond is outstanding, the balance of the tracked net proceeds should be periodically adjusted to match allocations to eligible Green or Social Projectsmade during that period. The issuer should inform investors of the intended types of temporary placement for the balance of unallocated net proceeds.

Reporting – Issuers should make and keep readily available, up-to-date information on the use of proceeds to be renewed annually until total allocation and on a timely basis in case of material developments. The annual report should include a list of the projects to which Green or Social Bond proceeds have been allocated and a brief description of the projects, the amounts allocated, and their expected impact.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Sustainable Finance Investor Strategies and Approaches

Sustainable finance products or assets promise long-term sustainable returns after considering environmental, social, and governance factors. At the same time, investors in sustainable assets expect that the companies they are investing in will be agents of social change, have strong corporate governance, improve environmental and social performance, and ensure the financial implications of sustainability-related issues are taken care of.

Hence, investing in sustainable finance requires strategy. Investment decision-making is itself a complex process. Therefore, the question is, what decision-making process should be taken to select and reject an asset as a sustainable asset or how can investors consider social and environmental issues in their investment decision-making?

Four sustainable finance investor strategies and three additional approaches to sustainable finance investment decision-making exist.

Four sustainable finance investor strategies:

Exclusionary or Negative screening: The investor excludes or rejects certain investments or funds (these can be from specific sectors, companies, countries, or issues) from portfolios based on values, norms, or moral principles. The process can exclude products and services such as gambling, adult entertainment, weapons, and tobacco. Alternatively, company practices involving animal testing, human rights violations, and corruption.

Best-in-class investment: Select investment in those sectors, companies, and countries that lead their peer groups regarding sustainability performance or have positive ESG performance.

Norms-based investment: Exclude investment in companies or government debts that fail to abide by standards set by the UN Global Compact, the Kyoto Protocol, the UN Declaration of Human Rights, or the International Labour Organisation.

Thematic Investment: Investing in companies or assets that contribute and advance sustainable solutions such as green technologies, sustainable agriculture, green buildings, and gender equity diversity).

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Additional approaches are:

ESG integration: Investment managers systematically and explicitly include environmental, social, and governance factors in financial analysis. The process focuses on assessing the potential positive and negative financial impacts of ESG issues and incorporating these data in valuing and assessing a company or asset. Investors or shareholders actively engage with senior management to highlight specific sustainability issues and to encourage companies to improve their sustainability issues and policies.

Impact investment: The Global Impact Investing Network defines impact investment as "investments made into companies, organizations, and funds to generate social and environmental impact alongside a financial return."

In other words, it provides capital to those companies or projects with clear social or environmental goals or intentions for the community well-being of traditionally underserved individuals or communities or targeted lending activities (Community Investing).

In 2020, ESG integration was the most adopted strategy worldwide to select and invest in sustainable assets, followed by negative or exclusionary screening, corporate engagement and shareholder action, norms-based screening, positive and best-in-class screening, sustainability-themed investing, and impact investing.

In the USA, ESG integration and hostile or exclusive screening were the most popular adopted strategies in 2020. In Europe, negative or exclusive screening, corporate engagement, and shareholder action were the most popular adopted strategies during the same period.

Sustainable Investment-Facts & Figure

Over the years, sustainable investment in the economy has grown manifold. As of 2020, the value of global sustainable investment stands at $35.3 trillion, and it has grown by approximately 55% between 2016 and 2020.

In 2016, Europe had the highest proportion of investment in sustainable investment, followed by the USA, Canada, Australasia, and Japan. In 2020, the USA overtook the rest of the regions, followed by Europe, Japan, Canada, and Australasia.

Overall, the USA and Europe constituted 80% of global sustainable investing assets between 2018-2020.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Figure 6: Growth in value of Sustainable Investment

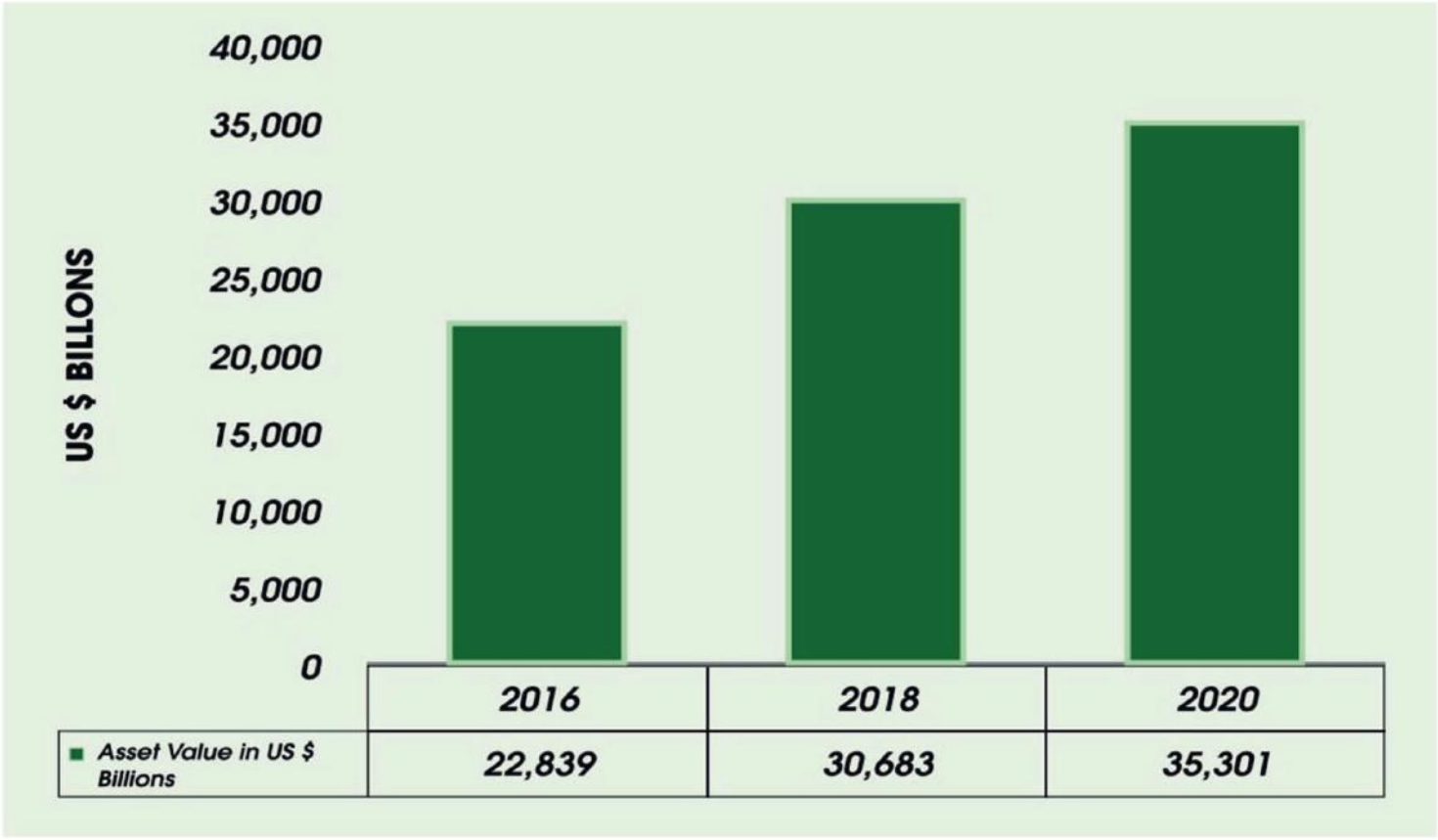


Figure-7: Sustainable Investment by Region (by percentage)

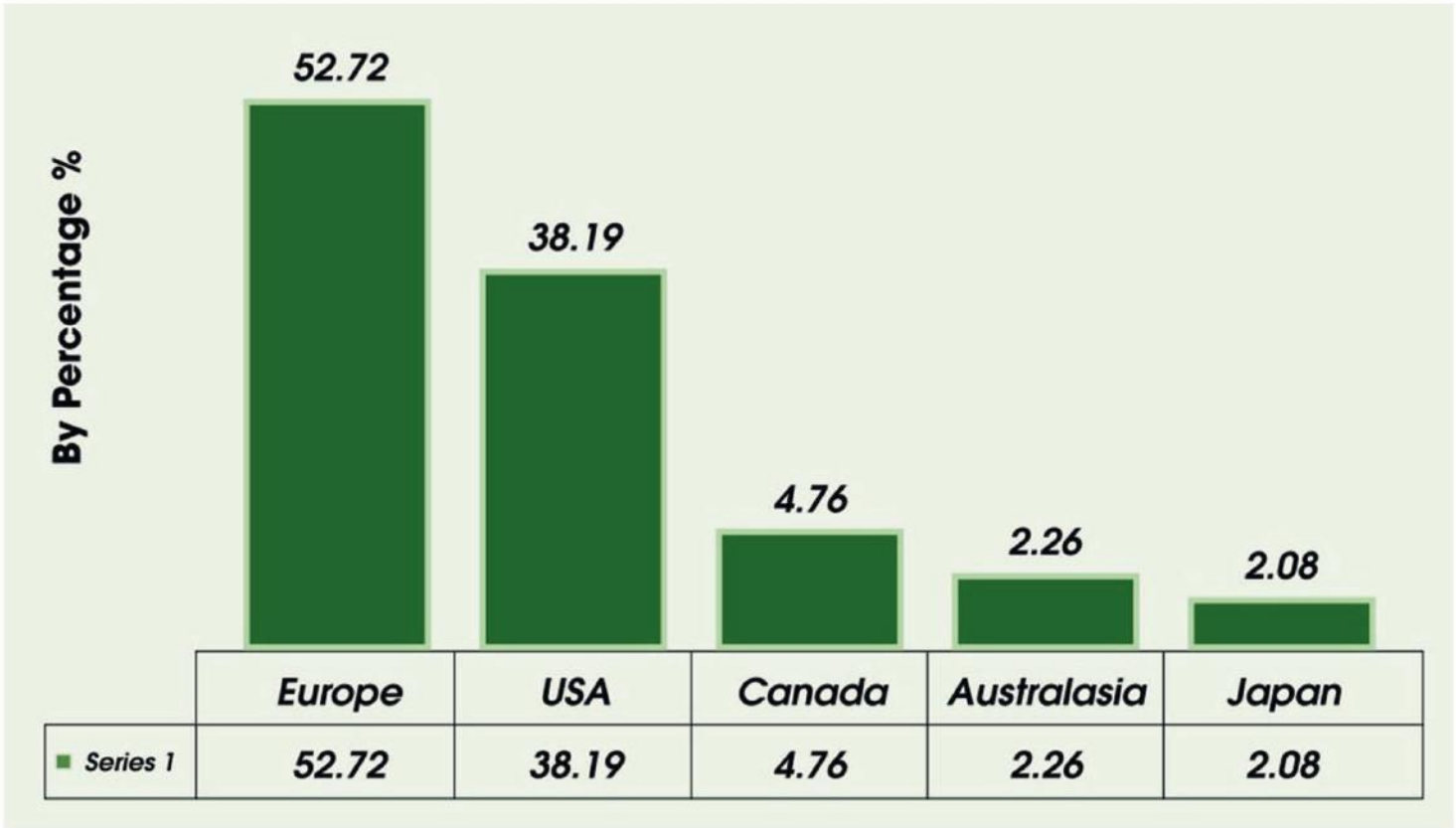


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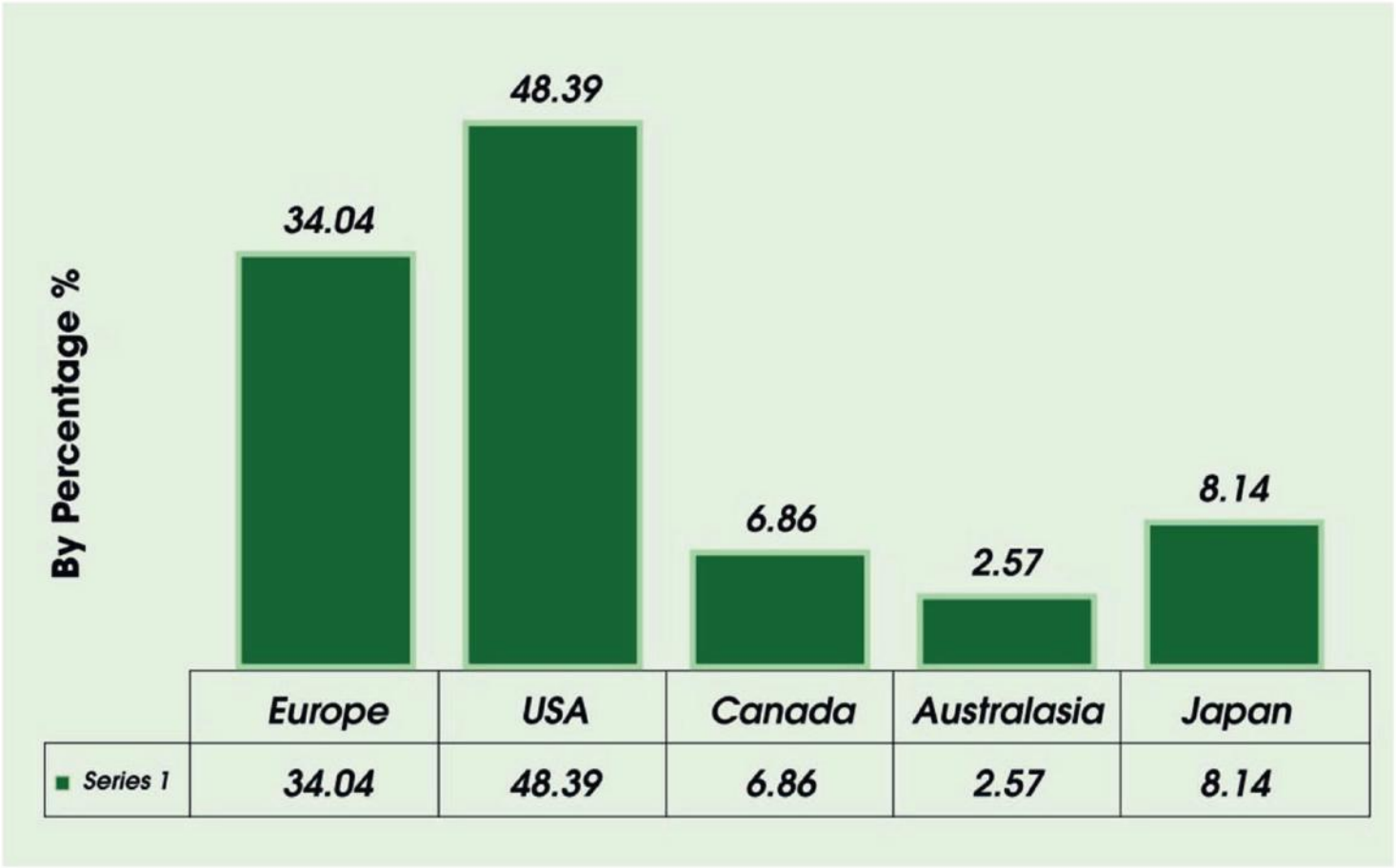
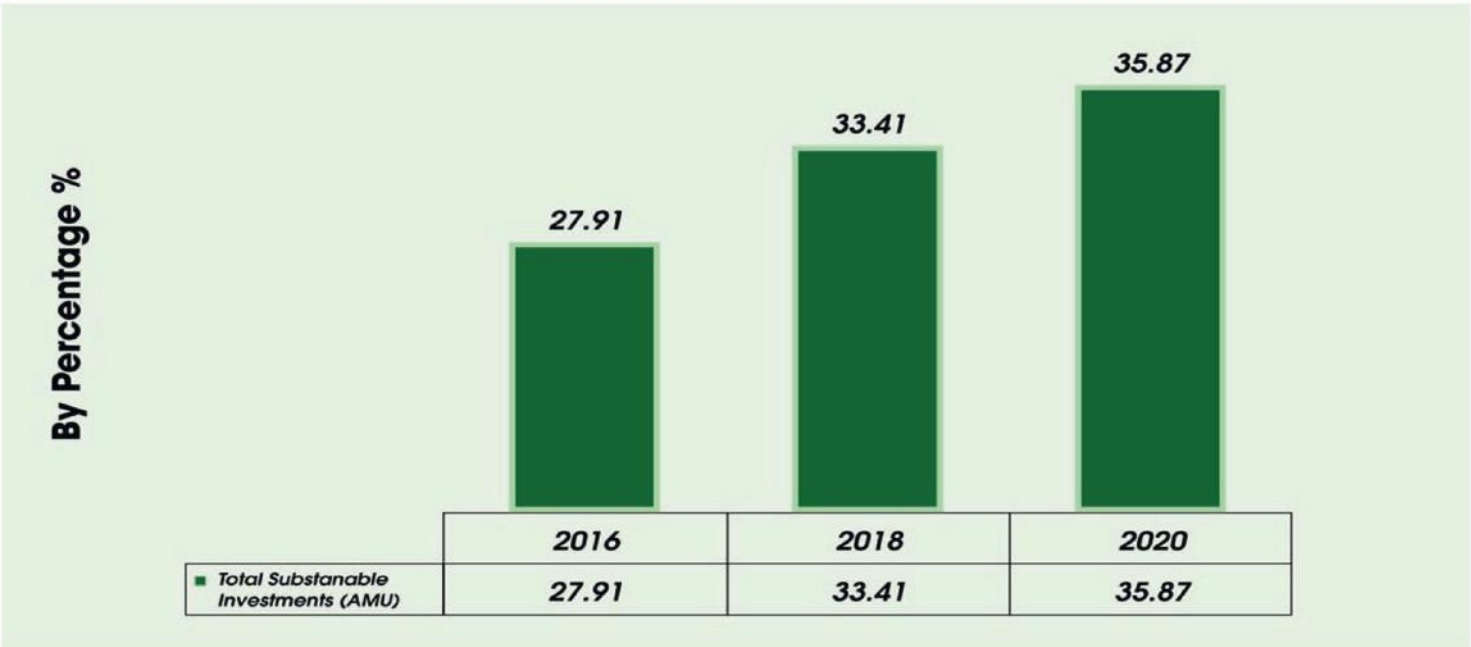
Figure 8:
Sustainable Investment in 2020 by Region (by Percentage)



The proportion of sustainable investment in the total 'Assets Under Management' (AMU) category grew by 54 % between 2016 and 2020, aligning with this trend

Figure 9: Proportion of Sustainable Investments in the Total "Asset Under Management" (AMU) category (by percentage)



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The global trend suggests sustainable debt instruments (Green, Sustainability, Social, Sustainability-linked bonds, and transitions) are used to invest in renewable energy, carbonneutrality, solar, environmental, water, green innovation, sustainable awareness, SDGs, positive impact, socially responsible investing, affordable housing,education, gender equality, SDG housing, youth, employment, blue transitions, green transitions, and low-carbon transitions health care, SDG housing, youth, employment, blue transitions, green transitions, and low-carbon transitions.

Table 2 Components of Sustainable Debt Instruments

GREEN	SUSTAINABILITY	SOCIAL	SUSTAINABILITY-LINKED BOND	TRANSITION
Blue	SDG	Affordable Housing	Sustainability-linked	Blue Transition
Environmental & Climate	Sustainability Awamess	Education	ESG-linked	Green Trasition
Carbon Neutral	ESG	Gender Equality	SDG-linked	Low-carbon Transition
Renewable Energy	Socially Responsible Investing	Healthcare	Social Impact-linked	
Renewable Energy	Positive Impact	SDG Housing	Social & Sustainability linked	
Water		Town Revitalisation		
		Youth & Employment		

As of 2021, Green bonds are the most significant sustainable debt instrument in terms of financial value, and they account for about 43% of the total USD 3.75 trillion sustainable debt market, followed by social, sustainability, sustainability -linked bonds, and transition bonds. Green bonds are also the primary debt instrument in terms of the number of issuers, number of instruments, number of countries of issue, and the number of currencies issued.

Table 3 Size of Sustainable Debt Instruments in 2021

	GREEN	SUSTAINABILITY	SOCIAL	SUSTAINABILITY-LINKED BOND	TRANSITION	TOTAL
Total size of market US in Trillion	1.6	0.520	0.538	0.135	0.96	3.753
Number of issuers	2045	425	861	225	15	3571
Number of instruments	9886	2323	3471	317	32	16029
Number of countries issued	80	51	44	37	12	224
Number of currencies	47	38	33	16	7	141

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

The longitudinal trend between 2015 and 2021 suggests that most green bonds are generated from Europe. Supranational and Latin America are significant sustainability issuers of debts. Europe is a primary source of Social Bonds; 88% of Non-financial corporations issue Sustainability bonds, and lastly, Europe and Asia-Pacific are major issues of transition bonds.

Most sustainable debt instruments are issued in Euro or USD with a maturity tenor of 5 to 10 years. The USA and China are the issuers of green bonds, while France is the major issuing country for social bonds, and Italy leads in issuing sustainability-linked bonds. The Chilean government is the only sovereign country in the world that issues green, social, and sustainability-linked sustainable debt.

Over the decades, sustainable finance has grown steadily; however, developing sustainable taxonomies in each jurisdiction is essential to provide clarity and guidance to the financial markets in which economic activities and investment assets can be termed sustainable investment and to avoid camouflage or greenwashing.

The EU, Russia, China, and ASEAN countries have a sustainable taxonomy in this context.

The UK and South Africa have draft taxonomies, while Canada, India, Brazil, New Zealand, and Chile are developing such taxonomies. Lastly, Australia and Mexico are at the discussion stage of such development.

Table 4 Characteristics of Sustainable Debt Markets (2015-2021)

	GREEN	SUSTAINABILITY	SOCIAL	SUSTAINABILITY-LINKED BOND	TRANSITION
Major issuer	Europe, Asia-PAcific & North America	Supranational, Latin America	Europe & Supranational	Europe (Italy), Asia-Pacific	Europe & Asia-Pacific
Purpose of use	Energy, Buildings, Transport	N/A	N/A	Consumer Discretionary, Utilities & Industrials	N/A
Tenor of maturity (mostly)	5 to 10 years	5 to 10 years	5 to 10 years	5 to 10 years	N/A
Issueing Currencies (mostly)	Euro, USD	USD, Euro & Pound	Euro & USD	Euro & USD	N/A
Size of bond in term of value (mostly)	USD 170 to 250 million	USD 1 billion	USD 500m to 1bn	USD 500m to 1bn	N/A

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Conclusion

Today's world is at the crossroads of challenges and opportunities. We are more than halfway into implementing the 2030 Sustainable Development Goals. In addition, we are also committed to comply with the Paris Agreement by 2030. However, as the world economy has been hit by two back-to-back events, such as the global pandemic and the Russia-Ukraine military conflict, the global effort for advancing sustainable development, including the determination to fight against climate change, has also faced a setback.

Many countries are experiencing primary food and energy crises due to high inflation following the Russian invasion of Ukraine, and, at the same time, the conflict has also triggered a surge in demand for coal. Both dimensions of development have become paramount, and sustainable finance is even more necessary than before to support greener, inclusive, and resilient economic development.

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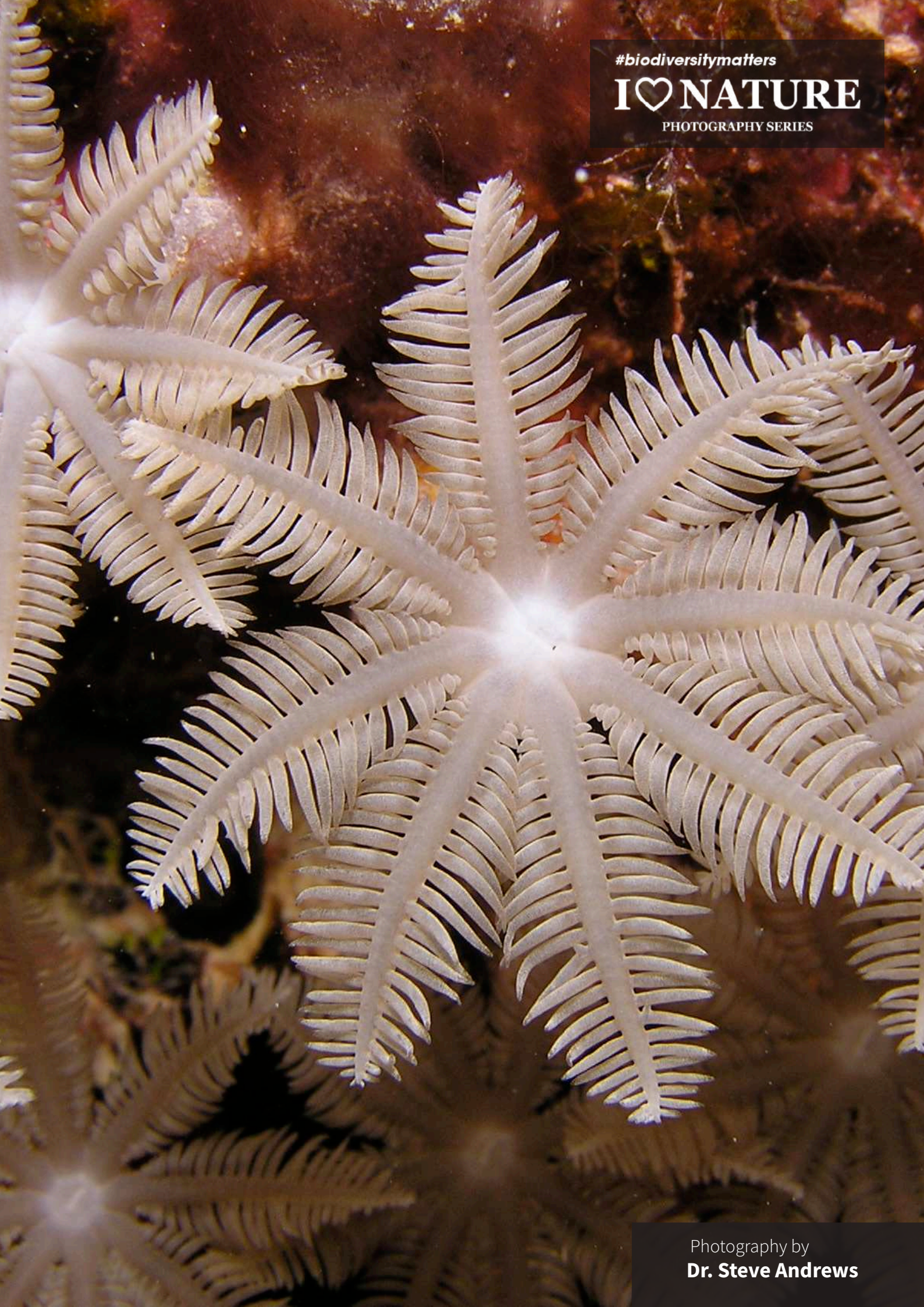

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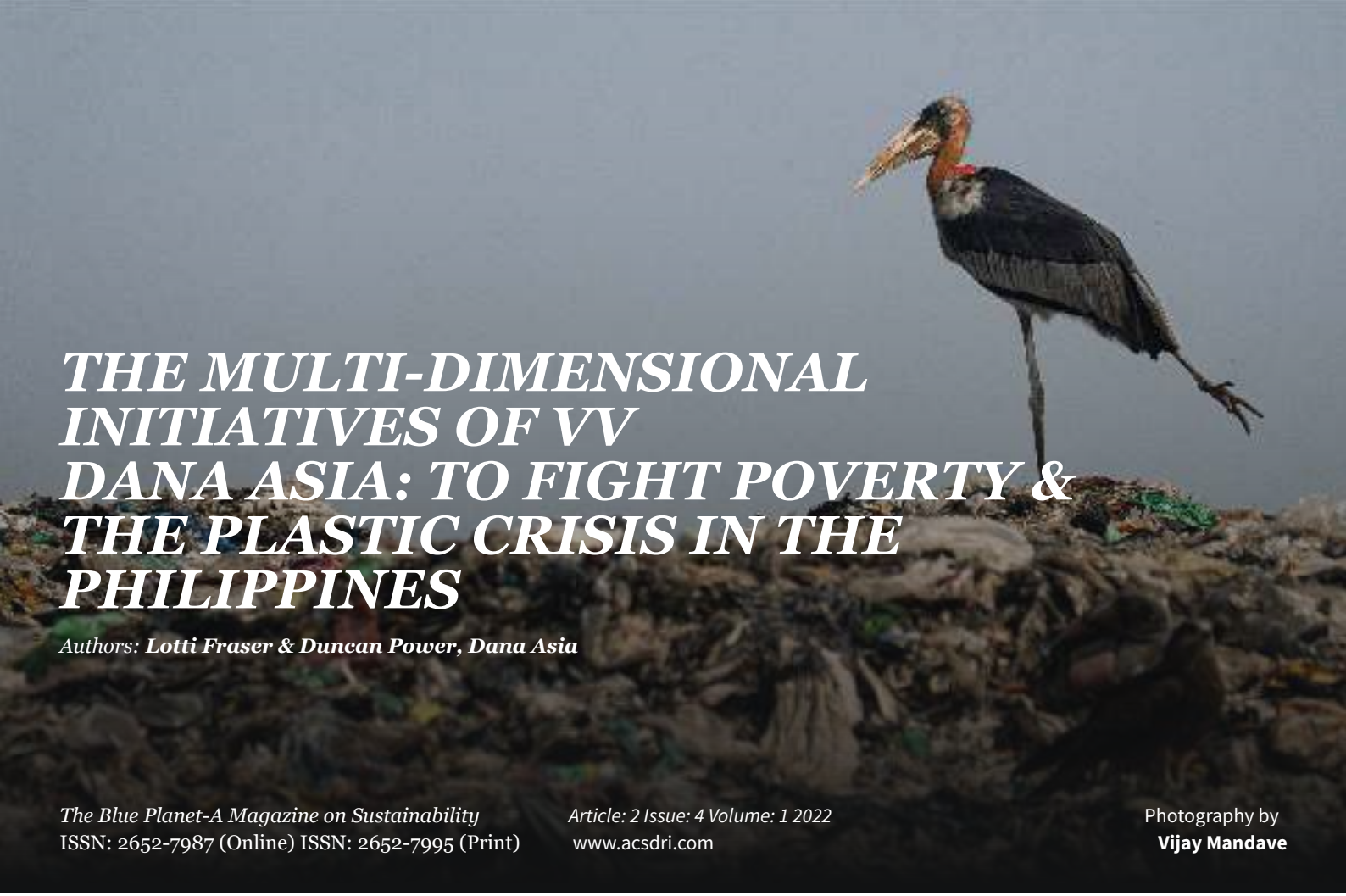

THE MULTI-DIMENSIONAL INITIATIVES OF VV DANA ASIA: TO FIGHT POVERTY & THE PLASTIC CRISIS IN THE PHILIPPINES

Authors: ***Lotti Fraser & Duncan Power, Dana Asia***

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Photography by
Vijay Mandave

The Multi-dimensional initiatives of Dana Asia: To fight Poverty & the Plastic Crisis in the Philippines

Introduction

The planet faces a plastic pollution crisis. It is estimated that only 9% of plastic produced has been recycled, with a massive 79% of the world's plastic ending up in landfills or the natural environment. Few places on Earth have more evidence of this problem than the Philippines. This island nation is the world's third-largest contributor of plastic waste.

Every year, the Philippines contributes an estimated 0.75 million metric tons of mismanaged plastic into the ocean, including nearly 60 billion sachets, 17.5 billion shopping bags, and 16.5 billion sandwich bags

As a result, natural water sources are heavily contaminated, and waterways are clogged, leading to worsening flooding - an issue already exacerbated by climate change.

Compounding this crisis is the increasing levels of poverty brought about by the COVID-19 pandemic. The World Bank estimates that COVID-19 has plunged between 88 and 115 million people into extreme poverty. In the Philippines, 4 million more Filipinos were pushed into poverty in the first half of 2021, and many lost their livelihoods entirely. With so many finding themselves increasing in debt, it is increasingly difficult for the most vulnerable to lift themselves out of poverty.

Social Housing Community Project at Metro Manila.

The crisis in the Philippines is profoundly complex, and solutions are neither straightforward nor instant. One thing, however, is clear: environmentally and economically sustainable livelihood options are urgently needed for those living in poverty to survive and thrive.

Dana Asia Ltd is a registered non-profit organization in Australia and the Philippines. It is working to develop sustainable solutions to social problems in some of Southeast Asia's poorest communities. To address the issue of plastic waste and to renew livelihoods many economically marginal communities in the Philippines, they are developing a new project concept within some of Metro Manila's social housing development sites.

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Social housing developments are growing across Metro Manila as part of a government resettlement scheme.

The Philippines government's Alternative Housing Program & People's Plan for Informal Settler Families is working to relocate the capital's 200,000 informal settler families (ISFs) living along dangerous flood-prone waterways to new social housing development sites.

These informal settler communities belong to the urban poor sector, primarily from poorer rural provinces to Metro Manila in search of jobs and livelihood opportunities. Associations and Cooperatives are forming to facilitate the resettlements, manage the housing estates, and ensure the rights of community members are upheld throughout the relocation process.

Though these new social housing sites provide safe homes for families, the newly formed communities need more amenities. One of the significant challenges for the urban poor is access to affordable goods.

With the market, families are forced to supermarkets to buy groceries, and for those living in extreme poverty, marked-up supermarket prices are often unaffordable. In some cases, housing developments have no access to main water, and drinking water is provided by private suppliers, making it expensive for households. Further input and support are needed to create thriving communities and micro-economies within the housing sites.

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Social Entrepreneurial Intervention of Dana Asia

Over the past few years, Dana Asia has worked within some of these housing developments to address key challenges in coordination with the Federation of Housing Associations and government agencies. The primary objective is to stimulate new business activity through microfinance and capacity building, equipping community members with the resources to set up their own small businesses through which they can earn an income.

In addition, the setup of wet and dry markets in housing sites brings affordable goods to community members, plus business opportunities for producers and food vendors who can avail themselves of microfinance loans to start and grow their businesses. Grameen-style microfinance loans are specifically aimed at the poorest members of society who would otherwise not be eligible for traditional micro-loans, with low-interest rates and flexible repayment schemes.

All microfinance loan packages come with capacity building in financial management and business development, with mentorship to give business owners the best chance of success. Increased business activity means increased money circulating at the community level, enabling micro-economies to grow and lifting the overall GDP.

Dana Asia's two impactful interventions:

1. Microfinance solutions for poverty reduction

With pilot projects complete and now being scaled and replicated, project evaluations have shown success for the community members who set up new businesses with the help of microfinance loans. As one example, Jay worked as a contractual maintenance worker, earning just 9,000 PHP (245 AUD) per month, but was forced to stop work in March 2020 when the Pandemic hit.

When Dana Asia initiated social business activities in his community in March 2021, Jay applied for a microloan to start a food vendor business. His first loan of PHP 7,000 (AU$190) gave him the start-up capital he needed to kickstart his business selling burgers and sandwiches. He and his wife worked hard to keep the business going through Manila's strict community lockdowns and were able to repay the initial loan and secure a second and third loan of PHP 10,000 (AU$272) and PHP 15,000 (AU$408), respectively.

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All loans were used to buy more capital and diversify the food items to attract more customers. In 2022, their average sales total PHP 4,000 (AU$109) per day, with a net income of PHP 1,000 (AU$27): more than twice the daily income when Jay was a contractual worker.

Jay's story is just one example of the potential that this project concept can bring to urban poor communities.

Dana Asia's Microfinance for economic empowerment

Environmental sustainability: turning plastic waste into Eco-Bricks

With environmental sustainability being a growing issue within housing developments and plastic waste a particular area of concern, Dana Asia's new project concept will address plastic waste management issues. Working in collaboration with local partners such as sustainable building firm Green Antz, recycling hubs will be established in social housing sites to collect plastic waste from local households and businesses to recycle it into eco-bricks to reduce plastic waste and improve the natural environment in urban poor communities.

These bricks are formed by breaking down the plastic and forming bricks under pressure - no high heat is required to set them, nor is much water used in the process making them highly environmentally conscious. The bricks meet building standards and can be used in constructing more social housing units and small business structures, such as sustainable consumer stores.

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More information on eco-bricks and other sustainable building materials can be found at https://www. greenantz.com/

Eco Bricks in Production

Eco bricks advancing circular economy

Multi-dimensional impacts

Through these two projects, Dana Asia aims to achieve positive economic, environmental, and social impacts:

1. Economic impact:

Creating jobs in impoverished communities and strengthening local microentrepreneurs through capacity building and microloans will support setting up and scaling sustainable small businesses. Specific microfinance products will be designed for specially designed sustainable small businesses, such as eco-consumer stores.

In the Philippines, “sari-sari” stores are on every corner, stocking essential goods and fresh produce. The project will pilot a new eco-sari-sari model to champion zero-waste retailing with refill stations and single-use plastic alternatives. Examples of such eco stores are popping up across Manila and show the potential to lower the cost of everyday goods by up to 40% compared with the price of conventional retail stores.

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Microfinance products will include training elements in sustainability, as well as standard business development and financial management. This new social business activity within housing sites will promote economic growth and improve livelihoods while stimulating business activity.

2. Environmental impact

Dana Asia's project also targeted to reduce plastic waste through recycling initiatives. Dana Asia's environmental goal was to emphasize on creating sustainable sources of fresh produce in communities where access to affordable fresh goods can be difficult. Livelihood skills training in home-based gardening, such as mushroom growing, gives community members practical skills that they can use productively to grow vegetables to sell for a small income or to consume to increase the family's intake of nutritious fresh produce. Working with technical partners, the project will design urban gardening modules for small spaces within urban backyards.

Mushroom houses are an example of this: at only 1.5m x 2m in size they easily fit into a small space with the capacity for 250 mushroom bags. Houses have the potential to grow an average of 2kgs of mushrooms per month over a 4-month cycle. Microfinance options are available for the start-up capital, and fully operational houses can achieve a potential net income of PHP 4,000 (AU$110) per month.

Not only do such activities lead to increased household income levels, but also increase the money circulating at a community level. Improved access to fresh produce also improves food security and promotes sustainable livelihoods.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Mushroom house for micro business and nutritional food source

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

3. Social Impact

Dana Asia aims to achieve two critical social impact objectives through this project: ecological sustainability and sustainable economic development. Recycling waste plastics will clean up the natural environment and promote responsible consumption.

Microloans bring new options for work and training to the most marginalized, tackling social injustice and opportunity gaps. Stimulation of business activity increases the income circulating among producers and consumers, positively impacting the community. Empowering local communities and building the capacity of local leaders encourages sustainability for long-term social impact.

Dana Asia bringing smiles to many.

Dana Asia bringing smiles to many.

Project implementation

Projects like these are not without their challenges. Sustainability is a fairly new concept for these communities, and its newness presents two challenges. Firstly, limitations in existing infrastructure mean options for renewable energy, plastic alternatives, recycling systems, etc, are also limited. Many NGOs, businesses, civil society groups, etc, are doing excellent work in this area, with many initiatives showing transformational progress. For widespread adoption of more sustainable practices, collaborative, multi-sector working is essential to have the biggest impact.

Secondly, the more significant challenge is capacity building and changing mindsets towards more sustainable practices. Learnings and real-life experiences within the Philippines context are limited compared with many more developed countries. However, much can be taken from successful initiatives in other countries and adapted for the Philippines context.

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The goal is also to bring more environmentally consciousness and changing old bad habits ingrained in the society. A typical example of ingrained bad habit: single-use plastic bags are seen as a cheap option for store owners, but giving them to customers is an entrenched habit.

As is shown by many successful initiatives across the globe, if shops stop offering free plastic bags, customers will soon adjust and simply bring their own. Breaking that habit by introducing convenient alternatives will significantly reduce reliance on single-use plastics overall.

Affordability is also a key factor. Sari-sari stores sell products in sachets, for example, because full bottles are too expensive – buying in small amounts is the only affordable option for a low-income consumer. Sachets offer no economic incentive to be recycled, unlike PET bottles, and will end up in landfills or water sources, contributing significantly to the plastic crisis.

The challenge here is shifting from the short-term view to the long-term. In the long term, bulk purchasing has proven time and again to be cheaper. However, investment is needed for the initial purchase, and more financial resources should be made available to communities to make such economies of scale viable for poorer communities.

Globally, the balance between financial and environmental sustainability is a much-discussed topic. In many cases, the more environmentally friendly approach is more expensive. For families living in extreme poverty, the priority will always be financial sustainability. If there is a risk that a more environmentally sustainable way of conducting business might negatively affect their profit margins, it is unlikely that business owners will be incentivized.

To address this, testing the model is essential to give working examples of how eco stores can be profitable and environmentally friendly. Business owners must first be motivated to take on a new business model for success.

Dana Asia's work within housing sites aims to challenge tradition and introduce new, innovative thinking methods to establish socially, financially, and environmentally sustainable businesses.

Keeping sustainability as the core message throughout makes solutions to poverty and the plastic crisis possible. The examples given here are real-life examples of projects currently active in Metro Manila, Philippines. None of this would be possible without the support of local partners and funders.

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DEVELOPING AN AWARENESS PROGRAM ON ENERGY CONSERVATION & RENEWABLE ENERGY USE

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Anirban Dasgupta

Introduction

Energy conservation and energy efficiency are the two foremost challenges of the time. While our commitment to energy conservation will lead to less wastage of energy, our commitment to achieving energy efficiency involves adopting technologies that require less energy to perform the same functions. Sometimes, the goal of conserving energy can be accomplished by undertaking simple actions.

For example, turning off the light when leaving the room, unplugging appliances when not in use, and walking or cycling instead of driving while going to a neighbourhood market. We must change our behaviours and habits and adopt cost-effective, innovative technologies to move towards energy conservation and efficiency practices.

Education and training can be vital in creating a culture and changing behaviours and habits toward energy conservation and efficiency.

We need to teach people the importance of energy conservation, how to gain more control over their energy bills, and how to use Earth's natural resources sustainably. The Sustainable Development Goal-7 advocates for investment in energy efficiency and increasing the share

of renewable energy by 2030. Keeping this global target in mind, we have conceptualized an action-based research project to raise awareness of energy conservation among undergraduate college students living in the central suburbs of Mumbai city. The project also focused on changing their energy consumption behaviours and habits.

About the action research project

The broad objective of the project was to encourage young people to learn to be energy efficient and to introduce them to different renewable energy sources. Our community-based action research project was carried out in 3 phases with 155 college students from the middle-income socio-economic neighbourhood of central Mumbai. The project ran for three months, from October 2019 to December 2019, in collaboration with the Indian Institute of Technology (IIT) Mumbai and Tata Power.

The experts from IIT Mumbai trained selected students to make solar lamps, and the experts from Tata Power were invited to educate students about energy conservation and how we can save electricity consumption by changing our habits.

A community-based action project was undertaken to evoke awareness in young students belonging to middle-class homes regarding energy conservation. The broad aim of the project was to educate students to be energy efficient, and a specific objective was to change their daily living habits and become more competent energy users.

Execution of Project

The protect commenced with a pre-training survey to check the student's knowledge and awareness of energy conservation and to understand their current energy consumption habits and behaviours. The survey findings show that most students have poor energy consumption behaviours, such as keeping mobile phones on charge for the whole night, not switching off water heaters, or keeping laptops on when not in use. Hence, an overall insight gained from the survey showed that the majority of the students were not aware of energy conservation measures, and few used renewable sources of energy.

Furthermore, the survey data showed that most students' families pay around INR 1500 to 2000 monthly power bills. The survey also revealed that since most of these students are from modest economic backgrounds, some families struggle to pay these electricity bills.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Phase 1: Orientation for the topic of energy conservation.

Conversation with energy experts

Experts from Tata Powers, India's leading Integrated power company, were invited as resource persons to inform students about the significance of energy conservation, energy generation processes, world energy use, and India's position in terms of its carbon footprint.

Phase 2: Workshop on making solar energy lamps.

1. Workshop on making solar lamps

The Solar lamp-making project was executed by experts from the Indian Institute of Technology (IIT) Mumbai. They trained students to make solar lamps to harness renewable solar energy. The students were provided with solar lamp kits for a nominal and affordable price, and the engineers from IIT Mumbai trained the students to assemble the kits. The experts explained to the students how to recharge lamps every day with solar energy. They were advised to use these solar lamps for their study at night. The use of solar lamps will help their families reduce their consumption of non-renewable energy and will help their families reduce their electricity bills.

2. Visits to manufacturers and outlets of solar products

The students were also taken to factories and outlets to introduce with various solar products available in the market.

Phase-3 Informative learning materials on energy conservation ideas

In the last phase, students were given informative learning materials in English and Hindi on various energy conservation ideas and rationales for energy conservation. The booklet highlights how some simple steps can make a huge difference and demonstrates how to save energy in everyday life at minimal marginal cost or without incurring additional smart gadgets.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Awareness program on energy conservation & renewable energy use

Renewable energy - the fuel for future economic development

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

The learning materials covered tips on lighting systems, room air conditioners, and refrigerators:

Lighting Systems

- Turn off lights when you are not in the room.
- Clean dust deposits on your tube lights and bulbs from time to time. Dust absorbs 50 percent of the light, and the light source reflects less light.
- Fluorescent tube lights and compact fluorescent lamps (CFLs) convert electricity to visible light up to five times more efficiently than ordinary bulbs, thus saving about 70% of electricity.
- Ninety percent of the energy consumed by an ordinary bulb (incandescent lamp) is used to produce heat rather than visible light.
- Replace your electricity-guzzling ordinary bulbs (incandescent lamps) with more efficient types. Compact fluorescent lamps (CFLs) use up to 75 percent less electricity than incandescent lamps.
- Paint and decorate your house in pale colours instead of dark colours, as pale colours reflect light, and the room needs less artificial lighting.
- Learned to select suitable lampshades. Darker lampshades absorb or reflect light in the wrong direction. Hence, take the right advice and choose suitable lampshades.

Room Air Conditioners

Use ceiling or table fans as your first line of defence against summer heat. Ceiling fans, for instance, cost about 0.30 paise an hour to operate—much less than air conditioners (INR.10.00 per hour).

You can reduce energy consumption from your air-conditioning by as much as 40 percent if you use thicker window curtains. Plant trees and shrubs to keep the day's hottest sun off your house.

A good air conditioner will cool and dehumidify a room in about 30 minutes, so use a timer and leave the unit off for some time.

- Try to close the door of the room when your air-conditioner is on.
- Clean the air conditioner's filter every month, as a dirty air filter reduces airflow and may damage the unit. Clean filters enable the unit to cool down quickly and use less energy.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Refrigerators

- Make sure that the refrigerator is kept away from all heat sources, including direct sunlight, appliances such as the oven, and cooking range.
- Refrigerator motors and compressors generate heat, so allow enough space for continuous airflow around the refrigerator. If the heat can't escape, the refrigerator's cooling system will work harder and use more energy.
- Don't overfill the refrigerator and ensure adequate air circulation inside.
- Think about what you need before opening the refrigerator door. You'll reduce the amount of time the door remains open.
- Allow hot and warm foods to cool and cover them well before putting them in the refrigerator. The refrigerator will use less energy, and condensation will be reduced.

Water Heaters

- To reduce heat loss, always insulate hot water pipes, especially where the pipe passes through an exposed area.
- By reducing the temperature setting of the water heater from 60 degrees to 50 degrees C, saving over 18 percent of the energy used at the higher setting is possible

Microwave Ovens & Electric Kettles

- Remember, microwaves cook food from the outside edge toward the center of the dish, so place more extensive and thicker items on the outside if you're cooking more than one item.
- Use an electric kettle to heat water as it is more energy efficient than an electric cooking top.
- It takes more energy to heat a dirty kettle, so clean your electric kettle regularly by mixing vinegar in the water and keeping it on the boil for some time, as the mixture will remove mineral deposits.
- Don't overfill the kettle for just one drink. Heat only the amount of water you need.

Computers

- Keep your computers and laptop in sleep mode when they are not in use; that simple action will help to reduce energy consumption by approximately 40%.
- Unplug your laptop, mobile phone, and digital camera battery chargers, as they draw power whenever they are plugged in.
- Buy energy-efficient appliances with energy-star ratings, as higher-rated appliances consume less energy and save money.

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Conclusion

The post-project survey response showed that exposure to the ideas of energy conservation and energy efficiency gave the majority of the students a better understanding of the issues. Most students also responded that they use solar lamps at night. The project has taught students to harness renewable energy cost-effectively for their households. Hence, this action-based project and training method can be adopted as a working model to bring behavioural change, teach youths about the importance of energy conservation, and introduce them to one of the primary sources of renewable energy.

Renewable energy for ALL by 2030 - Our commitment To PARIS AGREEMENT

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Ravindra Srinath

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Dr.Kuntal Goswami

STRUCTURING POWER: MANAGING THE RELATIONSHIP BETWEEN GOVERNMENT, CITIZEN, AND BUSINESSES

Authors: ***Dr. Jacob Deem, Central Queensland University***

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Introduction

The relationship between government and business is underpinned by a core tension: on the one hand, how do we ensure that government does everything it can to help private enterprise thrive, but on the other hand, how do we prevent the government from interfering too much in business? This article explains key structures, institutions, and principles that manage government, citizens, and business relationships.

Many societies (Australia, Canada, and the USA) use three key mechanisms to manage government power. First, constitutions, a nation's founding documents, and fundamental laws guarantee individual rights and limit government power. Second, power can be shared or divided across different governments in one country in a federation. Third, Parliament, as a representative body of the citizens of a country, is designed to ensure that the government reflects the people's wishes. These three topics are vital to understanding government-business relationships, as they underpin how a country is governed and how a business can or cannot operate in that country.

How does government exercise power?

The government's power over an individual is easy to observe in our everyday lives, especially in recent years with pandemic-related lockdowns, vaccine mandates, and mask-wearing requirements. Outside the exceptionalism of COVID-19, police can arrest suspected criminals; transport departments decide whether or not we are licensed to drive a car; education departments determine the education our children will receive (and how much we have to pay for it), and the difference between a well-run and a poorly run public hospital can mean the difference between life and death for patients.

Governments are equally powerful in the business world. Corporate tax rates are the most recognisable example of government influence in this field, but governments can also affect the way a business is run through investment regulations, small business start-up grants or tax concessions, industrial relations and workers' rights laws, and trade negotiations with other countries.

When used in a way that favours business, these powers can make it easier for private enterprises to succeed by maximising their profits and long-term viability, but this may come at the cost of workers' rights, the environment, or social welfare and well-being. However, when the government has other priorities, these powers can restrict a company's ability to do business.

Therefore, it is important that we have a political system that strikes the right balance between empowering the government to protect workers, the environment, and other interests and leaving space for innovation and enterprise by ensuring that the government does not have too much control over the way individuals and companies conduct themselves.

What is a constitution and government's power?

Constitutions establish the fundamental principles, structures, and rules for a society (whether that be a country, a state, or even a business). In a political setting, we can think of a constitution as a 'rulebook' for government because it maps how power is allocated and spells out what the government can and cannot do. Accordingly, the Constitution manages the relationship between citizens, businesses, and government by setting limits on government power.

It usually has little to say directly on the relationship between individuals and businesses, although a good constitution gives effect to the rule of law by both treating everyone equally and ensuring that no one is above the law (i.e., even the government is ruled by and subject to the laws in the Constitution).

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Constitutions also play an important role in establishing the key institutions and offices of a nation – Parliament (the democratically elected body responsible for making laws), courts, the head of State, etc. – and setting out their responsibilities. Embedding these structures in the Constitution sends a signal as to their value and importance in society. Constitutions can also be vital in federations or federal systems, where power is divided across different levels of government, and rules are needed to govern how the different levels work.

Importantly, constitutions are 'fundamental' because they are more challenging to change or amend than ordinary laws. Typically, constitutional amendment requires approval from a majority of citizens through a referendum, while ordinary laws are made, changed, and repealed in Parliament. The difficulty of amending the Constitution provides stability and consistency to society, especially in times of extreme uncertainty, and guarantees that citizens will be protected by the rule of law, even during a change of government.

What is federalism?

Federalism aims to manage government power by dividing the functions and responsibilities of governance across different jurisdictions. For example, in Australia, power is constitutionally split between the 'national' or 'federal' government and the State and Territory governments. Australian federalism mainly draws on the example of the US federal system, which contains Federal and State governments. However, Canadian and Swiss Federal systems also informed the drafters of our Constitution. In these cases, different individual governments (e.g., the States in Australia and the US) agreed to unite to form a new nation (quite literally, the 'United States' in the American case). However, they were reluctant to give up all their power. Accordingly, federalism is best understood as a compromise or bargain that carefully balances the autonomy, independence, and uniqueness of subnational governments with unity, uniformity, and equality across the nation.

Federal systems can be contrasted with unitary systems like the UK, New Zealand, or Japan, where true authority rests with only one (national) level of government. However, New Zealand and Japan have more than one level of government (national and municipal/local), while the picture in the UK is even more complicated, with national and local governments and Assemblies in Scotland and Wales with their powers and responsibilities.

So, how can we distinguish between a unitary system with multiple levels of government and a true federal system? The key difference is that in a federal system, power and sovereignty (the authority to rule) are genuinely divided across the different jurisdictions, such that one government cannot force another government to act in a particular way. By contrast, in a unitary system, the central level retains complete sovereignty, merely devolving power to lower levels, which it could (in theory) take back at any time.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

What are the advantages and disadvantages of federalism?

A federal system of governance has the potential to deliver a range of benefits to citizens and businesses, although these benefits do come at a cost. Historically, federations were often formed to facilitate trade and security by uniting the economies and armies of the constituent jurisdictions. These benefits typically carry on through the life of the federation.
In terms of policymaking, federalism is thought to produce mechanisms for better policies because State or subnational governments can make decisions that best reflect the needs and values of the local population, while national governments can take a 'big picture' approach and create policies that are in the national interest. Furthermore, jurisdictions can learn from each other, applying policies that seem to work well and innovating new improvements from which other jurisdictions can learn.

However, while federalism offers an array of advantages, it also has some drawbacks. The most commonly cited issue with federalism is that it can be inefficient compared with unitary systems. Dividing sovereignty between different levels of government can result in policy overlap and duplication (e.g., where national and State governments both make laws on the same issue), meaning that time and resources are wasted.

Perhaps more concerning is when laws are inconsistent between the national and State levels or between States. This is especially true in a business setting, where companies that operate in multiple States may face increased costs due to having to comply with different regulations in each jurisdiction. In Australia, a common complaint from businesses is that inconsistent approaches to climate change and environmental regulation at national and State levels stifle innovation and dissuade businesses from pursuing environmentally sustainable practices, as the costs and rewards for doing so are rendered uncertain.

A related concern is the inter-jurisdictional bickering that comes from empowering different levels of government. Furthermore, this bickering is even more concerning when it obscures accountability for problems and leads to a 'blame game' between governments. When federal and State governments share responsibility for a policy area, it can be hard to pinpoint who is at fault when things go wrong. In 2021, this accountability gap was highlighted when federal and State governments blamed each other for the shortage of COVID-19 vaccines.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Conclusion

We began by considering the core tension of government-business relations: a balancing act between giving governments enough power to help individuals and enterprises thrive but not so much power that they would be able to interfere with the freedoms and rights of those individuals and enterprises. We discussed three broad approaches to managing this tension: constitutions, federations, and parliaments. Accordingly, the relationship between business and government will depend on the country and its institutions – what powers does Parliament have in the Constitution? How many parliaments are there in a federal society? And how is power separated across the governing branches? A successful business will know the answers to these questions, as it can best adapt to the governing arrangements in which it finds itself.

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Kakuloor Rohith Sai Goud

THE ROLE OF INDIA'S NATIONAL GREEN TRIBUNAL IN GANGA AND YAMUNA POLLUTION ABATEMENT

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Photography by
Nagaraj D.

The river Ganga and its tributary river Yamuna embody Indian culture and spirituality ...

...Although it has significant economic, environmental, cultural, and religious significance, Ganga is the world's tenth most polluted rivers.

The National Green Tribunal (NGT) *has adopted three golden principles* **(the Polluter Pays Principle, the Principles of Sustainable Growth, and the Precautionary Principle)** *in pronouncing its judgment against polluters to curb the menace of pollution in the rivers Ganga and Yamuna.*

Introduction

Rivers are the most critical natural resource for the sustenance of life on earth. The Ganga and its tributary, Yamuna, embody Indian culture and spirituality. The transboundary river originates at the Gangotri Glacier. After flowing north to east for about 2,495 km, it ends at the Bay of Bengal, covering most of the northern and eastern states of India.

At Farakka, India, the river divides into two distributaries; one stays in India and flows as the Bhagirathi (also known as River Hooghly), and the other part enters Bangladesh as the Padma rivers, which later joins with rivers Brahmaputra and Meghna. Both the distributaries of the river Ganga end at the Bay of Bengal.

Although it has significant economic, environmental, cultural, and religious significance, the Ganga is the world's most tenth most polluted rivers. The incessant increase in population growth, along with unplanned urbanization, has led to a manifold increase in the river's pollution level.

Untreated and dangerous toxic effluents from industry, biomedical waste, and domestic sewage pollute rivers and pose a serious threat to the rivers' ecosystem. The water becomes unfit for bathing and human consumption and results in several waterborne diseases. Recognizing the need for urgent action, the Government of India has enacted several laws for pollution abatement, yet these have not made any dent in the problem.

These laws regulate river use and management to mitigate the environmental harms caused by unchecked use and misuse of natural resources like rivers. The Supreme Court invoked Article 48-A of the Constitution, which talks about protecting and enhancing the natural environment. Under Article 51-A of the Indian constitution, every individual is responsible for conserving the natural environment.

Indian Government's initiatives to clean Ganga and Yamuna

The Ganga Action Plan (GAP) began cleaning the river Ganga in 1985, and in 1993, the Yamuna Action Plan (YAP) was started. Funding was provided to build a sewerage channel, drains, low-cost community toilet complexes, sewage treatment plants, and electric-based or improved wood-based crematoria.

In 2009, the Central Government created the National Ganga River Basin Body (NGRBA) as an empowered authority to formulate a comprehensive strategy for planning, intermittent

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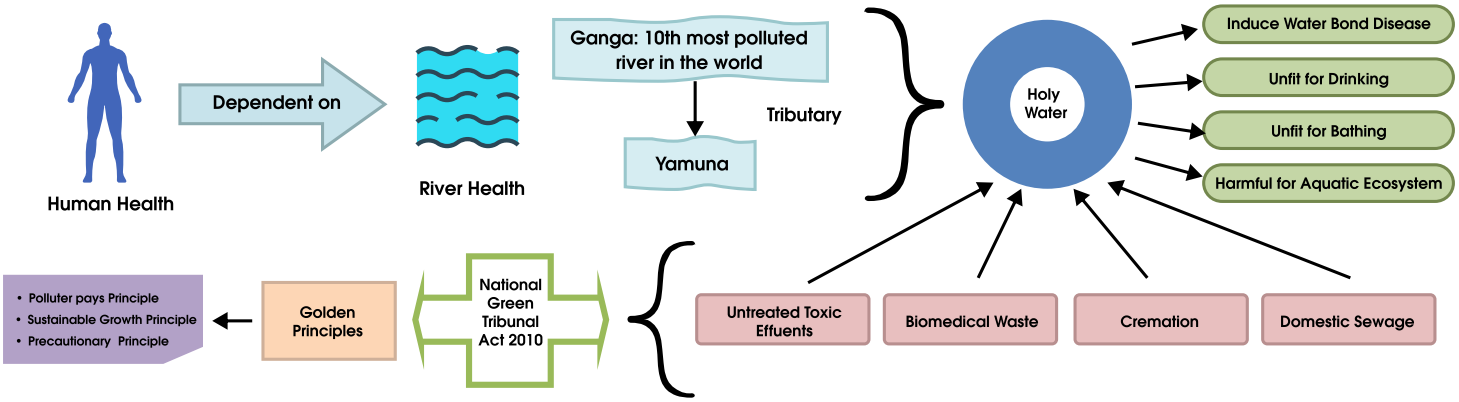
monitoring, funding, and coordination to achieve conservation and pollution abatement steps for the river Ganga. However, the robust mechanism of the Ganga Action Plans (GAPs) and the subsequent initiatives to reduce the river's pollution have so far failed to achieve the desired results.

In the end, the judiciary had to step in. Both the Supreme Court and the respective states' High Courts have directed the many polluting industries to shut down their operations, and, on several occasions, the courts have reprimanded the state governments for not fulfilling their accountability by failing to construct wastewater treatment plants and proper drainage. In addition, the courts have also reminded the respective state governments about their constitutional obligations to conserve the quality of the rivers.

In 2015, the Central Government launched a new policy called Namami Gange. The policy expects to implement a holistic strategy to rejuvenate the Ganga and to encourage all five Ganga Basin states to work in coordination, which was lacking in the previous initiatives. Previous experience shows cases of frequent violations of the statutory norms, issuing of fake clearances and permits, and non-compliance with rules. Hence, the National Green Tribunal (NGT) has adopted three golden principles (the Polluter Pays Principle, the Principles of Sustainable Growth, and the Precautionary Principle) in pronouncing its judgment against polluters to curb the menace of pollution in the rivers Ganga and Yamuna

Figure-1 Reproduced based on the National Green Tribunal of India



The evidence shows that in recent years, the NGT has issued stricter punishments, imposing fines and compensation requirements on heavily polluting industries. The NGT has also called for the adoption of a scientific approach, coordination with all stakeholders, and making cleaning up the Ganga and Yamuna rivers a primary goal of India's environmental governance program.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

It is also evident that the **"Polluter Pays Principle"** is becoming the bedrock principle in the tribunal's recent judgements. This Principle helps the tribunal quantify and determine the number of fines and compensation to be imposed in cases of breaches of environmental laws by any person or businesses.

Example of recent cases:

1. In the case of Krishan Kant Singh vs, the National Ganga River Basin Authority (2014), the NGT ordered the defaulting industrial unit to pay a fee of INR 500,00,000 (5 Cores) to the concerned State Pollution Control Board under the Polluter Pays Principle for performing remedial practices to ensure river safety in its judgment delivered on October 16, 2014.
2. In the case of R K Patel vs. the Union of India, the NGT ordered environmental compensation of INR 10,00,000 Lakhs to be paid to the impacted farmers in Vapi, Gujarat, due to hazardous waste contamination in a judgment issued on February 18, 2014.
3. In the case of Manoj Mishra vs. the Union of India and Others, the NGT ordered the Civic and Municipal authorities of Delhi to levy property taxes on homes, which included fines or compensation levied for Yamuna River pollution abatement.

Hence, the **"Polluter Pays Principle"** is expected to provide some teeth to the National Green Tribunal's judgements in the future, curbing the menace of the community and industry's business-as-usual attitude

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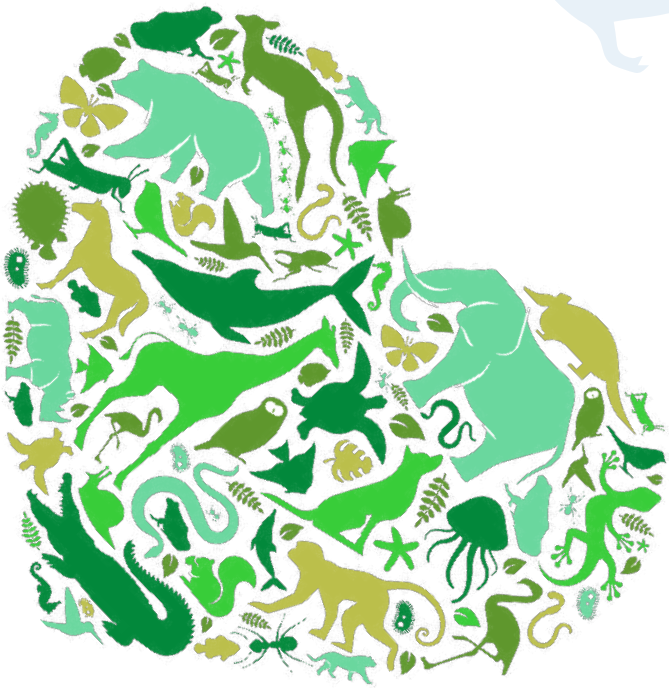

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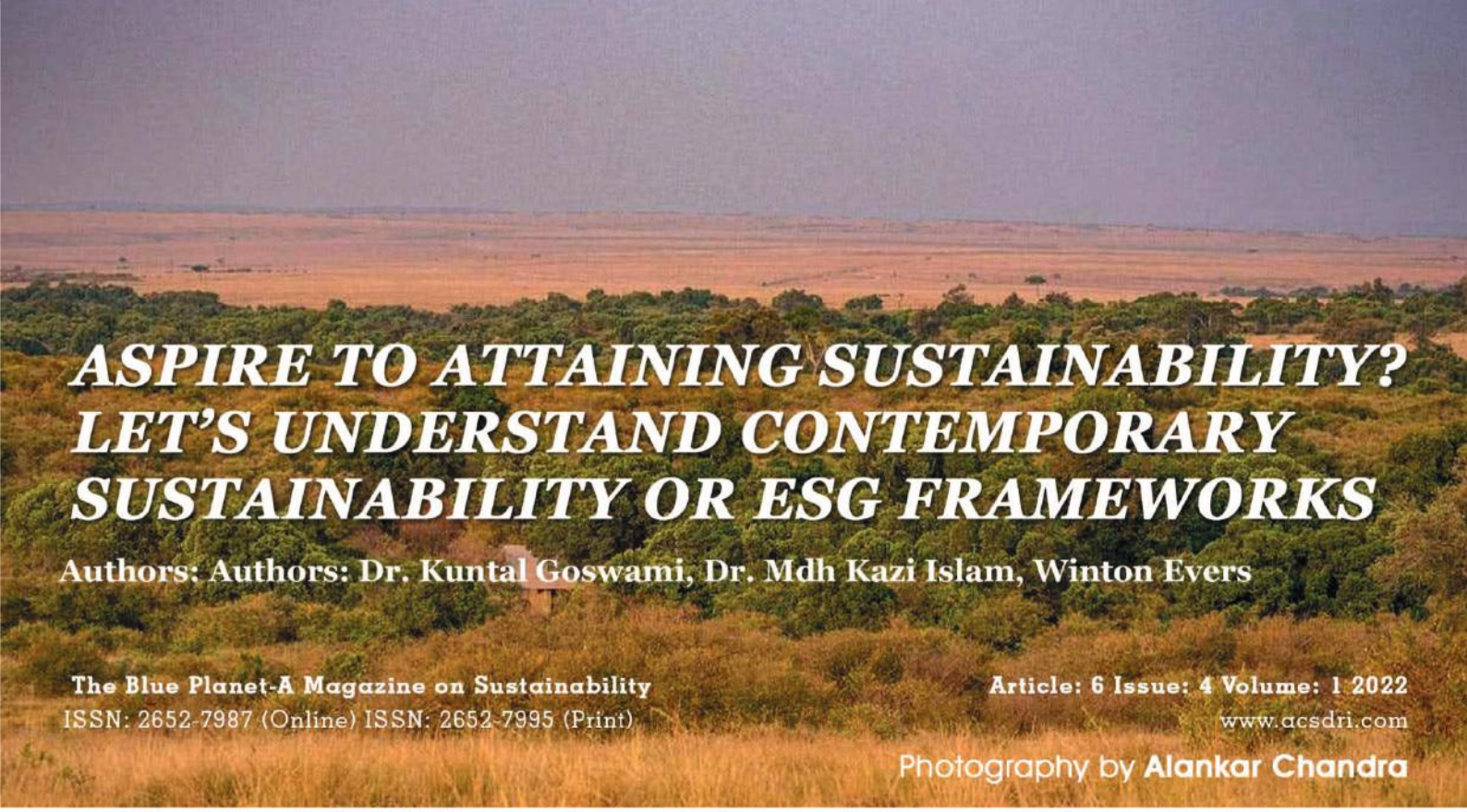

ASPIRE TO ATTAINING SUSTAINABILITY? LET'S UNDERSTAND CONTEMPORARY SUSTAINABILITY OR ESG FRAMEWORKS

Authors: Authors: Dr. Kuntal Goswami, Dr. Mdh Kazi Islam, Winton Evers

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If an organization aspires to attain Sustainability, it is vital to understand the fundamental perspective of contemporary ESG Frameworks or Sustainability Reporting Standards. The five most prominent contemporary ESG frameworks or Sustainability Reporting Standards have been promulgated by The Global Reporting Initiatives (GRI), International Integrated Reporting Council (IIRC) or Integrated Reporting (IR.), Sustainability Accounting Standard Board (SASB), Climate Disclosure Project (CDP) and Climate Disclosure Standards Board (CDSB).

Keywords: ESG frameworks, Sustainability Reporting, The Global Reporting Initiatives (GRI), International Integrated Reporting Council (IIRC) or Integrated Reporting (IR.), Sustainability Accounting Standard Board (SASB), Climate Disclosure Project (CDP) and Climate Disclosure Standards Board (CDSB), Sustainable Development Goals, Triple bottom line.

INTRODUCTION

In 1972, Barbara Word and Dubos Rene coined the term Sustainable Development. In 1994, John Elkington put forward the phrase "triple bottom line" to describe the concept of Sustainability. Sustainable Development or Sustainability concepts have travelled a long way since they were coined. Today, many communities are cities. Governments and organizations are aspiring to follow the path of sustainable development. Sustainability has become an essential strategic policy agenda for public and private sector organizations.

Even though the sustainability agenda is acknowledged as necessary, we must urgently address specific issues that tipping our planet's ecological balance. According to **The Global Risks Report** 2021, we face many risks over time. Some of the most critical environmental, social, and economic risks are listed in Table 1. The topmost **"Likelihood" and most "impactful" risks** are as follows:

- Extreme weather. Climate action failure. Human (induced) environmental damage. Infectious diseases Biodiversity loss. Digital power concentration, Digital inequality, Interstate relationship fracture, Cybersecurity failure, and Livelihood crises are the **topmost "Likelihood" global risks.**

- Infectious diseases, Climate action failure, Weapons of mass destruction. Bio-diversity loss. Natural resource crises, Human (induced) environmental damage, Livelihood crises, and Extreme weather. Debt crises and IT Infrastructure breakdown are the **topmost "Impactful" global risks.**

Table-1 Global Risk Exposure

Key Global Risks Horizon	Environmental	Social	Economic
Short-term Risk (0-2 years) Or Present dangers	*Extreme weather events* *Human (induced) environmental damage*	*Infectious* *Livelihood crises* *Youth disillusionment* *Social cohesionerosion*	*Prolonged stagnation*
Medium-term risks (3-5 years) Or Knock-on effects			*Asset bubble burst* *Price instability*
Long-term Risks (5-10 years) Or Existential threats	*Biodiversity loss* *Natural resource crises* *Climate action failure*	*Social Security collapse* *Backlash'against science*	*Industry collapse*

Over the years, there has been growing stakeholder pressure on the top management of companies to look beyond financial performance alone.

Organizations must excel in all three dimensions of sustainability performance (environmental, social, and economic). Against the backdrop of the above-mentioned global risk factors and as economies are emerging from the shock of COVID-19- 19, the chorus is growing loud to embrace the sustainable development model and integrate sustainability perspectives within organizational strategic policy.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Adopting Sustainability is increasingly seen as a responsible business practice and a fiduciary duty of business leaders. Most importantly. Operating within the holistic sustainability criteria is a prudent business decision to reduce negative socio-ecological impacts and mitigate risk exposure.

Sustainability practices: from a Voluntary to a Mandatory regime

After prolonged intellectual debate and activism by various stakeholders, Sustainability is an influential policy agenda within the statutory and regulatory frameworks. Today, Sustainability is no longer a voluntary disclosure obligation in many jurisdictions as organizations are mandated to disclose the positive or negative impacts of their operation's environmental, social, and economic impacts. In addition, stakeholders, including investors, are interested in knowing about an organization's risk exposure from a holistic sustainability perspective.

About 45 countries across the globe have enacted about 140 laws and regulatory standards that mandate companies to disclose some aspect of a company's sustainability performance. For example, the Czech Republic updated its accounting law in 2017 and prescribed that all large entities with more than 500 employees must report on their non-financial performance. In 2017, France transposed its, 1180 Ordonnance' based on the European NFRD into French law. In 2019, the Securities and Exchange Board of India (SEBI) instructed its top 1000 companies to publish Business Responsibility Reporting (BRR).

In 2017, Germany adopted the European NFRD and instructed all listed financial and non financial companies with more than 500 employees to report on certain sustainability information. In 2018, Japan adopted TCFD recommendations and revised its Environmental Reporting Guidelines.

In 2018, Nigeria's Securities and Exchange Commission (SEC) approved the Nigerian Stock Exchange's Sustainability Disclosure guidelines. In 2018, Pakistan adopted the Sustainable Development Goals in its National Framework. In 2019, the UK introduced the Net Zero 2050 commitment in law and instructed UK's listed companies to publish information based on TCFD recommendations from 2022. The Abu Dhabi Stock Exchange (ADX) has formally committed to incorporating sustainability aspects in the financial market in partnership with the United Nations-led initiative: The Sustainable Stock Exchange Initiative (SSE).

In addition, 15 stock exchanges have prescribed formal guidelines on sustainability reporting to their listed companies.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

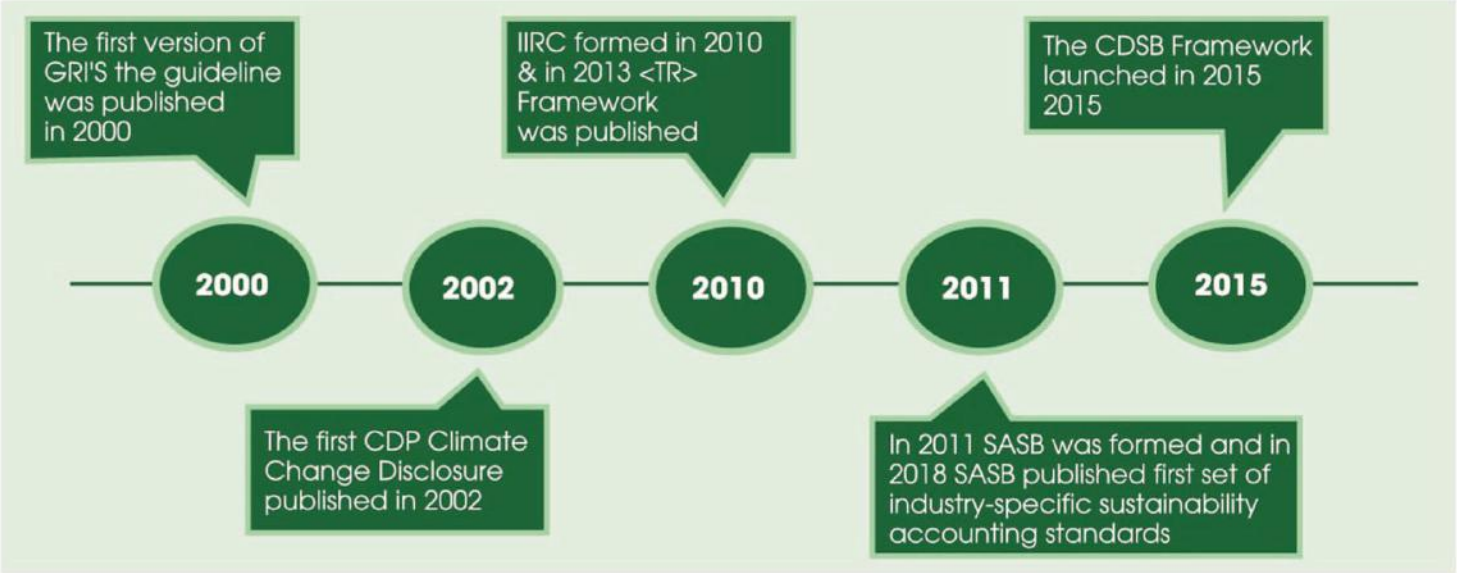
Contemporary Sustainability or ESG Frameworks

Many voluntary non-financial reporting frameworks and standards have evolved with a growing regulatory shift towards non-financial disclosures.

The five most prominent contemporary sustainability reporting or ESG frameworks and standards have been promulgated by:

- **The Global Reporting Initiatives (GRI),**
- **International Integrated Reporting Council (IIRC) or Integrated Reporting (IR),**
- **Sustainability Accounting Standard Board (SASB),**
- **Climate Disclosure Project (CDP) and**
- **Climate Disclosure Standards Board (CDSB).**

Figure 1: Timeline of Contemporary ESG Framework



Global Reporting Initiatives (GRI)

GRI provides multi-stakeholder-focused standards, and it has positioned itself as a catalyst for a sustainable world. The purpose of the standard is to support an organization's and its stakeholders' decision-making process environmental, and social performance.

GRI's sustainability topics include market presence, indirect economic impact, procurement practices, anti-corruption, anti-competitive behaviour, tax, material, energy, water, effluents, biodiversity, emission, waste, environmental assessment, employment, labour relation, OHS, training, diversity, equal opportunity, non-discrimination, freedom of association, child labour, forced labour, security practices, rights of indigenous people, human rights, local communities, supplier social assessment, public policy, customer health & safety, marketing & labelling, customer privacy, and socioeconomic compliance.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Table 2 An Overview of GRI Standards

Framework	Purpose	Stackholder Focus	Materiality Approach	Disclosure Structure
Global Reporting Initiatives (GRI)'s Standards	*Catalys for a sustainable world* *Catalys for a sustainable world*	*Multi-stakeholder focus*	*Materiality is seen through the lens of environmental, social, and economic impacts.* *GRI expects to disclose material information that are positively or negatively impacting economy, environment, and society.* *Material topic can be an organisation's significant economic, environmental, and social impacts; or can be those topics that can substantively influence the stakeholder' ability to assess and make informed decisions.* *GRI also expects to disclose whether an organisation's operation positively contributing or negatively impacting sustainable development.* *Finally, material topics should not be deprioritised based on not being recognised as financially material by the organisation.*	*GRI - Standards are broadly categorised into four segments:* • *Management Approach.* • *Economic Performance.* • *Environmental Performance.* • *Social Performance.*

GRI standards facilitate an organization to identify and report financial material positive or negative economic, environmental, mental, and social impacts of their operation on both the short- and long-term time horizons. As per GRI standards, an organization needs to identify material sustainability topics from two perspectives:

a) to identify those material sustainability topic areas of an organization's operations that are positively or negatively impacted, as well as advancing or detrimental to sustainable development.

b) to disclose that information has the potential to influence stakeholders' decision-making abilities and assessments significantly or substantively.

Most importantly, GRI strongly advocates that material sustainability topics should not be deprioritized based on not being recognized as financially material by the organization.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Integrated Reporting (IR)

The Prince's Accounting for Sustainability Project (A4S) and the Global Reporting Initiative (GRI) formed the International Integrated Reporting Committee (IIRC) in 2010. Later, the committee was renamed The International Integrated Reporting Council (IIRC).

Integrated reporting is a principles-based framework founded on the concept of integrated thinking, which is a subset of systems thinking. The integrated reporting system informs financial capital providers about how businesses create value by efficiently utilizing five broad-based capitals (financial, manufactured, intellectual, human, social, and natural). Capital is the stock of value and input of an origination's business model, which transforms through business activities into outputs. Hence, an Integrated Report defines material information through the prism of value creation.

As per IR., information is material if it substantively affects an organization's value-creation process in the short, medium, and long term. **The International Integrated Reporting Committee (IIRC)** and the Sustainability Accounting Standard Board (SASB) have merged to form the **Value Reporting Foundation.**

Table 3 An Overview of Integrated Report

Framework	Purpose	Stackholder Focus	Materiality Approach	Disclosure Structure
Integrated Reporting (IR) ***(Presently IR Merged with SASB to Form Value Reporting Foundation)***	*For efficient and productive capital allocation.* *To enhance accountability for the broad-based capitals (financial, manufactured, intellectual, human, social and natural).*	*Quality information for providers of financial capital.*	*Materiality is described through a value creation lens.* *Information is material if it substantively affects an organisation's value creation process in th short, medium, or long term.* *IR's materiality concept primarily focused on the value creation perspective of financial capital providers.* *Organisation need not to list all material issues, however, should disclose the materiality determination process.*	*IR framework is structured around five broad based capitals with input and outcome focuses.* *Capital is the stock of value and input of an orgination's business model, which transform through business process into outputs.* *IR framework is primarily for-profit motive private sector; however, it has its universal applicability too.* *IR's core disclosure includes business model, strategy and resource allocation, performance, and governance.* *IR also expects to identify organisational specific risks and opportunities that affects an organisation's ability to create value in short, medium, and long term.*

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Sustainability Accounting Standard Board (SASB)

SASB was established in 2011 as a not-for-profit organization to develop sustainability accounting standards for investors, lenders, and businesses in the USA. SASB provides sector-specific metric-based voluntary reporting standards. It encompasses eleven sectors and seventy-seven industries.

These sectors are:

- Consumer goods (7 industries),
- Extractive and minerals Processing (8 industries),
- Financials (7 industries),
- Food and beverages (8 industries),
- Health Care (6 industries),
- Infrastructure (8 industries),
- Renewable Resources & Alternative Energy (6 industries),
- Resource Transformation (5 industries),
- Services (7 industries),
- Technology & Communications (6 industries),
- Transportation (9 industries).

SASB covers five broad topics: environment, social capital, human capital, business model and innovation, and leadership and governance.

SASB's sector-specific sustainability topics include:

- GHG Emission
- Air quality
- Energy Management
- Water & Wastewater Management
- Waste & Hazardous Materials Management
- Ecological Impacts
- Human Rights & Community Relations
- Customer Privacy
- Data Security
- Access & Affordability
- Product Quality & Safety
- Customer Welfare
- Labor Practices
- Employee Health & Safety
- Selling Practices and product Labelling issues, alongside specific sustainability risks and opportunities

- Employee Engagement and Diversity Inclusion
- Product Design & Lifecycle Management
- Business Model Resilience
- Supply Chain Management
- Materials Sourcing & Efficiency
- Physical Impacts of Climate Change, Business Ethics
- Competitive Behaviour
- Management of the Legal & Regulatory Environment
- Critical Incident Risk Management and
- Systemic Risk Management

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

In the context of SASB, sustainability information is material if it is financially material and can impact an enterprise's value-creation process in the short, medium, and long term. SASB also prescribes a sector and an industry-level materiality mapping tool. The materiality map helps corporations to strategize sustainability goals and provides the metrics to underpin disclosure topics. For an investor, the materiality map provides a tool to analyse an industry or sector issue alongside specific sustainability risks and opportunities.

Table 4 An overview of the Sustainability Accounting Standard Board (SASB)

Framework	Purpose	Stackholder Focus	Materiality Approach	Disclosure Structure
Sustainability Accounting Standards Board (SASB)	*For efficient voluntary disclosure of material sustainability information in Forms 10-K, 20-F, and 40-F of US public listed companies.*	*To provide reasonably material and decision useful information to companies, investors, and corporate issuers.*	*SASB focuses on financially material issues which matter most to the investors and those issues that reasonably likely to impact financial condition or operating performance.* *Financially material sustainable information represents those sustainability factors which are material in short, medium, and long-term for enterprise's value creation.* *SASB Provides Sector as well as industry level materiality map. In the* ***sector level mapping system,*** *it provides hierarchy of material issues:* • *Likely material issues for more than 50% of industries in sector.* • *Likely material issues for fewer than 50% of industries in sector.* • *Not likely material issues for any of industries in sectore.* ***In the industry level mapping system:*** • *Likely a material issue or not likely material issue for companies in the industry.*	*SASB's sustainability topics are categorised into five broad dimensions:* • *Environment* • *Social Capital* • *Human Capital* • *Business Model and Innovation* • *Leadership & Governance*

The **International Integrated Reporting Committee (IIRC)** and the **Sustainability Accounting Standard Board (SASB)** have merged to form the **Value Reporting Foundation.** The merger of IR and SASB created a new synergy by combining two perspectives:

a) to formulate a strategy on how to utilize capital (environment, social capital, human capital, business model and innovation, and leadership and governance) to enhance and maintain the value of an organization over time the value of an organization over time horizon; and

b) to identify industry-specific financial material sustainability risks and opportunities that erode or enhance a company's ability to create value for investors over time.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Carbon Disclosure Project (CDP)

In 2000, CDP was established as a not-for-profit organization with the aim of building a sustainable economy and providing a global environmental disclosure system for companies, investors, cities, states, and regions. CDP provides its members an open-access online data portal to disclose their actions on climate, water, forest, and supply chain and their risks, as well as adaptation and mitigation strategies.

The platform focuses on measuring environmental impact for investors, companies, cities, and governments, along with information about how these entities act on their environmental impact. As of 2021, over 14,000 organizations, including 13,000 companies and about 1,100 cities, states, and regions, disclosed their environmental performance data through CDP's online platform.

Table 5 An overview of the Climate Disclosure Project (CDP)

Framework	Purpose	Stackholder Focus	Materiality Approach	Disclosure Structure
Climate Disclosure Project (CDP)	*The most comprehensive self-reporting online disclosure system for investors, companies, cities, states, and regions to manage environmental impacts.* *Organisation can publish their comprehensive environmental information in the CDP's online open data platform.*	*Company specific CDP information for investors and its customers.*	*CDP follows CLimate Disclosure Standard Board's materiality definition and scope.*	***Company specific CDP** disclosure platform has three primary disclosure areas: climate change, forests, and water security.* ***City specific CDP** platform has following disclosure theme: governance, Climate Hazards, Adaptation, City-wide Emissions, Emissions Reduction, Opportunities, Local government Emissions, Energy, Building Transport, Urban Planning, food waste, and water security.* *Based on the information disclosed a city gets its score and feedback from CDP.* ***States and Region specific** disclosure platform has following themes: governance, region wide-emission, strategy, risks and adaptation, water security and forest.*

Climate Disclosure Standards Board (CDSB)

The CDSB was formed in 2007 to standardize environmental information reporting. In the CDSB's standard, environmental information is material if "the environmental impacts or results it describes are, due to their size and nature, expected to have a significant positive or negative effect on the organization's current, past or future financial condition and operational results and its ability to execute its strategy; or omitting, misstating or misinterpreting it could influence decisions that users of mainstream reports make about the organization."

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

The CDSB framework expects an organization to report about its natural capital dependencies, environmental results, environmental risks and opportunities, environmental policies, outcomes, strategies and targets, and performance against targets. These aspects are addressed by answering twelve Reporting Environmental Questions (REQs), which are aligned with the recommendations of the Task Force on Climate-related Financial Disclosure (TCFD) on governance, strategy, risk management, metrics, and targets.

The twelve REQs are about governance, management's environmental policies, strategy, and targets, risks, and opportunities, sources of environmental impacts, performance and comparative management's environmental policies, strategy, and targets, risks, and opportunities, sources of environmental impacts, performance and comparative analysis, outlook, organisational boundary, reporting policies, reporting period, restatements, conformance, and assurance.

The CDSB's environmental information disclosure is guided by the following principles: Relevance and materiality, faithful representation, connection with other information, consistency and comparability, clarity and understandability, verifiability, and forward looking. In relation to environmental risks, CDSB expects an organization to identify its environmental regulatory risks and the physical effects of climate change.

For example, Regulatory risks include GHG emission limits, energy efficiency standards, carbon taxation, process or product standards, and participation in GHG trading schemes, and physical effects of climate change include changing weather patterns, rising sea levels, shifts in species distribution, changes in water availability, changes in temperature, and variations in agricultural yield. In addition to these, there are reputational and litigation risks.

Hence, in the CDSB framework, environmental information provides the scope of data where relevant environmental information is the subset of environmental information identified by management, and material information is the subset of relevant environmental information.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

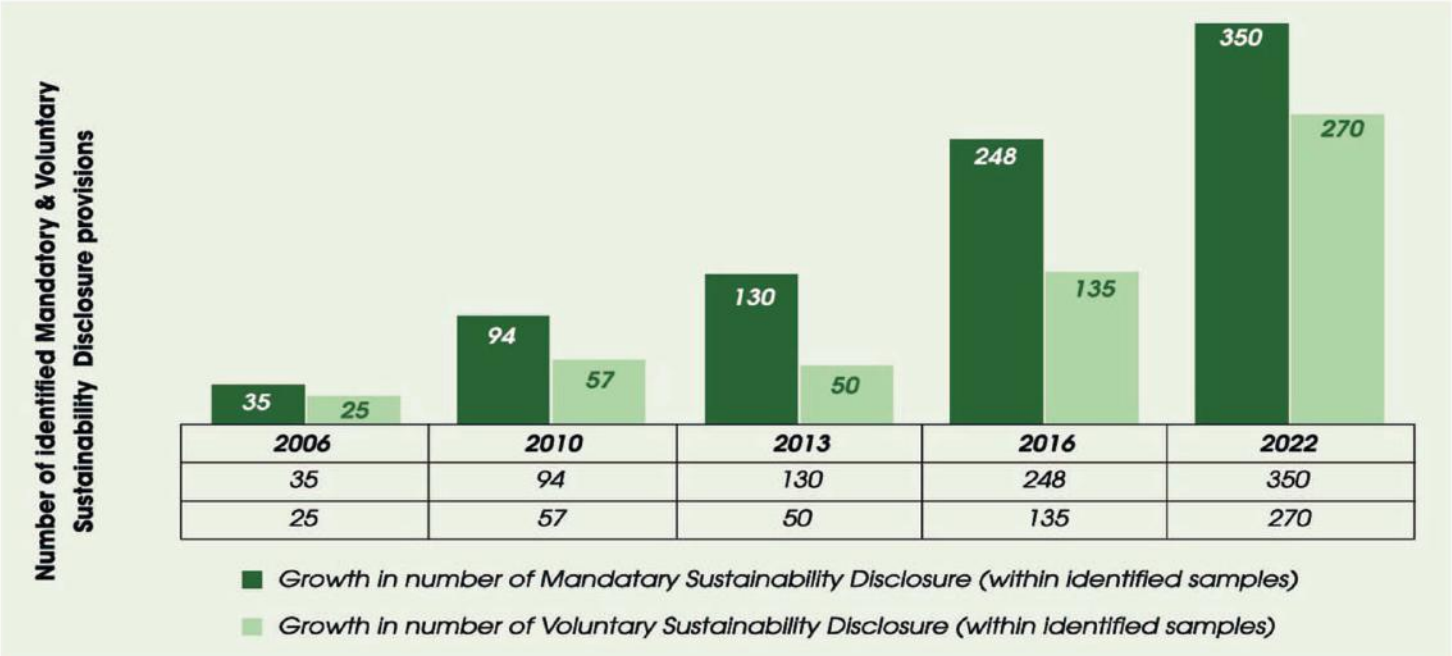
Table 6 An overview of the Climate Disclosure Standard Board (CDSB)

Framework	Purpose	Stackholder Focus	Materiality Approach	Disclosure Structure
Climate Disclosure Standards Board (CDSB)	*CDSB is a framework for reporting environmental and climate change information.* *A framework to align, equate, and advance environmental information with same rigour as financial information.* *To equate natural and financial capital information at par to assess corporate performance.*	*To provide investors with decision useful information on an organisation's natural capital dependencies, and environmental risks and opportunities.*	*CDSB framework is designed to report climate change-related and environmental information in mainstream reports.* *Materiality position of CDSB is near equivalent to the mainstream reporting model or like IASB* *Environmental information is material is:* • *the environmental impacts or results is expected to have a significant positive or negative effect on the organisation's current, past, or future financial condition and operation and its ability to execute strategy.* • *Omitting, misstating, or misinterpreting it could influence decisions that users of mainstream reports make about the organization.*	*CDSB do not specify the measures, indicators, and metrics to quantify sources of environmental impact.* *CDSB's environmental information includes:* • *Organisation's natural capital dependencies,* • *Environmental results,* • *Environmental risks and opportunities* • *Environmental policies, outcome, strategies, and targets,* • *performance against targets.*

Global trends on the uptake of Sustainability Practices

The global trend shows that the sustainability agenda has been mainstreamed over the years. Longitudinal studies such as "**Carrots & Sticks**' by the GRI and "**The Time has Come**' a survey by KPMG, confirm this growing global trend. The findings of these reports show that there has been a steady growth in mandatory disclosure provisions since 2006.

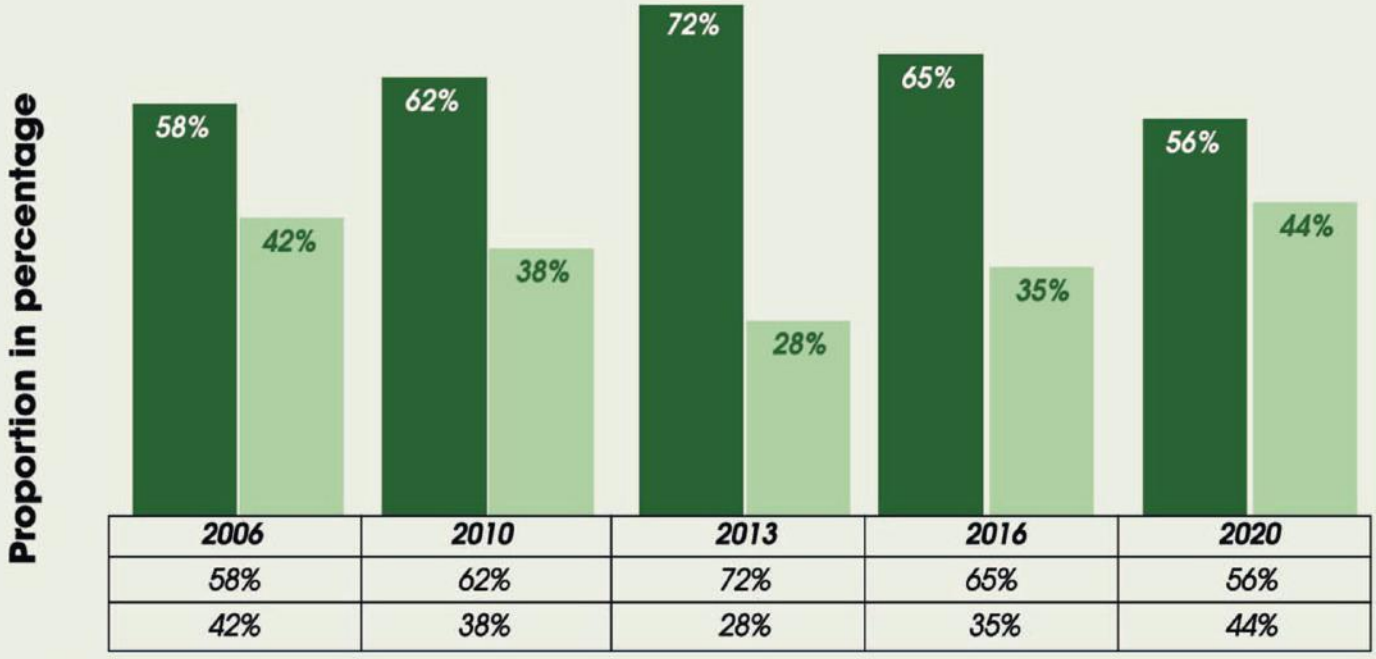
Graph-1 – Growth in the number of Mandatory and voluntary Sustainability Disclosure provisions between 2006 and 2020



Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

The survey can also identify a growing proportion of voluntary sustainability disclosure provisions within the surveyed sample. This trend suggests an increasing sense of urgency among organizations to monitor specific sustainability performance criteria.

Graph-2: Proportion of Mandatory & Voluntary Sustainability Disclosures (2006-2020)

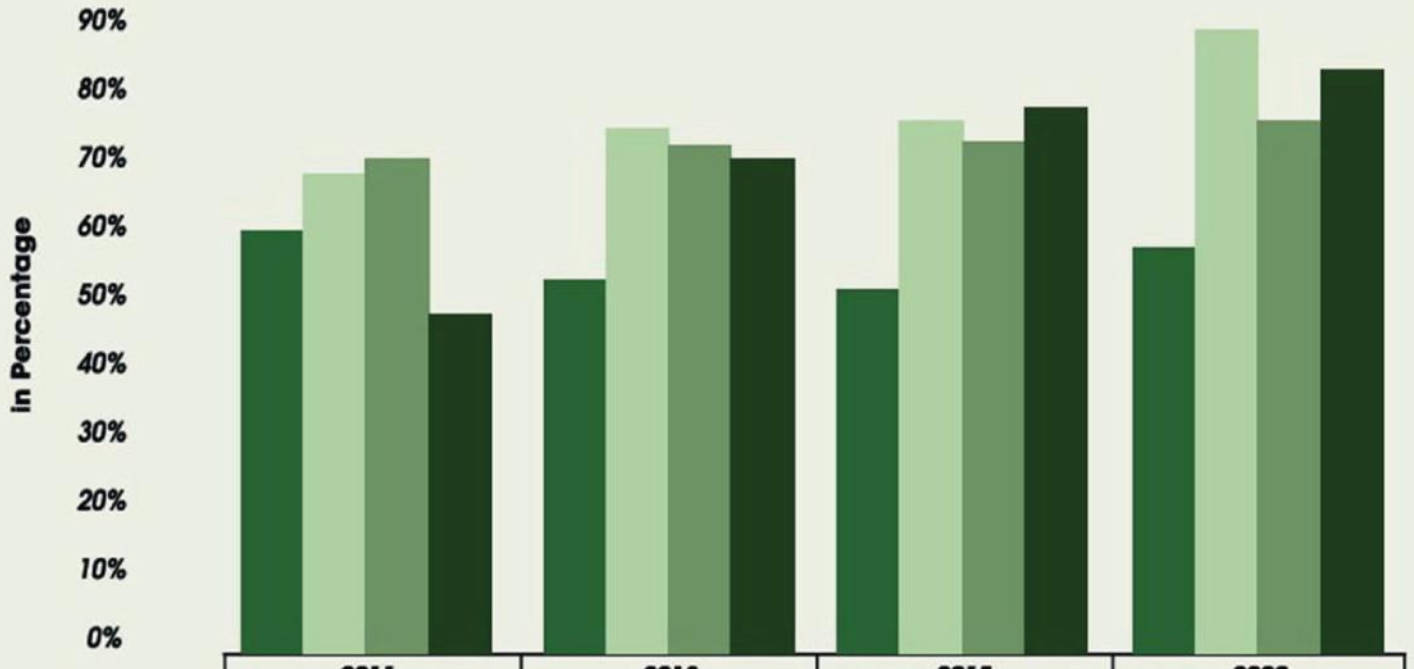


Supportive of the growing trend data, the uptake of sustainability disclosure among companies can also be noticed across regions. Companies in the Americas (including North and South America) report most on sustainability performance, followed by companies in Asia Pacific, Europe, Africa, and the Middle East. Among all regions, the trend of sustainability reporting among Asia-Pacific companies is growing fastest.

More specific country-wise data showed that 90% of top companies (by revenue) in Japan, Mexico, Malaysia, India, the USA, Sweden, Spain, France, South Africa, the UK, Taiwan, Australia, Canada, and Germany report on their sustainability performance. Sector data highlight that, except in the retail sector, almost 70% of the top 100 companies in all sectors report on their sustainability performance.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Graph-3 Trend of Sustainability Reporting among Top 100 Companies by Revenue (Regional trend between 2011 to 2020)



	2011	2013	2015	2020
Africa & Middle East	61%	54%	53%	59%
Americas	69%	76%	77%	90%
Europe	71%	73%	74%	77%
Asia Pacific	49%	71%	79%	84%

Table 7 Countries where companies disclose sustainability information

Countries where more than 90% of Top 100 companies (by Revenue) provide sustainability disclosures				
Japan	Mexico	Malaysia	India	USA
Sweden	Spain	France	South Africa	UK
Taiwan	Australia	Canada	Germany	

Countries where average 77% to 90% of Top 100 companies (By Revenue) provide sustainability disclosures				
Finland	Pakistan	Ireland	Netherlands	Italy
Brazil	Nigeria	Thailand	Argentina	Colombia
Hungary	Peru	Singapore	Switzerland	China

Countries where less than 77% of Top 100 companies (By Revenue) provide sustainability disclosures				
Slovakia	Austria	Belgium	Portugal	New Zealand
Czech Republic	Romania	Sri Lanka	Luxembourg	Panama
Greece	Kazakhstan	Costa Rica	Turkey	Iceland

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Sector trends showed that reporting rates of companies in sectors such as mining, technology, media and telecommunications, automotive, oil and gas, chemicals, forestry, and paper exceed 80%.

Table 8 The MOST Sustainability Reporting Sectors

The MOST Sustainability Reporting Sectors		
Sectors where More than 80% of Top 100 companies (by Revenue) provide sustainability disclosures		
Mining	*Technology, Media & Telecommunications*	
Automative	*Oil & Gas*	*Chemicals*
Forestry & Paper		
Sectors where Less than 80% to 75% of Top 100 companies (by Revenue) provide sustainability disclosures		
Utilities	*Financial Services*	*Manufacturing & Metals*
Personal & Household Goods		
Sectors where Less than 75% of Top 100 companies (by Revenue) provide sustainability disclosures		
Food & Beverages	*Healthcare*	*Construction & Materials*
Tranport & Leisure	*Retail*	

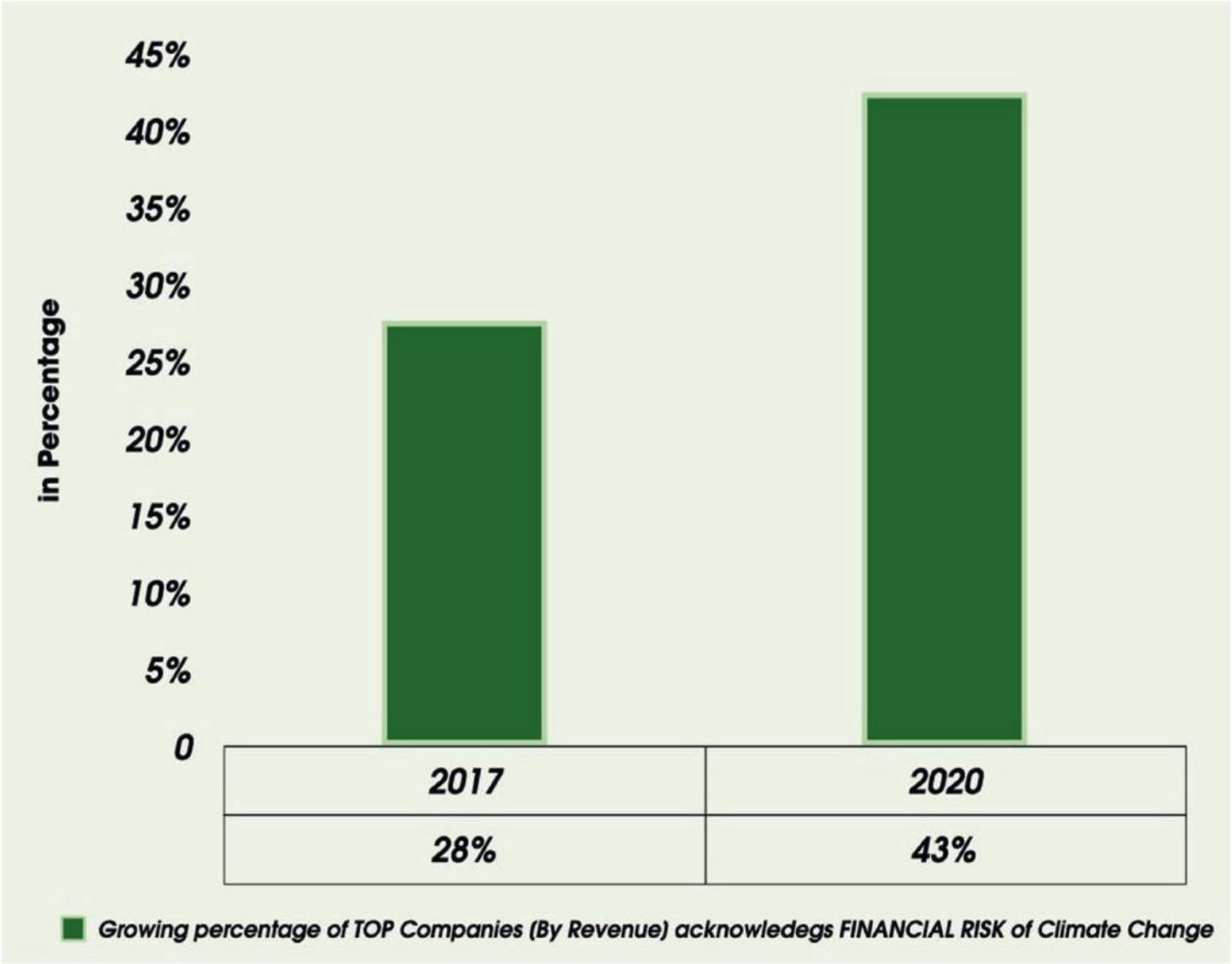
Sustainability is a holistic concept that encompasses environmental, social, economic, and governance topics. Any improvement in an organization's sustainability performance depends on the extent and depth of coverage of environmental, social, governance, and economic topics.

Among all environmental sustainability topics: a) climate, GHG emissions, energy, land use & forests; b) pollution, waste, hazardous substances; and c) environmental compliance risks are the TOPMOST-reported topics.

Data suggest that all significant companies across the globe have started acknowledging the financial risk of climate change. Top companies in Taiwan, France, the UK, the Netherlands, and South Africa acknowledge the most significant risk of climate change.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

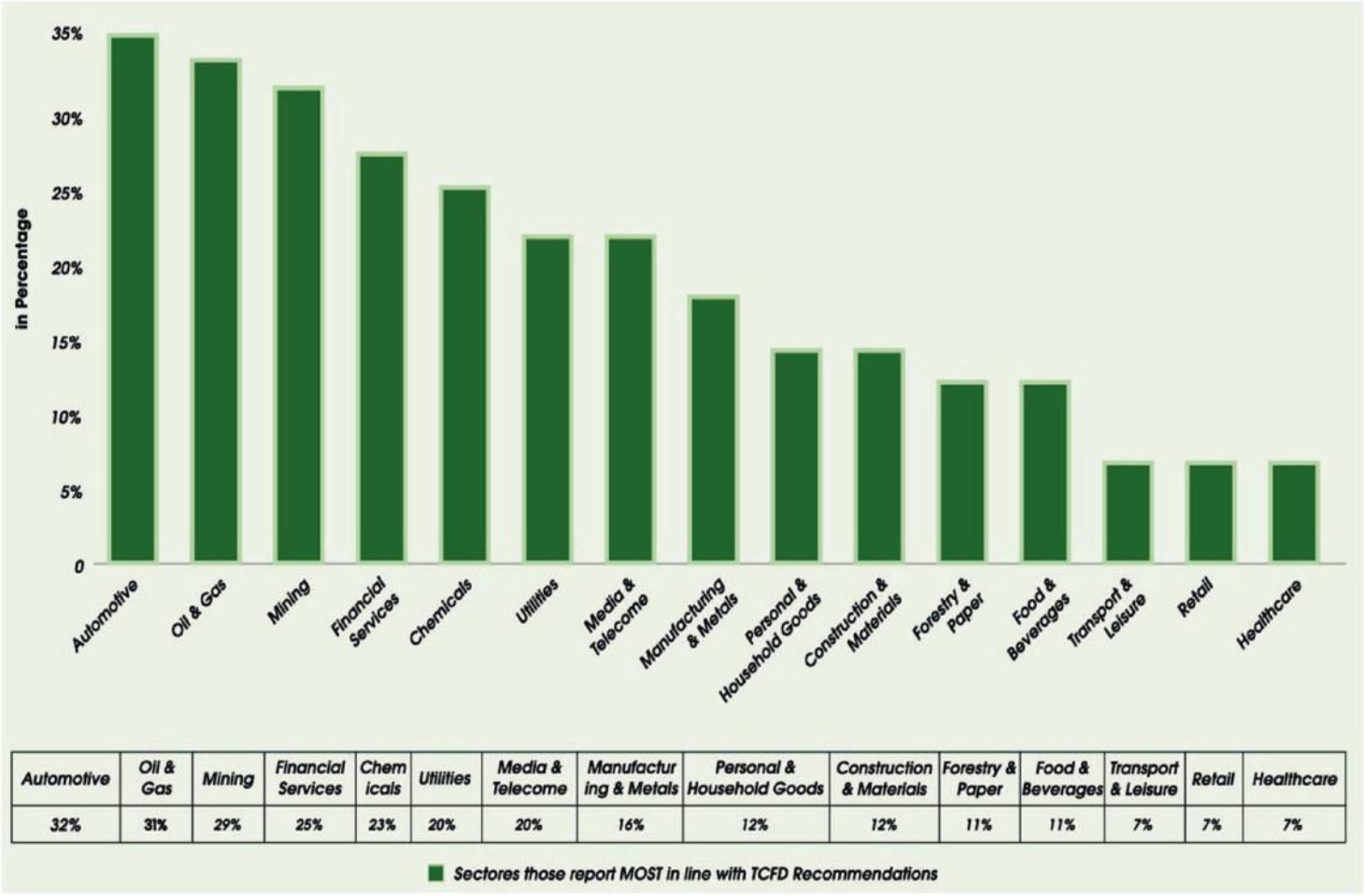
Graph-4 Percentage of companies acknowledging the FINANCIAL RISK of Climate Change



As the risk perception of climate change increases, companies across sectors are also aligning their corporate risk management strategies with the Task Force of Climate-related Financial Disclosures (TCFD) recommendations. In this respect, automotive, oil gas, mining, and financial services companies are ahead of all other sectors.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Graph-5 Sectors those aligned MOST with TCFD Recommendations



Automotive	Oil & Gas	Mining	Financial Services	Chemicals	Utilities	Media & Telecome	Manufacturing & Metals	Personal & Household Goods	Construction & Materials	Forestry & Paper	Food & Beverages	Transport & Leisure	Retail	Healthcare
32%	31%	29%	25%	23%	20%	20%	16%	12%	12%	11%	11%	7%	7%	7%

Sectores those report MOST in line with TCFD Recommendations

In addition to climate change risks, the world faces similar risks from biodiversity loss. The fifth UN Global Biodiversity Outlook report highlighted this fact and emphasized the interlinkage across climate change, unrecoverable loss of biodiversity, and long-term food insecurity.

Similarly, a Swiss Re Institute report mentioned that 55% of global GDP depends on high functioning biodiversity and ecosystems. Biodiversity is a fundamental component of the long-term survival of businesses; therefore, companies must disclose the impact of their operations on biodiversity and the risks of biodiversity loss on their business.

As per KPMG's survey, sectors such as construction and building materials, electricity, food and drug retailers, food producers and processors, forestry and paper, leisure and hotels, mining, oil and gas, and utilities pose a high risk of biodiversity loss. In addition, sectors such as beverages, chemicals, financial services, general retail, household goods and textiles, personal care and household products, pharmaceuticals and biotech, support services, tobacco, and transport pose a medium risk to biodiversity.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Table-9 Sectors pose RISKS to Biodiversity loss.

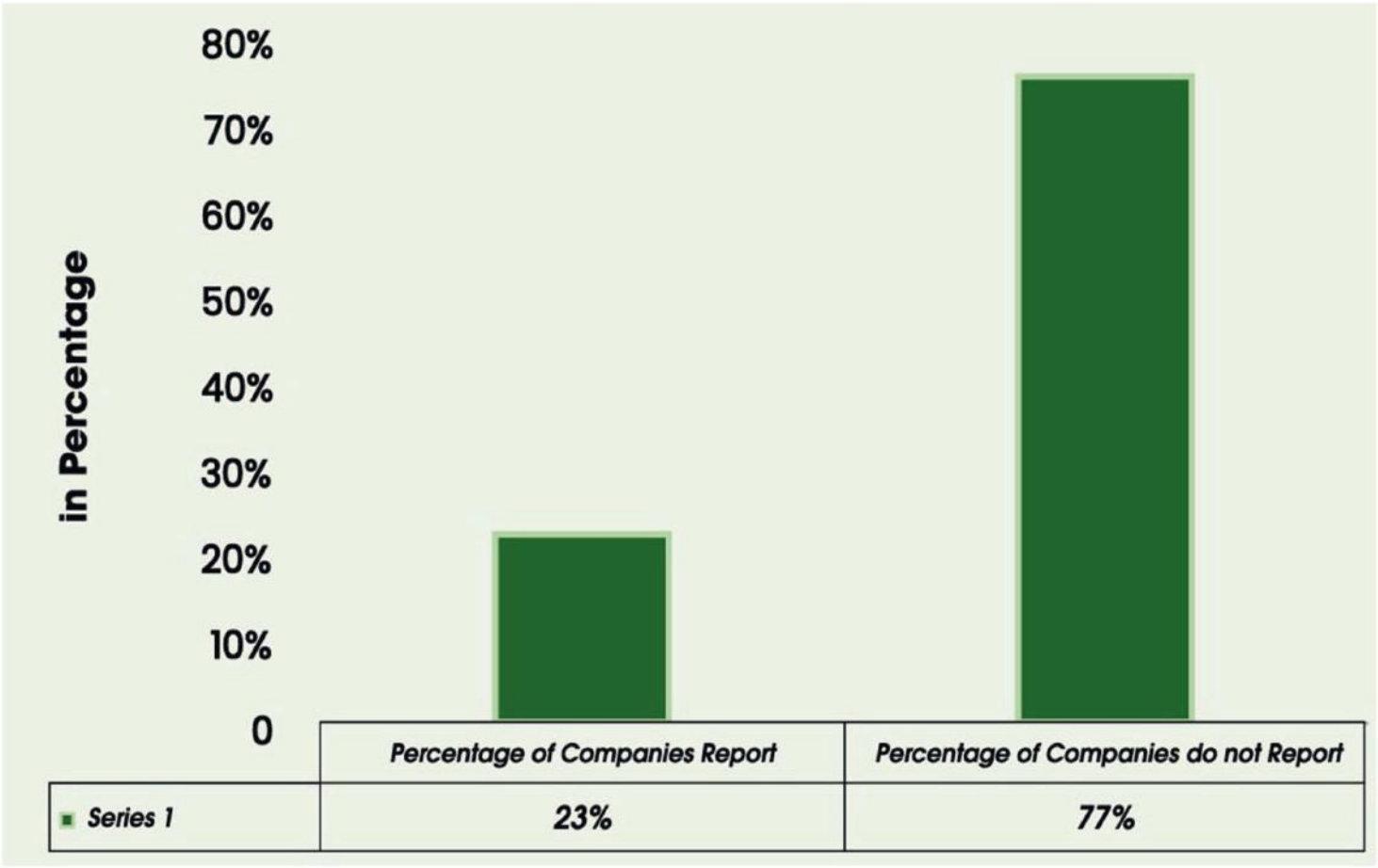
Sectors pose RISKS to Biodiversity Loss	
HIGH-RISK Sectors	
Construction & Building Material	*Forestry & Paper*
Electricity	*Leisure & Hotels*
Food & Drug Retailers	*Mining*
Food Producers & Processors	*Oil & gas*
	Utilities
MEDIUM-RISK Sectors	
Beverages	*Personal Care & Household Products*
Chemicals	*Pharmaceuticals & Biotech*
Financial Services	*Support Services*
General Retails	*Tobacco*
Household Goods & Textiles	*Transport*

Although the Global Risks Report 2021 categorized "Biodiversity Loss' as a long-term or existential risk, the reality is that disclosure of "Biodiversity & Ecosystem Services' has remained low and generic across many companies. Much of our economic prosperity depends on the quality of biodiversity. Many companies' profitability depends on the quality of biodiversity. So, loss of biodiversity poses RISK to their business.

Under the social sustainability topics, a) human rights, b) employment conditions, policies, and practices, and c) social impact and value creation are the TOP THREE reported topics among surveyed companies. Under the economic sustainability theme, a) economic performance, b) trade and investment, and c) business model, strategy, and innovation are the most reported topics.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Graph-6 Percentage of Top "At Risk" Companies reporting on the risk of biodiversity loss to their business operation.



As per the survey, 77% of the top 'At Risk' companies do not report on the risk of biodiversity oss to their business.

Only 23% of companies report the risk of biodiversity loss to their business. Out of this reporting percentage, companies from mining, forestry and paper, food and beverages, oil and gas, and personal and household goods report the most on biodiversity loss. Meanwhile, under the governance theme, a) accountability, anti-corruption, and anti-competitive Behaviour; b) structure and leadership; and c) ethics and integrity are the most reported themes. However, a comprehensive analysis of the disclosures suggests that most disclosures of companies are relatively generic rather than providing an explicit narrative.

Table-10 Top MOST Environmental themes addressed by Companies

- *Climate, GHG Emissions, Energy, Land use & forests*
- *Pollution, Waste, Hazardous Sustances*
- *Environment Compliance risks*
- *Water*
- *Material, Resource Efficiency (including circularity)*
- *Biodiversity & Ecosystem Service*
- *Supplier environmental assessment*

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

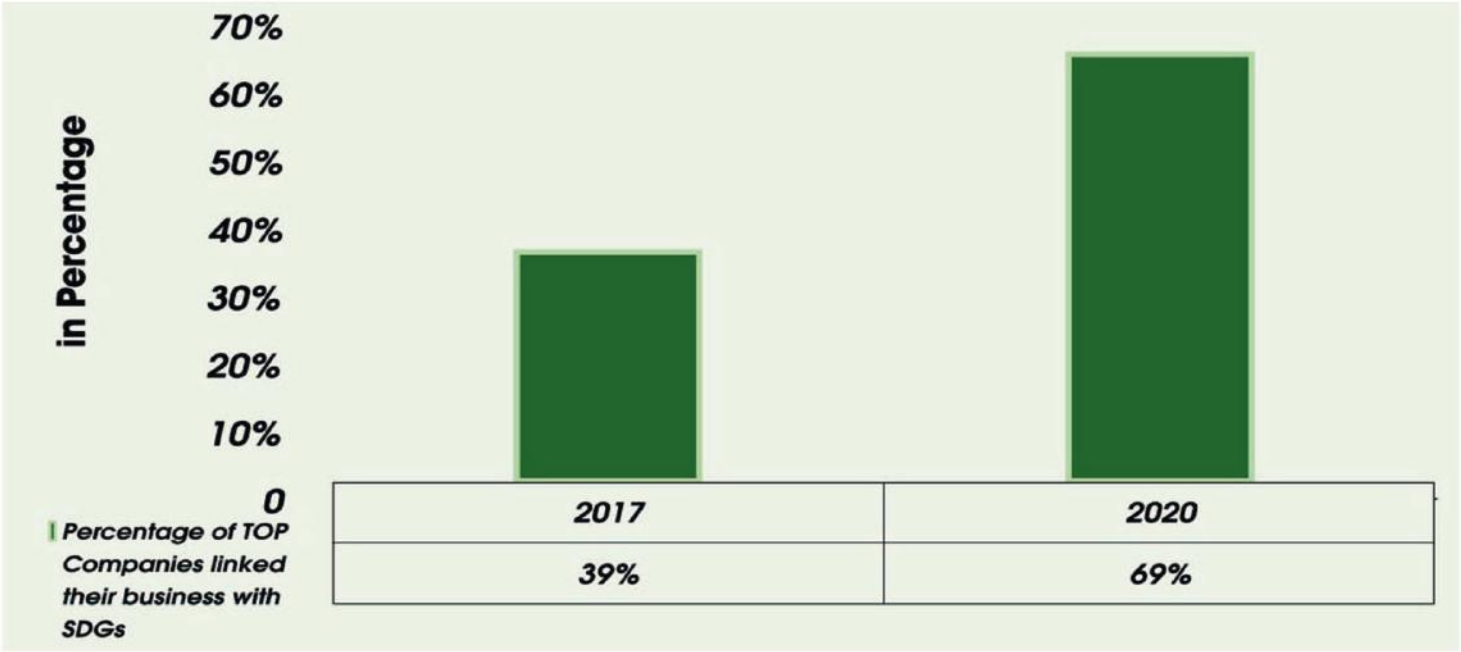
Table-11 Top MOST Social themes addressed by Companies	
• Human Rights	• Social impact and Value Creation
• Employment conditions, policies and practices	• Products & Service Responsibility

Table-12 Top MOST Economic themes addressed by Companies	
• Economic performance	• Procurement and Supply Chain Management
• Trade & Investment	• Indirect Economic Impacts
• Business Model, Strategy & Innovation	• Market presence

Table-13 Top MOST Governance themes addressed by Companies	
• Accountability, Anti-corruption, Anti-competitive Behaviour	• Remuneration
• Structure and Leadership	• Effectiveness (including evalution process)
• Ethics and Integrity	• Supplier Environmental Assessment
• Stokeholder Engagement	

In addition to organisational-specific sustainability frameworks such as GRI, IIRC, SASB, CDP, and CDSB, since 2015, the Sustainable Development Goals (SDGs) have acted as a macro-level road map for a sustainable world. About 69% of companies across sectors align their business with SDGs, and out of all sectors, companies from the automobile, oil & gas, media, and telecom sectors aligned their businesses MOST closely with the SDGs.

Graph-7 Percentage of Top Companies Aligned with Sustainable Development Goals



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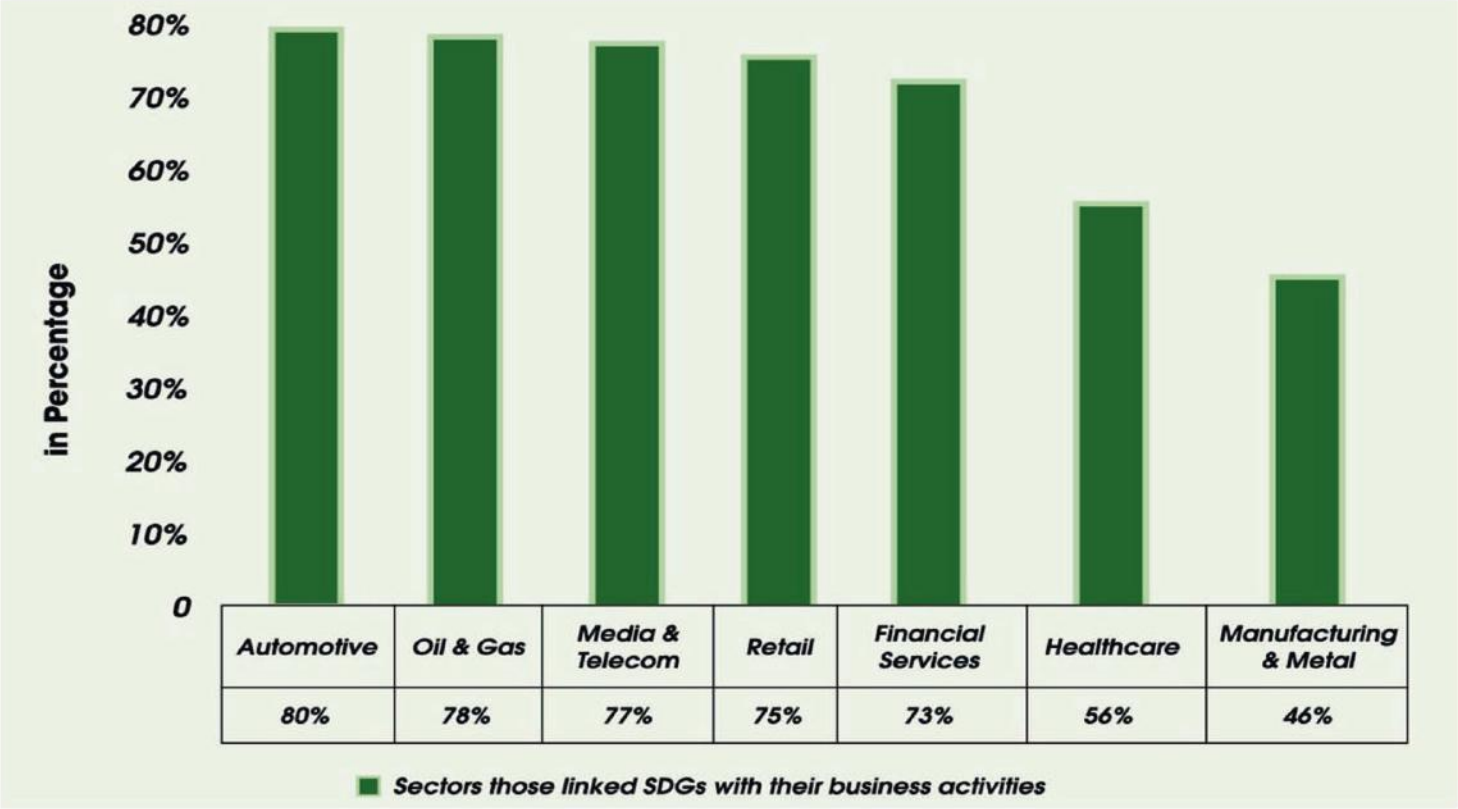
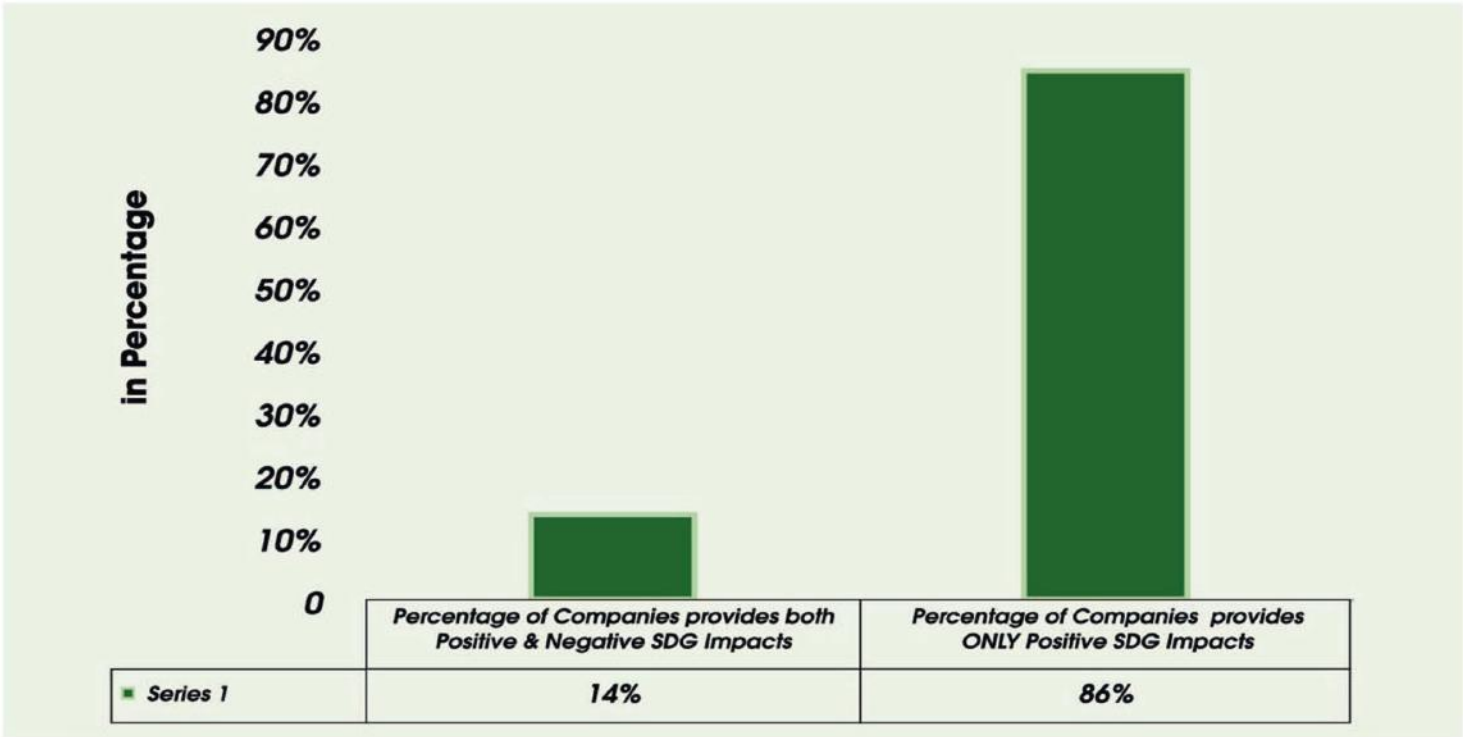
Graph-8 Sectors Aligned with Sustainable Development Goals



However, aligning a company's business with SDGs does not mean they provide a balance view of their contribution to SDGs. The study suggests that only 14% of all surveyed companies report on the positive and negative impacts of their operations.

Graph-9 Percentage of Top Companies Providing Balanced Impact Reports on Sustainable Development Goals



Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Conclusion

Non-financial voluntary reporting frameworks or sustainability reporting frameworks have been in existence for the last 22 years, starting with GRI as one of the pioneers, followed by CDP, IIRC, SASB, and CDSB.

We can broadly categorize GRI, IR, SASB, CDP, and CDSB standards and frameworks into two groups:

a) multi-stakeholder focus as in the case of GRI;
b) investor and capital provider focus as in the case of IR, SASB, CDP, and CDSB.

Furthermore, distinctions can also be drawn based on the materiality perspective. In the cases of IR, SASB, CDP, and CDSB, the materiality approach of a sustainability topic is considered through the prism of financial information.

Conversely, in the case of GRI, the materiality approach of a sustainability topic is wider than financial material in formation. Instead, it advocates that material sustainability information should not be deprioritized based on not being recognized as financially material by the organization.

The trend of considering Sustainability through the prism of financial and material information has further positive direct consequences.

Firstly, it will quantify non-financial sustainability data and improve its usefulness as investment-grade information. Secondly, it will facilitate the flow of capital toward the green economy and will advance the emerging sustainable finance domain.

However, focusing on the financial materiality of sustainability information alone may lead to a sub-optimal outcome in the long term. It may defeat the merits of early normative arguments for **sustainability accounting and reporting** over traditional financial accounting.

Hence, the literature argues that the financial market should embrace the inherent non financial nature of ESG data. The pressure to incorporate calculability into ESG data may make many ESG issues invisible.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Because of the growing divergence within various sustainability frameworks and standards, there is a global trend towards convergence of sustainability or ESG reporting frameworks and standards. We have seen the formation of the Value Reporting Foundation after the merger of the International Integrated Reporting Committee (IIRC) and the Sustainability Accounting Standard Board (SASB). The fundamental conceptual models of IIRC and SASB continued to exist.

In addition, an international collaboration is underway to consolidate Sustainability or the ESG landscape under one comprehensive international sustainability standard. **Hence, in 2021, the International Financial Reporting Standards (IFRS) Foundation established the International Sustainability Standards Board (ISSB).** The project is backed by the Financial Stability Board, the International Organisation of Securities Commissions, regulators, corporations, institutional investors, and other stakeholders.

Currently, the Technical Readiness Working Group (TRWG) has been set up to enable the ISSB to draft a new international sustainability standard based on existing standards and frameworks, including the Climate Disclosure Standards Board, the Task Force for Climate related Financial Disclosures (TCFD), the Value Reporting Foun nation's Integrated Reporting Framework and SASB Standards, and the World Economic Forum's Stakeholder Capitalism Metrics.

The ISSB proposed to provide material, thematic, and industry-focused sustainability information relevant to investors' decision-making. The materiality approach of ISSB's proposed standards will focus on identifying **"...**sustainability matters that are reasonably possible to affect enterprises' value creation**,** preservation, or erosion over the short, medium, and long term which therefore would impact investors' investment decisions**...".**

Finally, the global trend in Sustainability or ESG disclosures suggests that there has been considerable uptake of sustainability practices among companies worldwide, from around a paltry 12% in the early 90s to 80 % in 2020. The Percentage is even higher, up to 90 percent, among the world's largest companies. GRI has remained the dominant ESG reporting standard globally over peers such as IR and SASB.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

The reason may be that GRI is the pioneer in this landscape and hence garners much more universal acceptance and legitimacy because of its stakeholder focus rather than the investor only focus. However, there has been a growth in the adoption of IR in France, Japan, India, and Malaysia over recent years. Another significant trend is the growth in providing third party assurance of sustainability information by reporting entities. Even though 'reporting on risk from biodiversity losses remained low, climate change risk caught the imagination of the corporate world.

With SDGs, the trend suggests that corporate reporting on SDGs needs to be more balanced and connected to business goals. However, the silver lining is that most companies are connecting their activities with the seventeen global Sustainable Development Goals set by the United Nations.

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ENVIROTECH EDUCATION'S MORETON BAY HEALING SEA COUNTRY PROGRAM

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Photography by
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About Envirotech Education

Envirotech Education is an award-winning Registered Training Organisation (RTO) in Australia. It offers first-of-its-kind **accredited vocational** courses in **Marine Habitat Conservation and restoration (MHCR)** and **Sustainability Operations** for its domestic and international students.

The college also offers other courses in the disciplines of Business, Entrepreneurship, Hospitality, and Information Technology. An RTO offers vocational education, resulting in qualifications or statements of attainment recognized and accepted by industry and other educational institutions throughout Australia.

These qualifications can range from Certificate I-IV through to a Diploma Level. Diplomas can sometimes be recognized for university credit. **The college's accredited courses can be seen from the links below:**

- https://envirotech.edu.au/en/qualifications/
- https://training.gov.au/Training/Details/10749NAT
- https://training.gov.au/Training/Details/10750NAT

Envirotech Education's certificate programs in Marine Habitat Conservation and Restoration

(MHCR) involve online knowledge-based learning and hands-on practical exposure.
Each course consists of small, precise, practical units of competencies and skill sets. Participants can learn skill sets relating to conservation and restoration in local ecosystems such as mangroves, coral reefs, seagrass, and shellfish. The specialized skill sets, and micro-credential accreditations qualify people living in coastal areas to perform specialized marine conservation and restoration activities, reducing the need to import externally qualified workers.
Envirotech Education is based on the Gold Coast, Australia, but it also has other projects in the Philippines, UAE, and Europe.

Envirotech Education's Vision

In this time of global crisis, where climate change, corporate and government corruption, pandemics, and war overseas dominate headlines, Envirotech imagines a world that is far different and one that is counteracting these destructive forces. Envirotech is committed to a world where humans live in a balanced and interconnected natural world.

Envirotech envisions a world in which humans are actively regenerating the ecosystems that they have damaged or destroyed, a world in which Indigenous Communities are leading the way with their immense wisdom and connection to the country.

Envirotech is working with Indigenous Communities, who are being trained to be VET teachers, to help the community connect to its culture and protect its land. Students from all around the world have the opportunity to learn from these experienced and passionate Indigenous leaders about how to regenerate land and sea country.

The Lost Islands Project of Envirotech Education

The Lost Islands Project aims to foster the creation of operationally independent vocational training hubs with remote island communities, led locally and supported globally by the Envirotech group. Starting with marine accreditations and continuing to develop with other holistic environmental training programs, the key objective of the island education program is to foster the restoration of island biodiversity and help sustainably build the local economy.

Under this project scope, a course is designed to teach marine conservation and restoration knowledge and generate life-changing learning experiences. The project aims to connect with local needs to create local jobs and support local ecosystem conservation and restoration activities.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

In remote communities, the need for university degree requirements and marine VET qualifications has led to limited Indigenous community engagement with marine ecosystem management projects. The gaps also result in very high marine restoration project costs that prevent projects from progressing in remote communities due to the local skills gaps and the need to import external marine experts and specialists for entry-level jobs.

Around the world, governments, financial institutions, non-governmental organizations, and businesses are joining efforts to conserve and restore ecosystems to reverse human activity's negative impact. However, such efforts have been unsuccessful in mitigating negative impacts due to the inability to develop effective practical training and adopt regenerative practices, especially in the marine field.

Marine Habitat Conservation & Restoration (MHCR) is Australia's first-of-its-kind Vocational Education and Training (VET) course for Marine Habitat Conservation and Restoration training, which can lead to employment generation for Indigenous communities in the marine sector. Outcomes may extend to projects that could involve coral nurseries, mangrove nurseries, marine aquaculture, and oyster reef restoration, among others.

Restoration of marine habitats will support the rejuvenation of fish stocks and enrich ecosystem services to balance our increasing consumption of and impacts on marine life. These regenerative projects will also act as buffers and are intended to reduce the impacts of climate change and other human impacts such as floods, storms, bleaching events, pollution, and erosion.

The college supports these training hubs through their development process and assists local communities in becoming independent over a 1-3-year span. Students from Australia and overseas can learn ecosystem management, conservation, and restoration from these island communities. The college's long-term goal is to facilitate knowledge exchange between Indigenous communities and the VET sector and help establish future environmental leadership programs.

Lost Islands Project - Moreton Bay Healing Sea Country Program

Envirotech Education's first funded course was delivered in Moreton Bay, Queensland. The course focused on training Indigenous youth, with a cohort of about 25 students. Envirotech received a grant from the National Indigenous Australians Agency (NIAA) to teach Cert II in Marine Conservation and Restoration, Certificate IV in Training and Assessment, and Open Water Diving Certification to enrolled students.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Along with the qualifications, the students will be hired for a six-month period to build further skills, support the creation of regenerative projects, and help build a VET training hub in Moreton Bay so future students can come and study. The Certificate IV in Training and Assessment is essential for graduates to be able to teach at a vocational level.

The program's objective is to empower the Moreton Bay Island community to take environmental initiatives into their own hands and create an accredited local environmental workforce. This creates a win-win situation for the Earth, sea, and local communities. The program aims to create an island education hub, which Envirotech will assist in becoming an independent island-based RTO within five years.

ENVIROTECH EDUCATION

LOST ISLANDS PROJECT

Students are in a Field study aligning with the Spirits of Australian Vocational Education Model

Field study in Progress

The Local Need

A recent severe flooding event in Moreton Bay (February 2022) has led to unprecedented levels of silt, sediment, and pollution going into the Bay. It is estimated that 5-10 times more sediment than the previous most significant floods in the modern era (2011) has entered the Bay. In this event, 80% of the seagrass beds were killed, and it took 7 years for the seagrass to re-establish itself in the Bay. Many marine populations, including dugongs and turtles, depend on the seagrass, and the extent of the damage is yet to be determined.

One preventative solution for future events is ensuring Moreton Bay has healthy oyster reefs. Oysters once covered the Bay but were extracted for building and food through the 19th and

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

20th centuries, so very few reefs remain. Oysters filter the water, provide habitat for multiple marine animals, and hold the sediment together. Seagrass thrives with healthy oyster reefs. In order to have healthy seagrass beds, especially with climate change impacting the Bay more frequently, we need healthy oyster reefs again.

Empowering Traditional Custodians of the Bay to look after and regenerate their Sea Country, including oyster reefs, seagrass beds, mangrove habitats, and coral reefs, will be one solution to this crisis. Restoration of riparian areas upstream will also be critical to limiting the amount of sediment entering the Bay. The solutions are right in front of us, and the time is now to start regenerating these degraded and essential habitats.

Healing Sea Country - Project Objectives

- Build Island internet capacity, access, and infrastructure, as well as assist with technological literacy.
- Train 20-30 Traditional Custodians (focus on youth) of Moreton Bay in
  - Cert II Marine Conservation and Restoration
  - Cert IV Training and Assessment
  - Open Water Diving
- 6 months of employment with Envirotech for participants
- The creation of an Indigenous islander VET independent education hub that incorporates marine protection STEM with Indigenous marine environmental knowledge and protocols.
- Foster partnerships between the marine conservation and restoration industry, primary producers (oyster farmers, fishers, etc.), and VET training programs
- Upgrade the VET National Marine Environmental Accreditation programs with local Indigenous knowledge, IP rights belonging to the local community
- Create new job opportunities, such as “Blue Economy” entrepreneurship, through mutually agreed marine habitat conservation and restoration projects supporting local communities.
- Provide youth with the skills (technological, social, and ecological) that will empower them to face future social and ecological challenges.

Short-term

Indigenous islanders and coastal inhabitants, in collaboration with Envirotech, will deliver the Marine Habitat Conservation & Restoration Program to conserve and restore habitats and improve community practices in resource management, such as domestic waste and compost management.

Short-term successes aim to gather 20-30 youth to adult leaders (15 – 65 years of age) per island for training and accreditation clusters in 10749NAT Certificate II in Marine Habitat Conservation and Restoration, supported by LLND capacity programs to deliver online, face-to-face, and practical blended modes.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Medium-term

Continue delivery of short-term programs, supporting progress to 10750NAT Certificate III in Marine Habitat Conservation and Restoration. Initiate a Marine Habitat Conservation & Restoration Program at the school level. Expand training to environmental management, waste management, etc., and commence trainer accreditation as parallel programs.

Long-term

Establish VET and university pathways, led locally and supported by long-term collaboration with programs that connect marine science with traditional Indigenous Knowledge, culture, and stories. As a result, new environmental passions, innovation, and jobs will emerge.

Community benefits

1. Creation of income sources and employment opportunities for local communities.
2. Assimilation of values of sustainability in all areas of community life.
3. Regeneration of terrestrial and marine ecosystems through improving access to knowledge and developing practical projects.
4. Improvement in the use of natural resources and reduction in the impact of plastic and non-sustainable resources on the islands.
5. Improvement in sustainable food production, composting facilities, and waste management.
6. In the spirit of renewable resources sustainability, introducing renewable facilities and technologies for reducing the environmental impacts of infrastructure development, e.g., energy systems, water supply, wastewater, and aquaculture.
7. Enhancement of marine biodiversity, the emergence of a disaster-capable local workforce, and efficient fishing methods preventing overuse of natural resources and natural recovery.
8. Design and development of community structures for conservation, restoration, and monitoring of marine and terrestrial ecosystems.
9. Preservation of local and Indigenous people's ancient and traditional ecological knowledge.
10. Enhancement of the communities' interconnections between People, Place, Nature, and Spirit.

ENVIROTECH EDUCATION

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

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RESPONSIBLE PROCUREMENT: AN ORGANISATION'S QUEST FOR GREEN TRANSITION

Authors: ***Subhomoy Bandyopadhyay***

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At the end of COP26, Alok Sharma, the President of the Glasgow Conference, said, *"...We can now say with credibility that we have kept 1.5 degrees alive. However, its pulse is weak, and it will only survive if we keep our promises and translate commitments into rapid action..."*

...In the same context, the UK lead negotiator, Archie Young, said that *"...across the board, we achieved what we set out to achieve..."*

...Creating a **Green Supply Chain and Sustainable Procurement Practice** *is the secret to an ecologically sustainable world. This system can create a cascading effect across the value chain and act as a catalyst to drive ecologically sustainable development...*

Introduction

The fundamental goal of the **COP26** in Glasgow was to agree on achieving a global net zero target by the mid-century and not raising global warming above 1.5 degrees centigrade. This conference upheld these goals by signing the **Glasgow Climate Pact** and agreeing on the **Paris Rulebook.**

At the end of COP26, Alok Sharma, the President of the Glasgow Conference, said, *"…We can now say with credibility that we have kept 1.5 degrees alive. However, its pulse is weak, and it will only survive if we keep our promises and translate commitments into rapid action… "In the same context, the UK lead negotiator, Archie Young, said that "…across the board, we achieved what we set out to achieve…"*

However, many environmental groups also acknowledged that progress is slow, and steps are far from reaching that target. Given this reality, it is paramount that we collectively prioritize ways to implement and embrace sustainability initiatives.

It is also true that many organizations are proactively strategizing ways to address social and environmental issues and embedding sustainability risks and opportunities into their overall strategy and operation. Practicing sustainably is crucial for a business in the context of the post-Paris Agreement.

In addition, the publication of several contemporary sustainability frameworks and standards and the establishment of eco-labelling agencies are also facilitating this positive shift. These overall changes in the institutional ecosystem are motivating organizations to reach the global net zero targets by the mid-century.

This article discusses the strategic transformation of a Dutch trade-compliance organization, Pincvision, towards sustainability, which is also a business partner of IBM - a major multi-national Information Technology company.

IBM internally adopted a sustainable procurement policy to transition towards holistic, sustainable practice. As a result, all its suppliers and subcontractors had to adopt steps to operate environmentally and socially responsibly and comply with IBM's Sustainable Procurement Policy.

Hence, this article showcased how Pincvision qualified as IBM's recommended Green Supplier and illustrated the steps needed to adopt and internalize environmentally and socially responsible operational practices.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

The transition towards a Green Supply Chain

The secret to an ecologically sustainable world is to create a Green Supply Chain with a cascading effect.

IBM requested all its "First Tier" suppliers to access their current internal sustainability practices and implement a performance management system that would help the organization maintain and report on its sustainability performance periodically. In addition, IBM requested its vendors to set targets under the United Nations Sustainable Development Goals (UN SDGs) and accomplish these targets incrementally on an annual basis.

The steps to become a green supplier are as follows:

- **Define, deploy, and sustain** a corporate responsibility and environmental management system.
- **Measure** performance and establish voluntary environmental measurable goals.
- Publicly **disclose** results associated with the voluntarily adopted environmental goals and other environmental aspects of the management system.
- This set of requirements should be **cascaded** to the suppliers who perform material work for the products, parts, and/or services being supplied to your client.

The first step in transitioning towards a Green Supply Chain is to ***"define, deploy, and sustain*** *a corporate responsibility and environmental management system."* This step explicitly categorizes the entire process into three distinct steps.

Firstly, a vendor must "define" corporate sustainability for them. Intuitively, that requires the organization to know its current corporate sustainability situation.

Secondly, the organization had to "deploy" a corporate sustainability performance management system. This system allows the organization to conveniently measure its sustainability performance and individually manage the criteria it needs to achieve sustainability.

The system should be able to be used on an ongoing basis and be aligned with the third element of the requirement, i.e., "sustain."

The second step is **to "measure"** performance and establish measurable voluntary environmental goals. The firm needs to be proactive in its commitment to corporate sustainability.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

In this case, Pincvision voluntarily set measurable goals according to globally accepted targets. These goals were not limited to the environment but also addressed the social and economic dimensions of sustainability issues.

The third step is to publicly '**disclose'** results associated with the voluntarily adopted environmental goals and other environmental aspects of the management system. The firm must compulsorily report on the measures taken and targets achieved.

Pincvision was able to comply with the top three required steps; however, for the fourth step, **"cascade,"** an organization needs to have **"buyer's power."** Pincvision did not have the "buyer's **power"** to make its suppliers comply with these requirements. Thus, Pincvision was not able to fulfil this requirement to cascade its targets to its supply chain.

Social Responsibility & Environmental Management System (SEMS)

IBM also prescribes a **Social Responsibility and Environmental Management System (SEMS)** questionnaire (see Table 1a & b on the next page) to its suppliers. So that its suppliers can perform self-assessment and change their internal systems to match IBM's sustainable supplier credentials expectation.

The assessment based on the SEMS questionnaire identified the following gaps of Pincvision:

1. Pincvision, though sustainability-oriented, however, the company never documented or reported on its sustainable practices and did not align these practices with its long-term strategy hence, sustainability was not 'evidence-based' (full stop).
2. The company had not run any self-assessments around Corporate Social Responsibility.
3. The company currently has no environmental performance measurements or management systems.
4. The organization never publicly disclosed its results or progress against environmental goals to its stakeholders, as it had never set any goals.

Hence, the following four steps were prescribed by IBM to mitigate these gaps:

1. **Define** sustainability for your organization.
2. **Develop** a new or **adapt** an existing Corporate Sustainability Performance Measurement and Management System
3. **Report** on the measures taken and targets achieved.
4. **Establish** voluntary measurable goals

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Sustainability, ESG, CSR, SDGs, 3BL, 3P: Multiple Perspectives

Sometimes, it is easier to aspire to adopt sustainability practices; however, it can be not very clear to identify which steps to follow as there are multiple perspectives available on how to embrace a sustainable business practice. For example, various terms with similar goals, such as Sustainability, ESG, CSR, SDGs, 3BL, and 3P, are available; all provide similar solutions with slight variations in perspectives.

The very first dive into the literature or practice of corporate social responsibility hits the reader with a plethora of terms and concepts that deter the enthusiast from daring into the field. Of the various terms and concepts available, the most important ones are Sustainability and ESG.

Essentially, all other expressions lead to achieving these two goals. Thus, sustainability and ESG must be understood as a starting point.

Sustainability is an **"Inside-out"** concept that informs diverse stakeholders about an organization's internal practices. These practices can have both positive and negative economic, environmental, and social impacts.

Table - 1A Social Responsibility & Environmental Management System (SEMS) Questionnaire

Supplier Requirement	Related Questions - Please use the document " Supplier Guide to the S&EMS Questionnaire" for instructions on each question below	Question Response (Yes or No)	If Yes, provide verifiable evidence	If No, provide expected date to meet or explanation why N/A
1. Establish a corporate social responsibility and environmental management system that is defined, deployed, and sustainable and that identifies significant aspects of the supplier's intersections with these matters. including those articulated in the Electronic Industry Citizenship Coalition (EICC) Code of Conduct. The supplier must be able to demonstrate that such a management system is in place and is deployed at their sites where work for IBM is performed, such that should IBM choose to conduct an audit. either by IBM or an IBM-directed third party, of a supplier's corporate social responsibility program and/or supplier's environmental program, the supplier will be able to demonstrate complete compliance to all elements of the EICC Code of Conduct.	*Q1a. Does your company currently have a management system(s) addressing supply chain social responsibility, including those elements articulated in the EICC Code of Conduct?*			
	Q1b. Does your company currently have an Environmental management system(s) addressing, at a minimum. the elements described in Supplier Requirements 2 through 8 below?			
2. Establish programs (within the supplier's management system) to control operations that intersect with the above matters and that confirm their compliance with applicable law. regulation and any particular contractual requirements relevant to IBM.	*Q2. Has your company established a program(s) and procedure(s) within the management system that control these operations and confirm their compliance with applicable law. regulation and any related contractual requirements?*			
3. Monitor/measure supplier's environmental performance and have established voluntary environmental goals to track and improve upon environmental performance and, where applicable, include at a minimum each of the following environmental aspects *• energy conservation* *• waste management and recycling* *• scope 1 and scope 2 greenhouse gas (GHG) emissions*	*Q3a. Does your company currently monitor/measure energy conservation?*			
	Q3b. Does your company currently have a waste management and recycling program and measure the amount of waste generated/recycled?			
	Q3c. Does you company currently inventory its Scape 1 and Scope 2 greenhouse gas emissions?			

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Table - 1B Social Responsibility & Environmental Management System (SEMS) Questionnaire

Supplier Requirement	Related Questions - Please use the document " Supplier Guide to the S&EMS Questionnaire" for instructions on each question below	Question Response (Yes or No)	If Yes, provide verifiable evidence	If No, provide expected date to meet or explanation why N/A
4. Set voluntary environmental goals to achieve positive results associated with the supplier's significant aspects. where applicable, and include at a minimum one goal in each of the three aspects cited in Supplier Requirement 3 above	*Q4a. Does your company currently have established goals for energy conservation?*			
	Q4b. Does your company currently have established goals for waste management and recycling?			
	Q4c. Does your company currently have established goals to reduce Scope 1 and Scope 2 greenhouse gas emissions?			
5. Publicly disclose results associated with the above-mentioned voluntary environmental goals and other environmental aspects from the management system. including any regulatory fines or penalties that may have occurred.	*Q5a. Does your company currently publicly disclose results or progress against its environmental goals?*			
	Q5b. Does your company currently publicly disclose other environmental aspects of its management system, including any regulatory fines or penalties?			
6. Train employees who are responsible for the performing/ monitoring/measuring/reporting of environmental performance. assuring the appropriate skill-level and competency	*Q6. Does your corporate responsibility and environmental management system include employee training requirements?*			
7. As part of the supplier's management system, conduct self-assessments and audits as well as management reviews of the supplier's system.	*Q7a. Are self-assessments and audits regularly conducted to assess performance and verify conformance to management system requirements?*			
	Q7b. Are regular management reviews a part of the management system requirements?			
8. Cascade the above set of seven IBM supplier requirements to the supplier's own suppliers that perform work that is material to the products, parts and/or services being supplied to IBM.	*Q8. Do you cascade these requirements to your suppliers (at least to those suppliers who perform work that is material to the products, parts, and/or services you supply to IBM)?*			

Conversely, **ESG** (Environmental, Social, Governance) introduces one more dimension, i.e., Governance, into the triple bottom-line context. The usage of the term the financial community has predominantly adopted ESG. Instead of highlighting all the impacts that an organization has done, ESG concept focuses on the **"Outside-In"** aspects. It discloses risks an organization expects from its operational environmental and social impacts so diverse stakeholders (often investors) can decide whether to invest in the company.

It is advisable for an organization early in its sustainability/ESG journey to become aware of the market and the type of stakeholders to whom its business is targeting. Then, one of these terms can be adapted and maintained so that a common language can be practiced across diverse groups of stakeholders.

Standard practice and historical data show that organizations tend to use the term sustainability in the first instance, as they want to report their impacts on people and the planet. They eventually adopt ESG as they grow when potential investors seek to evaluate their business as an investment option.

The matrix below introduces a sustainability practice landscape and highlights each conceptual framework's classified domains. The frameworks, principles, and indices presented in Figure 1 are not exhaustive. It is suggested that the suitability of each framework and standard be identified before application.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Figure-1: Global Sustainability Practice Landscape

Global Goals and Principles have been devised to tackle the impending danger from the impacts of human economic activities. Globally, countries have developed their ratings and regulations by merging several frameworks. These ratings and regulations are then used by diverse stakeholders (authorities, investors, and regulators) for their decision-making.

Situation Analysis

A situation analysis is a crucial foundation for any sound intervention. It helps identify issues and select the best action to mitigate them. A situation analysis of its sustainability status was imperative to address Pincvision's gap no.2 based on the SEMS questionnaire. Instead of typical situation analysis models such as SWOT, PESTEL, VRIO, etc. Pincvision selected **the Situation Diagnostic Tool** – as a relevant model for analysis

Situation Diagnostic Model: *To Define Organisation Specific Sustainability Issues*

Because of the diverse sustainability / ESG frameworks and standards, analysing a company's sustainability risks and opportunities from its specific organizational context is better. Cory Searcy proposed the Situational Diagnostic Model in his 2009 article 'Setting a Course in Corporate Sustainability Performance Measurement' to support organizations in analysing their current situation and defining sustainability accordingly.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Once an organization undertakes a self-assessment using the **Situational Diagnostic Model,** ***it will know where to start and what to follow. After that, everything else will eventually fall into place.***

It is a three-step diagnostics model for developing a sustainable performance measurement system. Originally intended to be used by corporations to develop their performance measurement systems, however, this diagnostic tool can also be used to improve sustainability performance. Searcy (2009) states, *"A situational diagnostic is necessary to help a corporation develop an interpretation of sustainability". In the same paper, he mentioned that "a meaningful sustainability performance measurement system cannot be developed if the corporation has not defined sustainability".*

The situational diagnostic is intended to illuminate the context in which a new sustainability performance measurement system will be created, or an existing one adapted. It recognizes that each corporation is unique and that its sustainability performance measurement system must be designed considering its strengths, weaknesses, opportunities, and threats.

The situational diagnostic is a questionnaire-based model that helps decision-makers structure thinking and discussion around the key issues so that a meaningful corporate sustainability performance measurement system can be developed. The tool recommends focusing on a systematic survey of three key areas.

1 Interpreting sustainability in the corporate context:

The first challenge in creating a sustainability performance measurement system is to develop a shared understanding of what sustainability means in the organization's context. There is no definitive endpoint where an organization can declare that it has achieved sustainability. Characteristics like diverse stakeholder perspectives, emergence in dynamic internal and external environments, and pluralistic goals have implications for developing a sustainability performance measurement system. The questions raised in this vital area will guide corporate decision-makers in considering these implications.

2 Surveying the internal environment:

The organization must examine how its internal policies, structure, and ongoing initiatives related to the sustainability performance measurement system it intends to develop or adapt. A fundamental point in this process is that the sustainability performance measurement system cannot be designed without referencing what is already in place. Building on that notion, a logical starting point in the internal environment survey is the organization's sustainability policy and/or principles.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

The questionnaire identifies critical areas that should be considered in any survey to determine an organization's internal sustainability status. Undertaking this process should help the organization identify possible leverage points for change early on.

3 Surveying the external environment:

The organization must explicitly assess how the external environment could impact the development of its sustainability performance measurement system. One key to this assessment is identifying external stakeholders who are interested in and potentially affected by the system. Building on external stakeholder influence, the organization must also consider the potential impact of government regulations and voluntary initiatives.

The finding and analysis of these questions and responses will help the organization to define what sustainability means for them and enable them to decide whether to develop their own or adopt an existing Corporate Sustainability Performance Measurement System. Determining sustainability in their organizational context would enable companies to decide which Global Goals and principles to pledge, while the analysis would lead to the relevant Reporting Framework.

The representative questions of the situational diagnostic can be found in the image below:

Table - 1A Social Responsibility & Environmental Management System (SEMS) Questionnaire

Interpreting sustainability in the corporate context	*Has the corporation already defined what sustainability means in its context?* *If the corporation has already defined sustainability:* • *Does the definition address economic, environmental, and social issues?* • *Is the definition supported by top management?* • *Is the definition widely understood and accepted by internal and external stakeholders?* • *Has the definition provided a useful reference point for the implementation of past and present sustainability initiatives?* • *Does the definition provide a useful reference point for the development of a SPMS?* • *Does the definition need to be refined?* *If the corporation has not already defined sustainability:* • *What is the corporation's motivation for initiating sustainability initiatives?* • *Who needs to be involved in the development of the definition?* • *What conceptual! framework(s) should be used to help structure the development of the definition?* • *How have other corporations in the industry defined sustainability?* • *What are the characteristics of a sustainable corporation in this industry?*

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Table - 1B Social Responsibility & Environmental Management System (SEMS) Questionnaire

Surveying the internal environment	• *Has the corporation established internal policies and/or principles relevant to sustainability?* • *Which policy commitments require substantiation?* • *Does the corporate mission and vision address issues relevant to sustainability?* • *Is top management committed to the development and implementation of the SPMS?* • *Who could serve as the executive champion of the SPMS?* • *To which levels (business units, divisions, departments) of the corporation will the SPMS apply?* • *How will the SPMS accommodate multiple corporate levels (if applicable)?* • *Are sustainability responsibilities reflected in the internal organizational structure?* • *Who could serve as sponsors of the SPMS at the business unit, division, and department levels?* • *Which internal stakeholders will be interested or affected by the SPMS?* • *Which internal stakeholders need to be involved in the development of the SPMS?* • *How should internal stakeholders be involved in the development of the SPMS?* • *What performance measurement systems are Currently in place in the Corporation?* • *How are existing performance measurement systems currently being utilized?* • *What data collection systems are currently in place?'* • *What are the key management systems currently in place and how are they utilized?* • *Does the corporation currently produce a sustainability report? If so, what is reported, who Is responsible for developing it, and how is it integrated with annual reporting?* • *What are the major gaps in existing management, measurement, data collection, reporting, and decision-making processes?* • *Haw can the SPMS contribute to existing management, measurement, data collection, reporting, and decision-making processes?* • *What has worked well and what hasn't worked well in the corporation's previous sustainability initiatives?*
Surveying the external environment	• *Who are the corporation's key external stakeholders?* • *Which external stakeholders will be interested or affected by the SPMS?* • *Which external stakeholders should be involved in the development of the SPMS?* • *How should external stakeholders be involved in the development of the SPMS (including any special accommodations that may be necessary)?* • *Are there any barriers to the participation of external stakeholders in the development of the SPMS?* • *Are there existing mechanisms in place to engage external stakeholders?* • *What has worked well and what hasn't worked well in the corporation's past dealings with external stakeholders?* • *How are existing publicly-available reports and performance measures Currently being utilized by external stakeholders?* • *How are the corporation's existing sustainability initiatives perceived by external stakeholders?* • *What regulations (e.g. mandatory reporting} need to be taken into account in the development of the SPMS?* • *What external voluntary initiatives does the company subscribe to and how could these potentially influence the development of the SPMS?* • *What have other corporations within the same industry done with respect to sustainability performance measurement?* • *Haw is the corporate sustainability program inked to broader public policy initiatives and goals?* • *What are the main economic, environmental, and social issues facing the corporation, the industry, and the markets the corporation operates in?*

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Pincvision made the following analyses of their situation:

Interpreting sustainability in the corporate context:

Pincvision had the perfect seeds for germinating a functional, sustainable performance measurement system. The top management's motivation and involvement fast-tracked an assessment tool's selection and adoption process.

It became clear that there were two distinct goals:

1. Adopting a sustainability performance measurement system, and
2. Establishing voluntary targets to embed the UN SDGs.

Surveying the internal environment:

Revising the company's mission and vision to accommodate sustainability targets is important. Two compulsory elements, the "Management Approach" and "Topic-specific disclosure," would be essential requirements for the selected assessment tool. This analysis indicated that the GRI-based reporting format should be suitable for adoption.

Surveying the external environment:

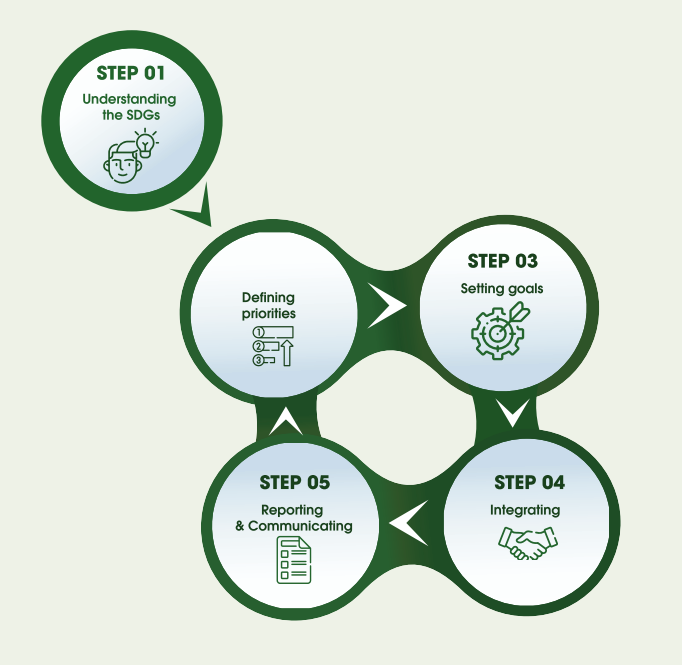
Salience, Credibility, and Legitimacy were the key high-scoring criteria on which the chosen sustainability performance measurement system performed better.

Pincvision adhered to the UN SDGs and decided to become part of the SDG Compass, which guides companies in aligning their strategies with the Global Sustainable Development Goals (SDGs).

Based on the analysis, Pincvision adopted the GRI Reporting framework as a relevant Reporting Framework. GRI Reporting also emerged as the best option because IBM uses the same reporting framework for its annual reporting and also scored high values on Credibility, Salience, and Legitimacy criteria.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Figure 2: The 5-Step Guide to Adopt Sustainable Development Goals



Sustainability Materiality Assessment:

To Map and prioritize Sustainability Topics and Stakeholders

Irrespective of which Global Goals and principles and Reporting Framework are chosen, every standard requires the organization to define and decide upon topics (economic, environmental, governance, and social) that are material for both its business and its internal and external stakeholders. Hence, there is a need for a **Sustainability Materiality Matrix.**

One critical step in every organization's sustainability journey is the ability to define and implement a robust materiality assessment process.

Organizations struggle with this process due to the constant addition of new regulations and the complexity of the available standards. Common challenges include decoupling the materiality assessment process from the rest of the business, unachievable stakeholder engagement, non-involvement of senior management, broad material topics, and so forth.

To guide organizations in avoiding these challenges and to ensure they are practicing a robust materiality assessment process, the following eight steps are recommended:

1. Define purpose and scope:

Define materiality for the organization and be clear about the objectives and audience. For this purpose, create a materiality matrix (discussed below), which assesses topics in terms of the significance of their economic, environmental, and social impacts and their influence on stakeholder assessments and decisions.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

2. Identify potential topics and relevant stakeholders:

A long list of topics or issues is developed from various sources, such as the organisation's previous materiality matrix, issues in sustainability reporting frameworks, company sustainability reports, etc. Stakeholders are identified on their credibility, value to the business, and the relevance of their work on materiality.

3. Categorize:

Refine the long list of potential topics and relevant stakeholders by clustering them into categories. Align the granularity of these topics to ensure the natural use of terminology, strategy, and policies is maintained.

4. Collect data from internal and external stakeholders:

Explore each material topic in detail to understand its relevance to the business and stakeholders. Assess each topic's actual and potential economic, environmental, and social impacts to gain a holistic understanding.

5. Map & prioritize:

In this step, all of the data collected from internal and external stakeholders is put into a model or framework (generally with a quantitative ranking component) and transformed into a quantitative score that can be used to map and prioritize issues. It is important to note that while it is helpful to make the mapping process quantitative and 'scientific,' sometimes it is more of an 'art' than 'science'.

Thus, while relying solely on the quantitative output is not helpful, many organizations will look at the initial outputs and then realign issues accordingly. Set up a threshold or cut-off point for defining which topics will be considered material.

6 Align with key management and strategy development

Once the final materiality matrix is determined, it should be reviewed with key executives and managers. As soon as the final changes are made, the organization can start embedding the topics into its overall strategy.

7 Report

This step is the culmination of all the previous activities. Compile and publish the annual sustainability reports to report on progress. These reports generally refer back to the sustainability strategy and materiality matrix and provide an update on key metrics and targets. Most reports also include a narrative on targets missed or goals not achieved. Any reporting framework in the market can be chosen according to the analysis of the situational diagnostic.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

8 Seek stakeholder feedback

As a final step, follow up with stakeholders to get feedback on the sustainability report published and incorporate this feedback into next year's materiality assessment since sustainability reporting is an iterative process.

The materiality matrix is a graph that quantitatively categorizes and prioritizes topics that an organization seems material for its purposes. It shows the two dimensions for assessing whether a topic is material and whether a topic can be material, even if it is based on a single one of these dimensions.

These two dimensions are:

1. the influence on stakeholder assessments and decisions, and
2. the significance of economic, environmental, and social impacts.

This materiality matrix approach is developed based on the **Global Sustainability Standards Board's (GSSB)** GRI Reporting format.

It defines the most widely used materiality matrix method globally, although organizations can to decide on their custom methods. As the topics are assessed on these two dimensions, numerical values are given to their corresponding influence and impact, which can be achieved after strategic internal and external deliberations.

Some specific topics were found to be material based on Pincvision's organizational size, sector, and business impacts. Based on management experience and strategic deliberations with top management, values were allocated to the elements for each GRI topic-specific disclosure.

After this step, the values were plotted to the **Materiality principle graph** (figure below), with "significance of economic, environmental, and social impacts" being on the X-axis and **"influence on stakeholder assessments and decisions"** on the Y-axis. Values below 2.5 for either element were treated as **"not material".** Thus, topic-specific disclosures with a value below 2.5 were not chosen for GRI reporting.

After strategic deliberations, targets were set for 9 UN SDGs. For example, Pincvision decided to support the orphans in Malawi by donating a part of the profit to the Children's Fund of Malawi.

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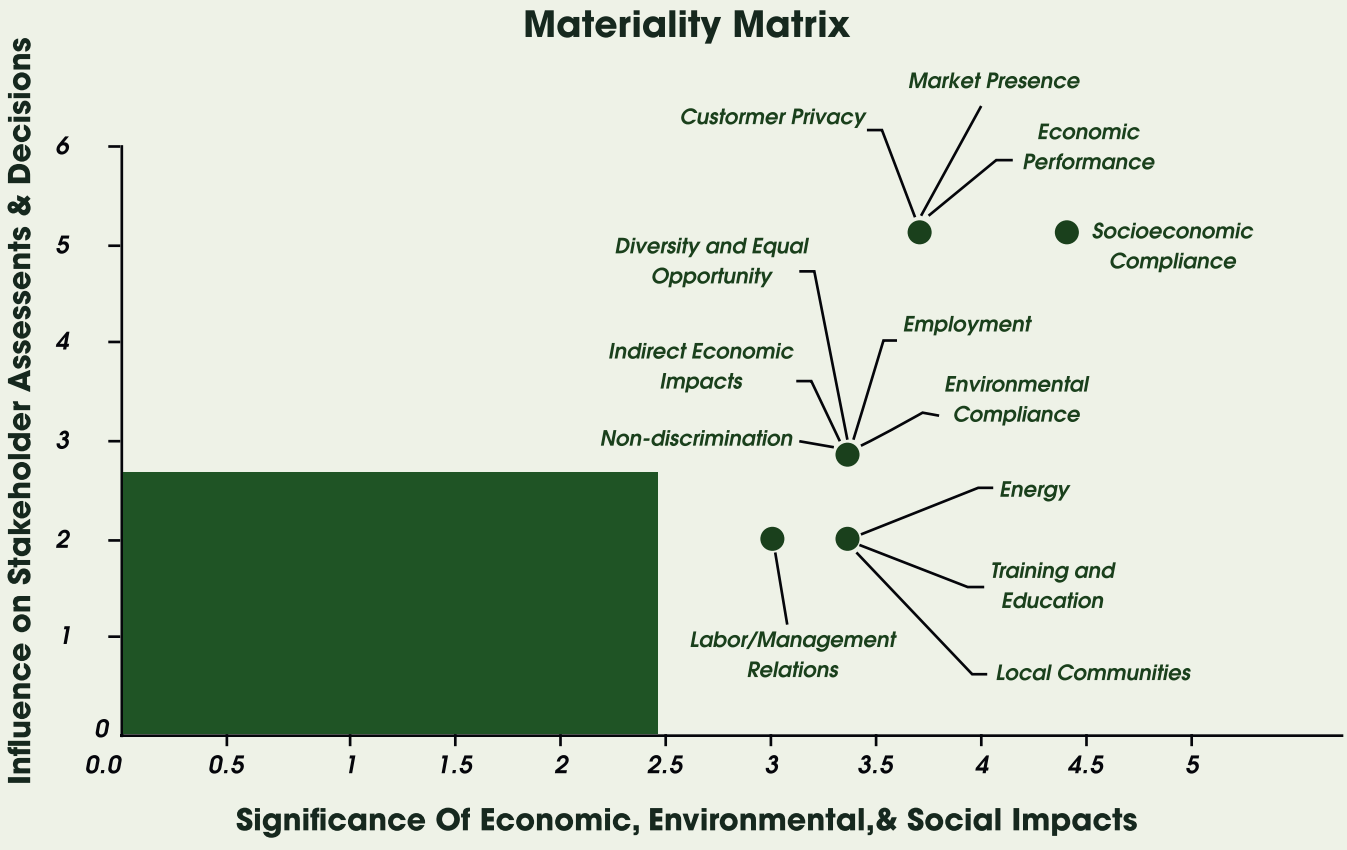
Outcomes of Green Transition

The following outcomes were achieved after the SEMS questionnaire, Situational Diagnostic, Materiality Assessment, and UN SDGs target setting:

1. Pincvision able to assess its current sustainable health and kickstart its journey towards sustainability.
2. Pincvision met and exceeded IBM's expectations and maintained a robust client relationship by being an environmentally compliant supplier.
3. Pincvision increased its reach and visibility through an annually published GRI report to Sustainability/ESG-conscious potential clients.
4. The company adopted a sustainability performance measurement and management system which ensured continued sustainability compliance.
5. Princeton became socially responsible by aligning sustainable measures to its decision-making strategy and operations, thereby transitioning from a reactive to a proactive, responsible organization.

Figure - 3: Pincvision's Materiality Matrix



Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Conclusion

Currently, stakeholders are putting significant pressure on organizations to become sustainability oriented. IBM's buying power drove Pricvision's organizational change towards sustainability. The article shows various steps to embrace and embed sustainability at strategic and operational levels.

As a result, sustainable procurement at the supply chain level can transform our society and potentially create a cascading effect towards a sustainable value chain, which can act as a catalyst to drive ecologically sustainable development.

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BIOFUELS: THE RENEWABLE ENERGY SECTOR'S SLEEPING GIANT

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the Late Anuj Mukherjee

Introduction

Australia generates 29% of its total electricity demand from renewable sources such as solar, wind, and hydro as of 2021; surprisingly, it generates less than 1% from bioenergy. According to the Global Bioenergy Statistics 2020, "…bioenergy is the single largest renewable heat source globally with a share of more than 95%..." as of 2018 data.

What are Biofuels?

Biofuels are genuinely the oldest form of renewable energy, used by humans worldwide since the dawn of human civilization. When troglodytes created the first ever wood fire for heating and cooking, they were the first humans to utilize biofuel to produce bioenergy. Thus, bioenergy is the energy that is derived from biofuels. These fuels can be liquid, solid, or gas, technically termed bioliquids, biomass, and biogas, respectively. All biofuels are derived from organic matter, which may be wood, crop, municipal waste, or other organic sources.

Are Biofuels really "Renewable"?

There will always be advocates and critics of bioenergy and biofuel manufacturers. The most significant criticism received in the biofuels industry is that it impacts natural forests, either directly or indirectly. Critics argue that biofuels produce the same, if not higher, carbon emissions than their fossil-fuel counterparts, but unlike fossil fuels, biofuels decimate natural forests.

This argument is a paradox as it is both valid and invalid. One only needs to have a fundamental sense of introductory physics and chemistry to understand the laws of energy conservation and mass conservation. In principle, the combustion of a certain mass of carbon-based matter (say coal or wood) will result in proportionate carbon emissions (say carbon dioxide and carbon monoxide). It is folly to believe that biofuels do not emit carbon or CO2.

Rather than the renewability and sustainability arguments, the biofuel argument should be based on the fact that the biofuels are sustainably replenished. The replenished organic matter absorbs carbon dioxide from the atmosphere; hence, the process is "carbon neutral" and forms a carbon cycle. Of course, in practice, the cycle is imperfect as some amount of fossil fuel will be burned in logistics, plant construction, etc.; however, this imperfection can be accounted for and can be negated by purchasing carbon offsets.

No government wishes to be seen as supporting a practice that emits more carbon or pollution than the fossil fuel it seeks to replace. However, it is true that if biofuels are generated directly from cutting down natural forests or from plantations that have replaced natural forests, then this would be counterproductive in the global fight against climate change. Currently, correct controls are in place to ensure that these practices are not supported and endorsed.

In most cases, government subsidies to biofuel ventures are dependent on proof of sustainability, such as certification from reputable international programs, such as **the Forest Stewardship Council (FSC), the Programme for the Endorsement of Forest Certification (PEFC), Green Gold Label (GGL) and the Sustainable Biomass Program (SBP).** These programs have varying levels of certification and, in general, ensure the credibility of the 'sustainably-produced' claim of biofuel ventures.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

What is the scope of Biofuels in Australia?

The renewable energy option of any jurisdiction depends on the availability and abundance of uninterrupted sunlight without cloudy skies for solar energy, stable wind speeds in the case of wind energy, or the required amount of rainfall and altitudes in the case of hydropower. In the case of Australia, the country is fortunate to have rich sources of biofuel. It has sustainable wood waste from its significant timber industry, straw from the wheat and barley industry, ethanol from the sugarcane industry, and biogas from municipal waste. Hence, it can be safely concluded that Australia has abundant organic reserves of biofuel because of its significant agriculture and forestry industries.

Yet, it is unfortunate that this potential is not being exploited for biofuel generation other than for the use of wood in fireplaces for residential heating in Australian homes. There is practically zero large-scale industrial generation of bioenergy for heating or electricity. It is difficult to fathom the ignorance about biofuels in Australia, particularly given their abundance and clear benefits. This article will explore some possible factors and rationales around this attitude.

While it has been established that the most viable option for any renewable energy is generally based on the most incredible abundance of its resources in a geographic region, it is also a fact that governments worldwide opt for a mix of renewable energies for their renewable energy policies. Subsidies and feed-in-tariff programs are typically legislated to incentivize markets to develop solar, wind, and geothermal power. It is acknowledged that each form of renewable energy has its advantages and disadvantages, and governments tend to target developing a portfolio of all the available types of renewable energies to create a renewable energy mix.

Reliance on energy from a mix provides security and dependability, as opposed to sole reliance on any one source. For example, due to night or low light conditions - the intensity of solar energy fluctuates, or due to seasonal fluctuation of wind speed, the amount of wind power generation also varies. Low seasonal rainfall may reduce the capacity to generate hydropower. Hence, further mitigation and contingency plans are necessary to address the natural fluctuation of renewable energy sources. We require a reliable energy storage system or battery system as a solution.

Batteries are no new solution; however, the large-scale use of batteries as a solution has only recently been recognized. Batteries are expected to provide a consistent power supply, mainly when renewable energy sources cannot deliver power. Hence, large-scale battery systems and

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

renewable energy are becoming interlinked.

Battery systems act as a buffer and offer grid support when the renewable energy supply in the power grid power is intermittent. One such system is the **Hornsdale Power Reserve Station** in Jamestown, South Australia. It is the world's first large-scale battery system and is considered a success story by experts. It is a 100MW system designed to supplement and stabilize electricity in the grid and pump a significant amount of electricity into the grid to prevent power failures. This is necessary for specific renewable energy sources prone to intermittent supply problems.

Fuels: A Energy System

Coal, gas, and oil are all fossil fuels that act as energy storage sources of dependable dispatchable baseload energy because the fuel itself is the energy storage system. When there is an energy demand, fuel is used in power plants to produce electricity. Whether day or night-time, windy or calm, the rainy season or drought, fossil fuels provide consistent energy around the clock. Unfortunately, supplies of fossil fuels are not renewable, and fossil fuels are the primary cause of global warming, as stated by the International Panel on Climate Change. It is estimated that about 89% of the world's anthropogenic carbon emissions derive from fossil fuels.

In this context, biofuels act as the renewable energy sector's sleeping giant. Biofuels are renewable and sustainable and a dependable, baseload energy source on demand. Biofuels are relatively easy to make from waste or other by-products. They eliminate the need for ecosystem destruction, mining, or drilling kilometers into the Earth's crust for oil. Biofuels are readily transportable in the form of gas or in liquefied or solid states. Biofuels have internationally tradeable commodity markets. Energy storage and transportability are some of the key barriers to the uptake of renewable energies. However, this is not the case for biofuels.

Investment in Biofuel-based power plants

Capital Expenditure (CapEx) is the capital required to acquire or upgrade physical assets such as property, plant and equipment, buildings, or technology. Operational Expenditure (OpEx) is the capital required to operate assets or to incur day-to-day operational expenses. The total capital requirement is calculated by summing all costs (CapEx and OpEx).

In the case of renewable energy generation out of biofuel, the OpEx requirement is comparatively low. For example, the raw material cost for biofuels is low because it is generated from low-cost by-products or waste. In the case of other types of renewable energy production, such as solar energy, there are significant costs associated with the purchase of solar panels; for

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wind energy production, the significant costs are associated with the transportation and assembly of wind turbines, whilst in the case of hydropower construction of the dam itself needs significant Capex. In this context, bioenergy generation perhaps has key advantages, as observed in biomass-based power generation plants worldwide.

It is possible to generate energy based on biofuel with only minor plant modifications of thermal power stations or by repurposing coal power stations to run partially or completely on biomass. This trend has been ongoing for more than a decade and has received significant subsidy support from Governments around the world.

The largest coal-converted power plant in the world is Drax Power Station in the United Kingdom. It has a total capacity of 3,906 megawatts, with 2.6 GW capacity from biomass and 1.29 GW capacity from coal. Several other examples exist worldwide that allow existing coal power plants to be converted and made renewable. This diminishes the CapEx requirements for bioenergy significantly. This success story should be replicated in Australia, as the country relies heavily on coal-based thermal power generation.

Since the late eighteenth century, coal has been mined in Australia for domestic consumption and export. Today, it represents a $50 billion dollar industry and has significantly contributed to the country's gross domestic product. Furthermore, domestic coal consumption accounts for 75% of Australia's electricity generation.

Coal has powered both Australia's homes and economic development. It has also provided Australian families with jobs and opportunities. It is understandable that any argument to replace or compete with the coal industry faces significant opposition or is perceived as adversarial. It could well be that attitude that prevails in Australia, which has then led to comparatively low uptake of renewables (when assessed against other developed countries). This is particularly true for bioenergy, as discussed earlier. It can completely displace coal in coal power stations. Rather than be seen as the replacement for coal in coal power stations, it should be seen as the prolonger of coal-based thermal power stations with biofuels. Already, the closure of coal power stations in Australia has been witnessed, in part or whole, due to pressure from environmentalists because of the polluting nature of these plants. Had biofuels been under consideration prior to these closures, it would have been possible to prolong and repurpose these plants to utilize biofuels in place of coal.

This would have maintained jobs, provided economic benefits, and may have given reliable, dispatchable baseload power. Furthermore, the production of biofuels-based energy could be seen as a new emerging industry that supports Australia's agriculture and forestry sectors, adding value to waste and by-products of these industries.

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Conclusion

Of all the reasons for ignorance about biofuels in Australia to date, perhaps the most plausible justification is the lack of understanding about biofuels and bioenergy. To date, biofuels have received comparatively little focus in Australia. In 2016, after several energy failures in various states, the Coalition of Australian Governments (COAG) energy ministers called for an independent review of the national electricity market.

This resulted in a highly anticipated report called the Independent Review into the Future Security of the National Energy Market, simply referred to as "the Finkel Report." It was chaired by Australia's Chief Scientist at the time, Dr. Alan Finkel AO. The key recommendation of this 210-page report was the adoption of a Clean Energy Target as a transitional instrument to a pathway for lower emissions.

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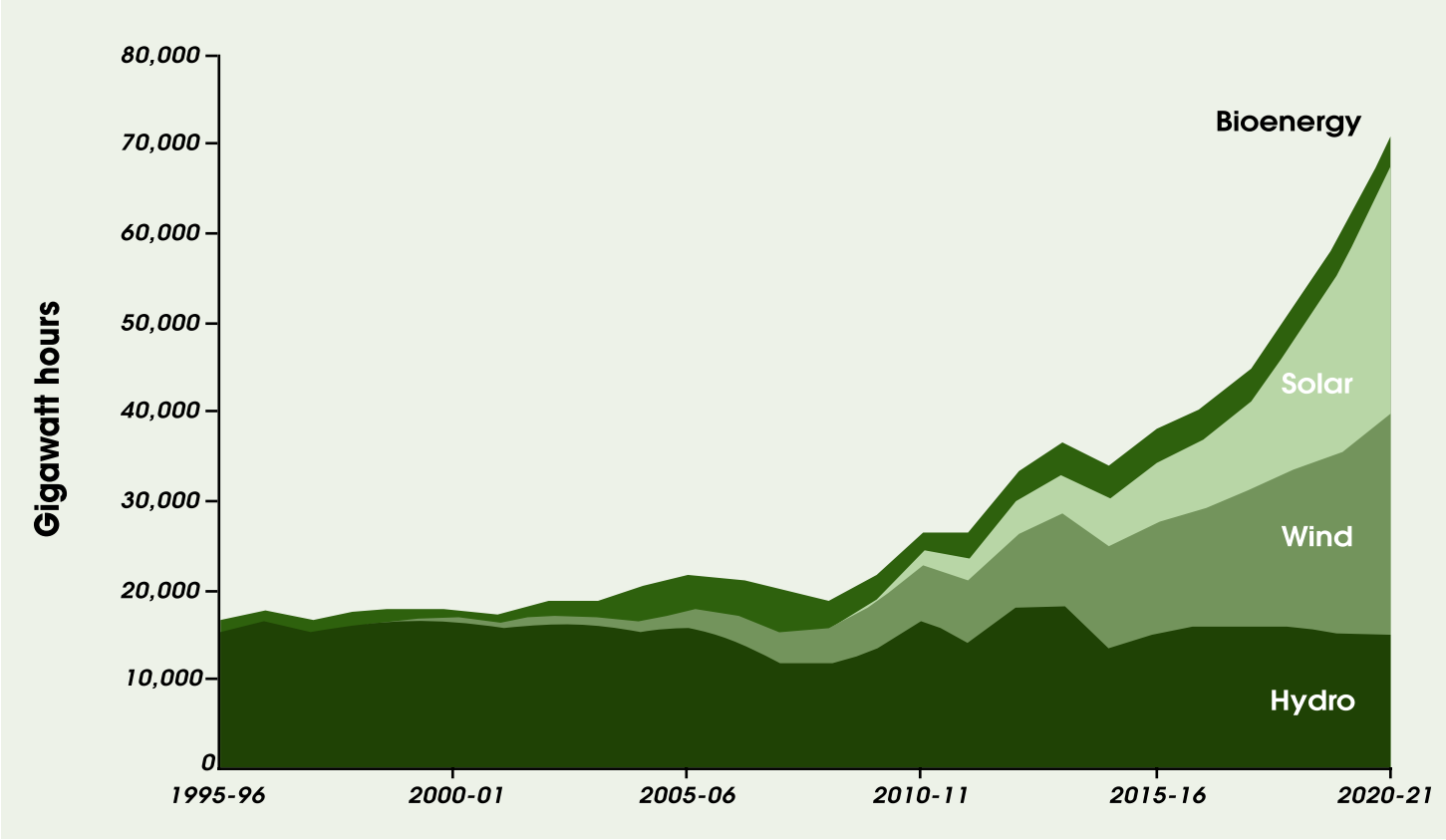
Biofuels are practically ignored in any policy recommendation scenarios. It was mentioned earlier that biomass represents only 1% of the energy mix at any given time. In other words, Finkel's recommendations showed there is unlikely any chance of an increase in biofuel use in Australia over the next 30 years.

Whether the recommendations are based on an unsound understanding of biofuels or for other unknown and undisclosed reasons, this public report and expert rhetoric are outrightly unconducive to the growth of the biofuels-based renewable energy industry in Australia. Australia lags significantly behind in its uptake and commitment to this logical renewable energy choice compared to other developed countries. It is hoped that this article will shed some light on some of the clear benefits of biofuels, in the hope that soon, there will be an awakening of the renewable energy sector's sleeping giant – biofuel.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Graph-1 Australian Electricity Generation from Renewable Sources



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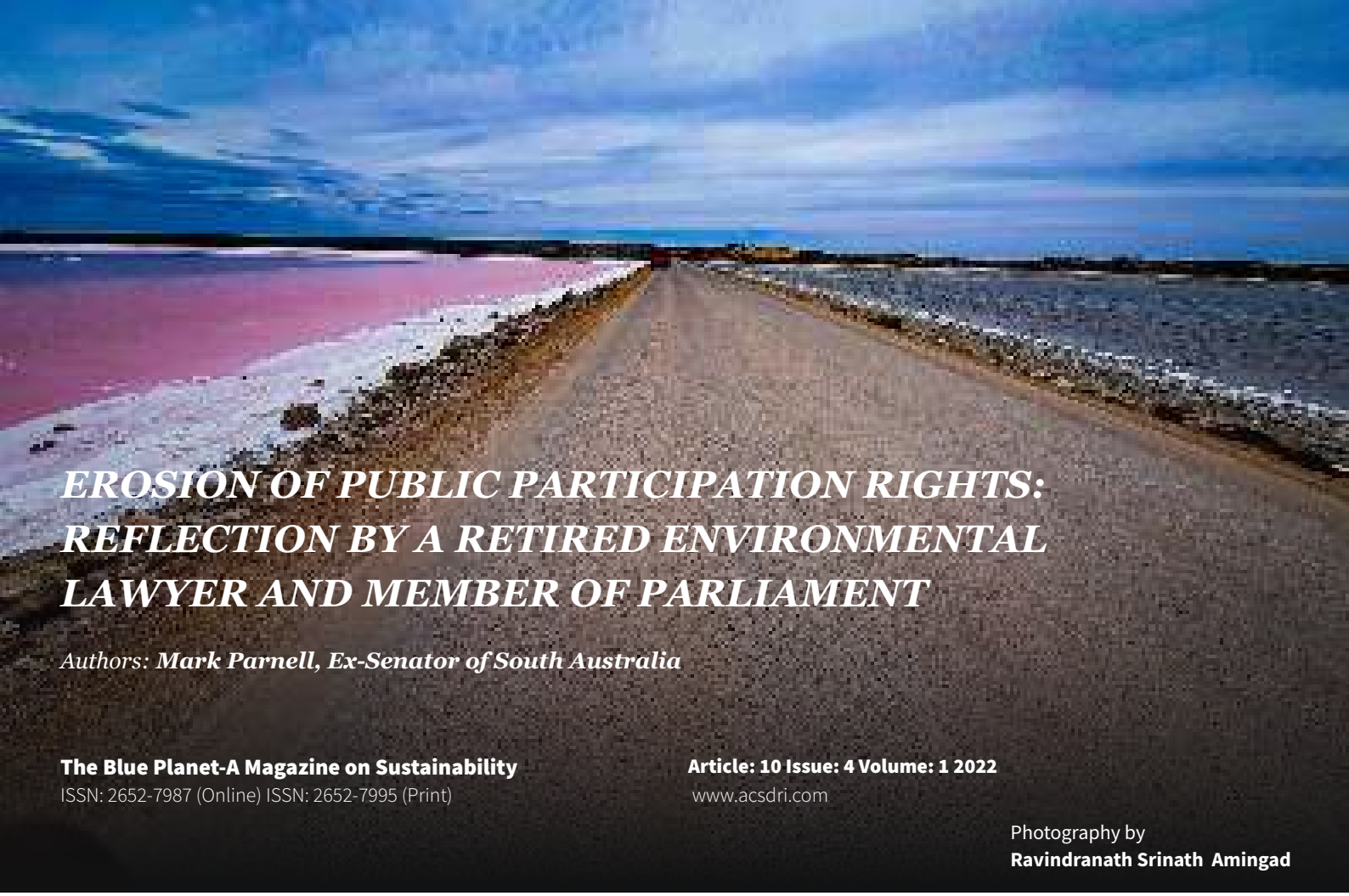

EROSION OF PUBLIC PARTICIPATION RIGHTS: REFLECTION BY A RETIRED ENVIRONMENTAL LAWYER AND MEMBER OF PARLIAMENT

Authors: ***Mark Parnell, Ex-Senator of South Australia***

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Ravindranath Srinath Amingad

Introduction

Over the last several decades, one of environmental law's most consistent and depressing themes has been the erosion of public participation rights. This includes 'soft' rights, such as the right to make a submission or have your say, and 'hard' rights, such as the right to appeal against the merits of government decisions. Also being eroded are fundamental rights of judicial review, such as the ability of environmental advocates and groups to insist that proper processes be followed and the environment be protected appropriately. Less obvious erosions are at the parliamentary level, where the ongoing tension between the Executive and the Legislature sees the former prevailing over the latter more often than not.

This article uses some South Australian examples from recent decades to show how this erosion is achieved and why environment professionals should be concerned about its implications.

It is all about Power

When it comes to the environment, governments have long realized that they either lack science or are doing the bidding of their corporate donors. The proposed Nuclear Waste Dump in South Australia is a recent example. Under this plan, the National Radioactive Waste

Management Facility will be designed to permanently dispose of low-level nuclear waste (for example, medical waste) and potentially store intermediate-level waste (for example, nuclear reactor waste from Lucas Heights in New South Wales) temporarily until a more permanent solution can be found.

This project has pitted federal, state, and territory governments against each other for decades. SA went so far as to pass special state legislation back in 2000 to make it clear that nuclear waste dumps were illegal within the state. Nevertheless, the Federal Government has overrode state laws through its legislation.

Remarkably, the debate in the Senate over the enabling Commonwealth legislation was not so much about whether the dump was actually needed as about how to ensure that the Minister for Resources' decisions could not be challenged in court, particularly by First Nations representatives or conservation groups. The original Bill identified Kimba in SA as the site of the facility. As a decision of Parliament, that would have been very difficult, if not impossible, to challenge.

Following amendments, the Bill now provides a short list of locations, with the Minister for Resources making the final decision. While Kimba will again certainly be chosen, that will then be an administrative decision subject to review pursuant to the Administrative Decisions (Judicial Review) Act 1979 (Cth).

Ultimately, amendments to the Bill were passed to enable judicial (but not merits) review. This 'concession' was hard-fought and ultimately overshadowed the more important threshold question about whether moving dangerous intermediate-level nuclear waste from one 'temporary' storage site (Lucas Heights, NSW) to another (Kimba, SA) was a good idea.

For decades, conservationists have fought to have safeguards and checks and balances included in decision-making processes, with some success. Now many of these protections are being dismantled. Governments are characterizing important accountability measures as unnecessary. We are told that these measures impede progress, do not improve decisions, and cause significant harm to the economy.

The language might change over time, but phrases like 'business certainty' and 'efficient decision-making' are usually euphemisms for 'let us make sure those pesky environmentalists and their even peskier lawyers cannot interfere with the right of the Government to make whatever decision it likes, regardless of the impact on the environment or what the public might think.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

As environmental advocates with national conservation groups and lawyers with the Environmental Defenders Office (EDO) in SA, we saw many cases where relevant information and important stakeholder views were deliberately withheld from the decision-making process. Even when conservation groups did manage to get a foot in the door, we saw successful environmental challenges quickly overturned by executive action and the door firmly shut to challenge further.

Fortunately, the legal profession rallied behind the EDOs, and the funding was maintained, but with conditions, including a 'no litigation' restriction. At the time, we were the only part of the legal aid family of services not able to use legal aid funding in the courts on behalf of our clients.

The View from inside the Parliament

My subsequent 15 years as a legislator in the State Parliament were equally frustrating. I opposed the inadequacies at every opportunity, but regardless of who was in power, their philosophy was the same: make it as hard as possible (and preferably impossible) to challenge Government decisions on environmental grounds. That philosophy now permeates the statute books. In the state of SA, whether explicitly or by omission, many of our Acts, regulations, and other statutory policy instruments deny citizens a voice and any meaningful engagement in many decisions that affect them personally and the environment more generally.

Below is a description of some of the deliberate tactics used to prevent or undermine more genuine public participation in environmental decision-making.

Banning legal challenges

In a famous 1999 case, the Conservation Council of SA successfully overturned the approval for 42 tuna feedlots in the sea near Port Lincoln on the grounds that the development was not 'ecologically sustainable'. The decision of the Environment Resources and Development Court in what was then the state's longest-ever environmental trial stood for about a week before the Government passed new regulations (now superseded) declaring that henceforth, such developments would be beyond legal challenge. The developers relodged their defeated applications, which were then duly approved with no ability for objection. The relevant Planning Scheme was also eventually changed to remove the term 'ecologically sustainable', once it became apparent that these words had some meaning.

That experience convinced me that over-reliance on the courts has severe limitations. If I wanted to help defend the environment, I needed to be closer to where the laws were being made.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

(Incidentally, given the 'litigation restriction' imposed on EDOs by the Howard Government, the EDO had to do its fundraising to defend the action opposing the development application).

Going through the motions of public participation

Given that Australia is one of the most urbanised countries in the world, it is not surprising that urban developments, particularly urban sprawl, feature prominently in the rollcall of environmental disputes. One development, in SA, involved rezoning farmland for housing on the urban fringe of Mount Barker. This rezoning process did involve public consultation, including lengthy public hearings which ran for over five nights, for 15 hours in total. Every one of the hundreds of representations was opposed to the plans for urban sprawl, yet the Government's hand-picked 'Advisory Committee that heard all the objections waved it through with minimal changes and the Minister then gazetted 1,300 ha of farmland for urban use.

In a subsequent Ombudsman's inquiry, it was found that the Government's planning consultant was also working for the private property developers who had bought up the farmland in anticipation of rezoning, but the horse had bolted by then. No amount of hand-wringing could wind back the clock or return the farmland.

One recent dispute was over rezoning an old industrial site in Adelaide's inner suburbs. There was agreement that this underused site could be redeveloped, but disagreements persisted over building height and density. When one of the Government's committee members was absent from a meeting, the non-government MPs were able to use their numbers to support disallowance—for the first time since the Development Act 1993 (SA) (Development Act) came into force 25 years earlier.

This allowed the developer and residents to negotiate a mutually acceptable outcome for future development. The zoning rules were adjusted and the disallowance motion was quietly dropped, with no fanfare or publicity. The question remains, though, why it should take the absence of an MP from a committee meeting to deliver proper public participation and an outcome that suits all parties.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Welcome to the silo

One of the frustrations of tackling massive global problems such as climate change is the difficulty with convincing government planning bodies that they have a role to play. Most jurisdictions now have statutory planning policies dealing with climate change that tend to focus on 'adaptation' rather than 'mitigation'. This tends to take the form of not allowing building too close to the coast in case sea levels rise and buildings are flooded but seems not to consider as relevant the issue of whether the planned development would help to drive climate change in the first place.

For example, in SA, the State Planning Commission is responsible for assessing significant new developments, including new fossil fuel power stations. Following good planning practice, the officers involved have taken great care to explore visual amenity, traffic implications and noise levels; however, they have not paid attention to the fact that burning fossil fuels to generate electricity is bad for the climate.[1] Indeed this is something that we need to stop doing as a matter of urgency? I ensured in my last few years in Parliament that I always attended planning hearings for new gas power stations and always raised climate change impacts as my main submission. My objections, though heard politely, had no effect.

Planning authorities might be hamstrung by 'existing use rights' in relation to existing fossil fuel power generation facilities, but when it comes to brand new facilities my experience is that the proponent has not been asked to estimate the emissions. When challenged, the best planning authorities can offer is acknowledgement that climate change was raised in submissions, without taking responsibility for addressing the issue in a planning context. Accordingly, I have raised this concern many times in Parliament, in the media and in other contexts: 'What planet do these people live on?'.

Limiting Public Participation to Policy, not Assessment Decisions

Most people don't get particularly excited by the prospect of making submissions on government policies. However, when the bulldozers turn up to start clearing the bushland or laying concrete slabs it is easy to fill the local hall with protesters. It is cold comfort to be told, 'It's too late now – you should have submitted five years ago when we consulted over the rezoning'.

An important part of this strategy for the Government is regulating that consultation can be on 'planning policy' only, with no opportunity for public comment when actual development applications are eventually lodged. It's the 'wedding clause': speak now, or forever hold your peace! For example, a government might consult on, and eventually adopt, a general policy that allows it to identify suitable areas for nature-based tourist accommodation. Then, environmentalists are told they can't be heard when it decides to support a development of exclusive private cabins and lodges in unspoilt wilderness in the middle of a national

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

park. The hand-picked Government assessing body can simply shrug its collective shoulders, since it is legally prohibited from considering submissions or hearing public concerns.[1] It will only hear from the proponent developer and a few government agencies. It approves most applications that come before it.[1] Furthermore, often even the development plans are not available for public view.

That is precisely what happened with the iconic Flinders Chase National Park on Kangaroo Island.[1] Despite courageous judicial review proceedings instituted by local conservationists against the development,[1] the project was all set to proceed until the devasting bushfires of 2019–2020 decimated the National Park. The fires were a tragedy for Kangaroo Island, but the SA Government's denial of the basic rights of public participation was a serious hit to democracy as well.

Resilient Communities Don't Give up

However, despite this depressing backdrop of the denial of public rights, I am continuously heartened by and amazed at the resilience of communities. They know they are up against it, but they fight on. Sometimes the fight is conducted in the courts, but when those avenues dry up direct action is put back on the table. Iconic environmental battles such as the fight to save the Franklin River in the 1980s used every tool in the shed – legal action, direct action, community education and political pressure.

Movements like Extinction Rebellion are born out of regulatory and institutional failure. These groups include lawyers who realise that putting all your trust in these legal and political institutions will not deliver the needed change. If our political and legal processes were up to properly protecting the environment, dealing with the climate crisis and reversing our appalling loss of biodiversity, then no one would need to lie on the road to block traffic or 'superglue' themselves to anything.

After a lifetime of working for the environment in the law and in politics, my message to campaigners is pretty simple. Don't give up entirely on legal and political institutions; be clear-eyed about the system's limitations. As a politician my advice to constituents, and as a lawyer my advice to clients, was: 'Don't put all your eggs in one basket, and always have another plan ready as well, because more often than not the institutions will let you down.'

About the author:

Mark Parnell has worked for the environment for the last 31 years. This includes 15 years as a Greens Member of the Parliament of SA, 10 years as a solicitor in environmental law with the Environmental Defenders Office (EDO) and 6 years with state and national conservation groups. He is now working with community groups and campaigners to help demystify the workings of Parliament.

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Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

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- For example, the Development Act, s38(17), provides that representations on development applications from anyone other than immediate neighbours '[are] not required to be taken into account' and 'will not have any effect'.

- For example, in 2000, following the Conservation Council of SA's win in the case referred to at notes 11 and 12 – the 'Tuna feedlot' case (see <https://d3n8a8pro7vhmx.cloudfront.net/edonsw/pages/1409/attachments/original/1429164947/impact_57.pdf?1429164947>) – the Government passed new regulations to prevent future legal challenge. The defeated development applications were relodged and approved with no opportunity for third party appeal.

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Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

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The 'Tuna feedlot' case, ibid, was determined on planning principles contained in the relevant 'Development Plan'. The principles of development control under the old Land Not Within a Council Area (Coastal Waters) Development Plan under the Development Act have been amended many times; however, the specific requirement that all development in coastal waters must be 'ecologically sustainable' has never again been included.

Members of the Development Policy Advisory Committee (DPAC) under the former Development Act were appointed by the Minister for Planning. The author was briefly a member of this Committee during the early 2000s.

The DPAC advice to the Minister was initially kept secret, but was eventually published and can be found in the archives. See <https://www.dpac.sa.gov.au/__data/assets/pdf_file/0013/113332/Mount_Barker_Urban_Growth_DPA_Report_to_the_Minister.pdf> p 8, for reference to the fact that every submission over five hearings was opposed to the rezoning.

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Planning, Development and Infrastructure Act 2016 (SA), ss46 and 74.

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- There was some discussion in the Committee about whether there was one other casefrom the early 1990s, but, while it may have reached the Legislative Council Notice Paper, there is no record of its being debated. Regardless, the process is very rare given the hundreds of rezonings that the Parliament has considered over the years.The motion disallowing the rezoning was 'discharged' from the Notice Paper of the Legislative Council on 4 December

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

2019 following agreement between the property owner, local residents, the government and the local Member. So it was never debated on the floor of Parliament, but was unanimously 'discharged' with only the author offering an explanation of it. See <http://hansardpublic.parliament.sa.gov.au/Pages/HansardResult.aspx#/docid/HANSARD-10-28804>.

- Advice from the SA State Commission Assessment Panel (SCAP) is not generally published, but redacted copies can be obtained under the Freedom of Information Act. For example, the advice from SCAP to The Hon John Rau MP, Minister for Planning, on 15 February 2018 in relation to a proposed Alinta Energy gas/diesel power station at Reeves Plains (SA) acknowledged that climate change was raised as an issue by representors, but stated that 'consideration was not able to be given to the wider strategic implications of the proposal as raised in public representations.' In other words, it was not the job of this body to assess the proposal against climate change policy. This is my experience, having studied many development applications for fossil fuel power stations. In SA, even where public submissions are allowed, copies of development applications are routinely pulled from the Government website after the hearing. Rather than maintaining an 'archive' of old applications, the State Planning Commission required Freedom of Information applications before releasing documents that were briefly freely available. At time of writing, the practice of removing documents still persists. See under 'Previous Meetings' at <https://www.saplanningcommission.sa.gov.au/scap/about_scap/commission_meetings>.

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- At the hearing the Presiding Member of the State Commission Assessment Panel acknowledged the strong public interest in the development, and the frustration of opponents at not being able to make representations. This resulted in the proponent accusing the Presiding Member of not being impartial. See <https://www.adelaidenow.com.au/business/sa-business-journal/the-company-which-wants-to-build-sleeping-pods-on-kangaroo-island-says-the-lengthy-approvals-process-has-been-sidetracked/news-story/3dd08a8e38fb7104145d685bc722234d>.

Under the Planning, Development and Infrastructure Act 2016 (SA), the Governor on the recommendation of the Planning Minister appoints members to the State Planning Commission and Assessment Panel.

Under the Planning, Development and Infrastructure Act 2016 (SA) and its predecessor, the Development Act, the right to make a representation either in writing or in person is limited

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

to certain categories of development, mainly those that are well outside the contemplation of the relevant planning scheme or zone. In relation to private tourism developments inside Flinders Chase National Park, the Chair of the SCAP said it was 'unfortunate' that the public was excluded from the process: <https://www.adelaidenow.com.au/business/sa-business-journal/controversial-kangaroo-island-accommodation-plan-wins-development-approval/news-story/2fa70e8ec34a652866908938d61cfc0f>

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Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

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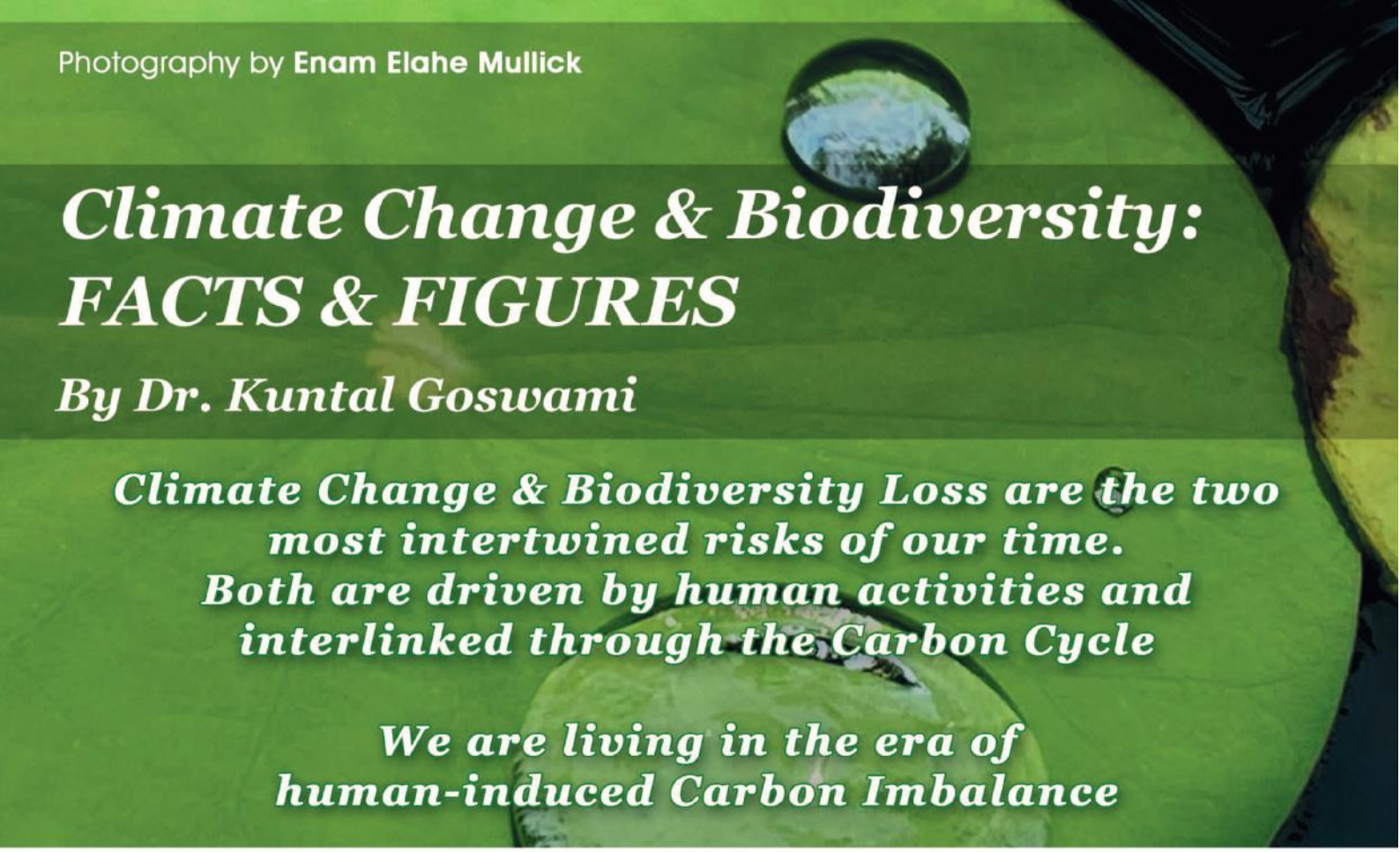

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Climate Change & Biodiversity: FACTS & FIGURES

By Dr. Kuntal Goswami

Climate Change & Biodiversity Loss are the two most intertwined risks of our time. Both are driven by human activities and interlinked through the Carbon Cycle

We are living in the era of human-induced Carbon Imbalance

Keywords: Carbon, Climate Change, Biodiversity Loss, Biodiversity Finance, Blue Carbon, Wetland, Soil, Sustainable Development, Biodiversity

CARBON – THE OMNIPRESENT ELEMENT OF NATURE

Carbon is omnipresent. It is one of nature's essential building blocks. Carbon is profoundly important in the universe. We are all made from carbon and live in a carbon world.

Carbon forms at the core of stars under extreme temperatures. Hydrogen atoms forms Helium. When two Helium atoms stuck together, they form Berylium.

Berylium is extremely instable and does not last long. As it forms, it tends to disintegrate instantly and at that very moment or at that fraction of a second, out of mere chance, if it is hit by another Helium atom, then Carbon is formed

Carbon is released into the universe as stars die. Carbon is the most abundant element in the universe after Hydrogen and Helium. A fifth of our body is made of Carbon. We are all technically Stardust.

In the context of Climate Change, carbon is not the problem. We need to learn about carbon cycle, how to reduce the present carbon imbalance created by human activities. Hence, we need to learn how to maintain the carbon equilibrium of nature to ensure sustainable life on earth.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

WHAT IS CLIMATE CHANGE?

Climate change is a long-term shift in global or regional temperature, rainfall, or wind patterns. This shift can be natural however, in the present context, rises in temperature since the 1800s are due to human activities, primarily because of burning fossil fuels like coal, oil and gas. This is popularly referred as climate change.

WHAT IS BIODIVERSITY?

The Convention on Biological Diversity defines biological diversity as "the variability among living organisms from all sources including, inter alia, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems"

A simpler explanation of biodiversity is that it represents collective diversity of all life on Earth including animals, plants, fungi, and micro-organisms like bacteria.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

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WHY DOES BIODIVERSITY MATTER?

Simply put, human cannot survive without biodiversity.

Animals and plants provide us with fresh water, food, and medicines. However, humans cannot get food, water, medicines from any single plant and animals, we need a collective diversity of plants and animals to gain all these benefits from nature.

For example: plants and trees are essential to improve the quality of clean air, limit rising temperatures, protect us against climate change and to limit soil erosion from rising sea levels.

In the past the value of biodiversity and the ecosystem was sidelined in national decision-making, which resulted in a widespread loss of biodiversity and a significant decline in ecosystem services. An estimate shows more than half of the world's GDP, approximately $44 trillion of value-added goods, is dependent on industries that are highly or moderately reliant on nature and its services.

It is also estimated that transitioning to nature-friendly production practices could generate about $10 trillion in business opportunities and about 395 million jobs by 2030. Most importantly, a biologically diverse ecosystem can reduce upto 37% of carbon emissions, which will be an important contribution towards the objectives of the Paris Agreement.

Hence, our natural environment is fundamental to our economics, health, and climate change mitigation and adaptation plans. However, human economic activity is causing biodiversity loss at an unprecedented level.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

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Climate Change & Biodiversity loss – interrelation

As climate change will intensify, it will shift the distribution and habitats of animals and plants.
The extent of intensification will also determine whether species will ultimately thrive or not.

Climate change as such is not the key driver of biodiversity loss; rather over-exploitation and habitat destruction are the leading causes of biodiversity loss

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Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

How are Climate Change and Biodiversity intertwined?

Climate change, biodiversity loss and human well-being are interdependent and inextricably connected with one another.

Carbon is one of the fundamental elements of life on Earth. All plants and animals are made from carbon. At the same time carbon is the common elements of all heat trapping gases in the atmosphere.

Carbon dioxide is the raw material for photosynthesis, and also a source of energy circulation. Therefore, distribution of carbon in appropriate quantity in both above and below the ground is important.

Plants transform light energy into chemical energy and produces organic compounds (carbohydrates) as food to live and grow.

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...How are Climate change and Biodiversity intertwined? ...

...However, change in temperature and carbon dioxide alter rates of photosynthesis and carbon content within primary producers.

Most carbon and nutrients are transferred to soil through litterfall, root exudation and decaying organism.

Plants and animals on land & in the ocean create habitat structure, local environment, and source of food in ecosystem hierarchy. Plants also return half of the carbon to the atmosphere through respiration in the form of carbon dioxide.

Eventually plants, algae, microplankton degrade after death and some are buried for millennia to form coal, oil, and gas. In this process, carbon is trapped in these fossil fuels. These fossil fuels have become the primary source of energy for human activities since the industrial revolution...

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Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

...How are Climate change and Biodiversity intertwined? ...

Human economic activities release these trapped carbon dioxides again in the atmosphere through the combustion process and alter atmospheric chemistry. We also transform land and ocean surface, causes deforestation and results in widespread loss of biodiversity and climate change.

Human activities such as change of land use or sea use, agricultural practice, and fossil fuel combustion are the direct drivers of biodiversity loss and climate change. A recent study based on cross-national sample of 115 countries showed that the occurrences of natural disaster events, rise in temperature, and change in precipitation, play important role in affecting biodiversity loss.

However, the impact on biodiversity loss is more affected by the changes in precipitation and temperature rise than the changes in the frequency of the natural disaster events.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

STRATEGIES TO REDUCE IMPACTOF CLIMATE CHANGE AND BIODIVERSITY LOSS

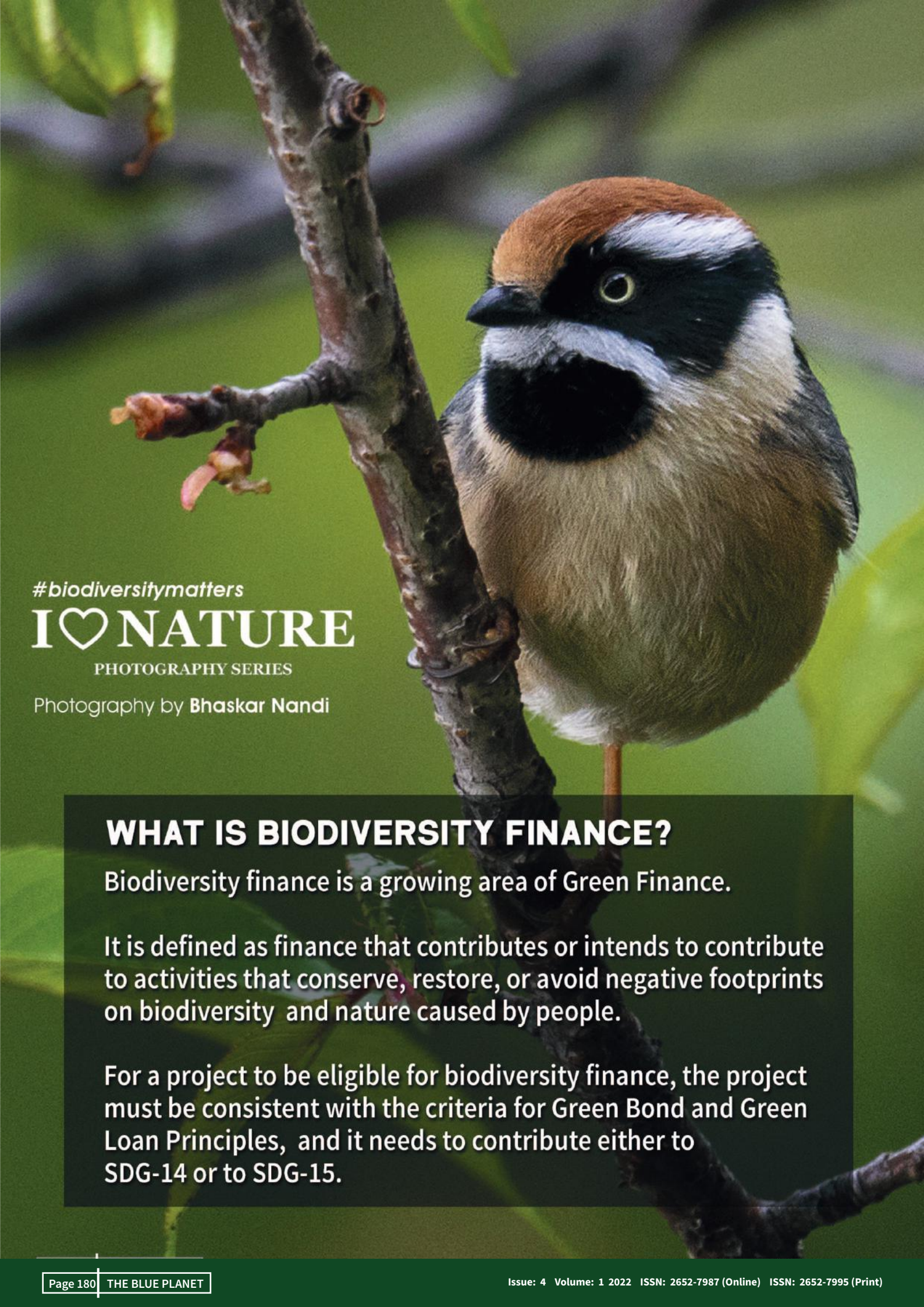
Strategies to conserve biodiversity must be formulated in the context of climate change and reciprocally, strategies to mitigate climate change should be formulated in the context of impact on biodiversity impacts.

The government, the industry and the financial sector should be held responsible for the loss in biodiversity. Their activities in pursuing the ultimate goal of prosperity and profits are at the expense of biodiversity leading to unbalance economic development. Hence, to conserve nature we need better planning, control of corruption and stricter enforcement of environmental protection law.

From now the government should sanction only "nature friendly" investment and development program for future development. There is a need to strengthen respective countries' national biodiversity strategies and action plans to reduce emission of carbon stocks by preventing degradation of ecosystem which will in turn halt climate change.

The parties involved in the development process (including the financial institutions that provide funding and their potential borrowers) should understand the risk of biodiversity loss and should build certain criteria for safeguarding biodiversity loss into every step of the project planning and in its financing approval.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)



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WHAT IS BIODIVERSITY FINANCE?

Biodiversity finance is a growing area of Green Finance.

It is defined as finance that contributes or intends to contribute to activities that conserve, restore, or avoid negative footprints on biodiversity and nature caused by people.

For a project to be eligible for biodiversity finance, the project must be consistent with the criteria for Green Bond and Green Loan Principles, and it needs to contribute either to SDG-14 or to SDG-15.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

What constitutes biodiversity or nature related investment activities?

To be considered as biodiversity or nature related investment activities, it should address one of the following drivers of biodiversity loss:

a) to change land use - from agriculture, unsustainable forest management, urbanization, industrial developments, and transport networks.

b) to stop over-exploitation and unsustainable use of nature.

c) to stop pollution from nutrients (nitrogen and phosphorous) and other pollutants from industrial, mining, and agricultural activities as well as air pollution, greenhouse gas emissions, untreated urban and rural waste, and plastic pollution.

d) to mitigate climate change

e) to stop spread of invasive species

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

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WHAT IS BLUE CARBON?

Blue Carbon is the carbon stored in the marine biosphere, such as in the leaves, branches, stems, roots of mangroves, saltwater tidal marshes, and seagrass meadows, and in the coastal organic soil. Data suggest that coastal ecosystem can sequester carbon dioxide from atmosphere and oceans at significantly higher rate per unit area than terrestrial forest.

Mangrove forest, saltwater or tidal marshes, and sea grass meadows are three most important components of marine and costal ecosystems in the context of Blue Carbon. Mangroves are tropical marine forest grows in the tidal flooded area at the edge of the land and sea.

Tidal marsh are coastal wetlandscontaining partially or fully submerged vegetation suited to both fresh and salt water. Seagrasses are fully submerged flowering plants that can grow in meadows.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

IMPORTANCE OF BLUE CARBON

The marine ecosystem is a major element of the global carbon cycle, and it contributes approximately half of the annual photosynthetic absorption of carbon dioxide (a greenhouse gas (GHG) from the atmosphere.

Carbon is sequestered in both terrestrial and marine ecosystems. Blue carbon is sequestered in living marine biomass for relatively short time scales (years to decades). However, unlike terrestrial ecosystems, carbon can be stored or remain trapped in coastal soil for much longer time periods (centuries to millennia).

The reason for this is that in the terrestrial ecosystem there is potential for aerobic microbial oxidation and release back into atmosphere, while in the marine ecosystem, the soil remains submerged underwater in an anaerobic state (low to no oxygen). The Coastal Blue carbon ecosystem is highly efficient in storing and sequestering carbon. However, if the coastal ecosystem gets degraded, lost, or converted for other land use, then there will be a high risk or chance of releasing blue carbon or CO2 to the atmosphere.

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Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

...Importance of Blue Carbon...

...In addition to blue carbon, coastal and marine ecosystems provide other benefits such as protection from storm and flood, erosion prevention, filtering of pollutants and contaminants, spawning grounds for fish species, and habitats for fisheries and marine species.

Studies suggest 83% of global carbon is circulated through the ocean. Data also suggests that even though coastal habitats cover less than 2% of the total ocean area, it accounts for almost 50% of the total carbon sequestered in ocean sediments.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

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WHAT IS A WETLAND?

Water is the blood stream of the biosphere and wetlands are the source and purifier of water. About 75 Sustainable Development Goal (SDG) Indicators are directly or indirectly related to Wetlands.

Lakes, rivers, swamps, marshes, peatlands, mangroves, underground system, lagoons, shellfish & coral reefs, and kelp all constitute the global natural wetland ecosystem. Wetland protects us from floods, droughts, and other disasters. It supports biodiversity, provides us with food and livelihoods. Wetland is the largest storage facility for carbon across among all the ecosystems.

All these wetland ecosystem services can be consolidated under the following categories Provision services (food, fresh water, fibre, fuel, biochemical and genetic material), Regulating services (climate, hydrology, pollution control, erosion protection, natural hazards); Cultural services (spiritual and inspirational, recreational, aesthetic, and educational); and Supporting services (biodiversity, Soil formation, Nutrient cycling, and pollination.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

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COMPOSITION OF NATURAL INLAND WETLANDS BY PERCENTAGE:

Rivers & Streams - 6%; Natural lakes - 29%;
Non-forested peatlands-27%; Forested peatlands-6%
Marshes and Swamps -22%; Forested Wetlands-10%

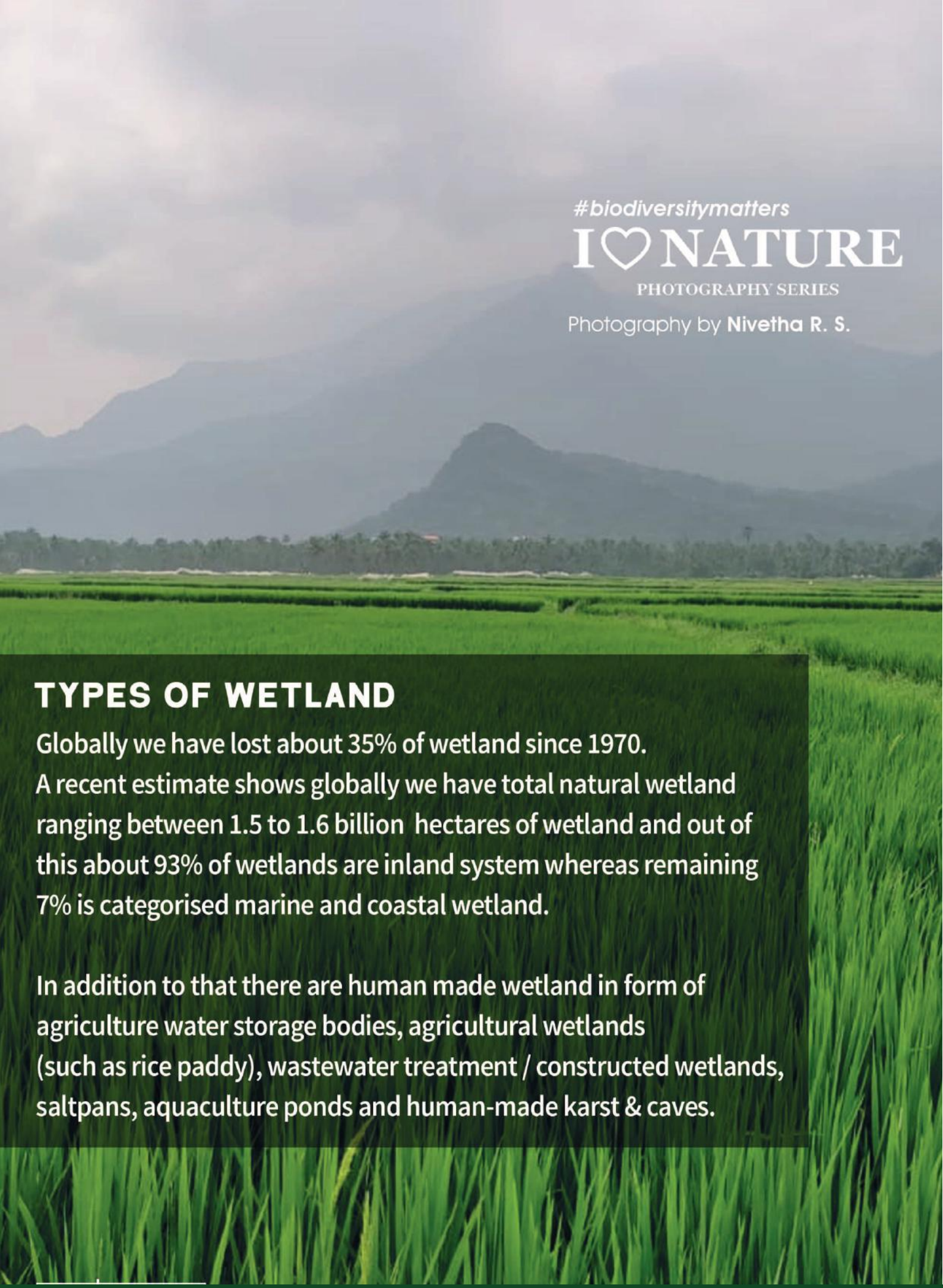
COMPOSITION OF NATURAL MARINE AND COASTAL WETLANDS BY PERCENTAGE:

Unvegetated tidal flats-28%; Saltmarshes-34%;
Coastal deltas-2%; Mangroves-8%;
Seagrass beds-11%; Coral reefs (warm water systems)-17%

REGIONAL DISTRIBUTION OF GLOBAL WETLANDS BY PERCENTAGE:

Asia-31.8%; North America-27.1%;
Latin America and the Caribbean 15.8%;
Europe-12.5%; Africa-9.9%; Oceania-2.9%

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)



TYPES OF WETLAND

Globally we have lost about 35% of wetland since 1970.
A recent estimate shows globally we have total natural wetland ranging between 1.5 to 1.6 billion hectares of wetland and out of this about 93% of wetlands are inland system whereas remaining 7% is categorised marine and coastal wetland.

In addition to that there are human made wetland in form of agriculture water storage bodies, agricultural wetlands (such as rice paddy), wastewater treatment / constructed wetlands, saltpans, aquaculture ponds and human-made karst & caves.

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SIGNIFICANCE OF WETLANDS FROM THE SDGS PERSPECTIVE

SDG-1	More than a billion people depend on wetlands for living.
SDG-2	Rice paddy agricultural wetlands provides staple diet for 3.5 billion people.
SDG-3	Wetlands (especially rivers, lakes and coastal areas are hotspot for relaxation and pleasure tourism.
SDG-4	Safe water access enhances educational opportunities for communities living along wetland.
SDG-6	Almost all of world's freshwater consumption is either directly or indirectly drawn from wetlands.
SDG-7	Sustainable upstream water management can provide affordable and clean energy.
SDG-8	Wetlands supports 266 million jobs through wetland-based tourism and travel activities.
SDG-9	Health wetlands protects from flooding and storm surge.
SDG-11	Urban wetland acts natural affluent treatment zone.
SDG-12	Sustainably managed wetlands support water consumption demand.
SDG-13	Heathy wetland can mitigate climate change as natural carbon storage zone. For example: Peatlands cover only 3% of global land but store about twice the amount of carbon stored by world's entire forest biomass.
SDG-14	Healthy and productive oceans rely on well-functioning coastal and marine wetlands.
SDG-15	40% of all the world's species live and breed in wetlands.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

NOT just HUMAN-induced CLIMATE CHANGE but HUMAN-induced EXTINCTION OF SPECIES

Species evolve and become extinct overtime – a normal process of nature. It is estimated that 98% of all species that ever lived are now extinct.

Scientists have observed that, at present, the extinction of species is happening 1000 times more quickly than expected and 29% of 142,000 assessed species are now extinct

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Dr Kuntal Goswami

PERCENTAGE OF SPECIES IN THE INTERNATIONAL UNION FOR CONSERVATION OF NA TURE (IUCN) RED LIST

Date shows one in four species are at risk of extinction. Recent assessment shows that, 40% of amphibians; 34% Conifers; 33% Reed corals; 31% Sharks and rays; 27% selected crustaceans; 25% Mammals; and 14% Birds, are at very high risk of extinction.

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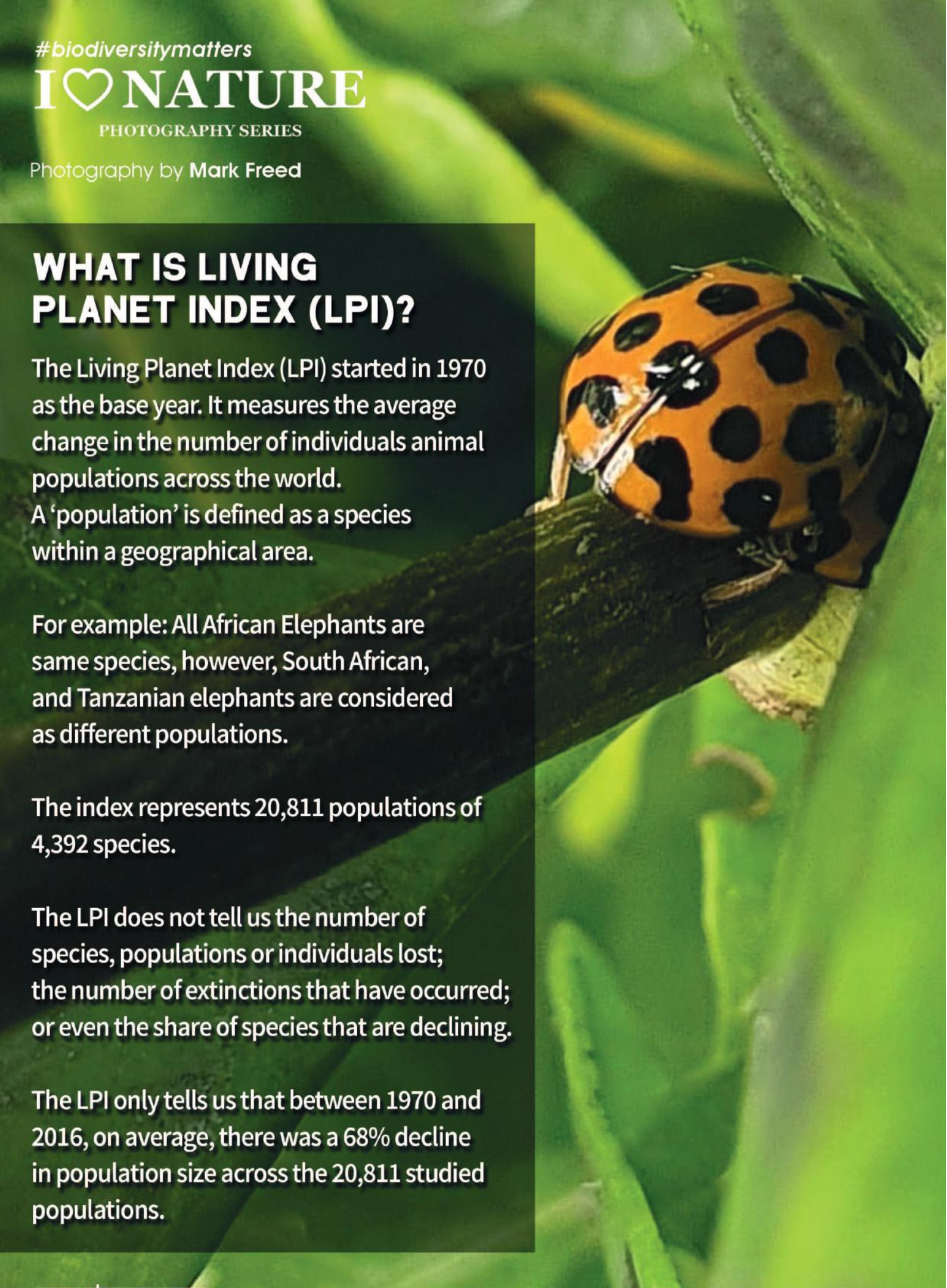


WHAT IS LIVING PLANET INDEX (LPI)?

The Living Planet Index (LPI) started in 1970 as the base year. It measures the average change in the number of individuals animal populations across the world.
A 'population' is defined as a species within a geographical area.

For example: All African Elephants are same species, however, South African, and Tanzanian elephants are considered as different populations.

The index represents 20,811 populations of 4,392 species.

The LPI does not tell us the number of species, populations or individuals lost; the number of extinctions that have occurred; or even the share of species that are declining.

The LPI only tells us that between 1970 and 2016, on average, there was a 68% decline in population size across the 20,811 studied populations.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Forests in the Natural Ecosystems – the Bedrock of Life on Earth

Forest is fundamental to fight climate change, to conserve nature, to save people and to run the economy. It is estimated that 1.6 billion people depends on forests for food, water, wood, and employment.

Forests sequester carbon, regulate our climate, acts as flood barriers, recharge groundwater, filter air, protect biodiversity. In addition, forests contribute about $150 trillion to economic progress.

Deforestation is increasing global CO2 emissions by 15% and if we consider tropical deforestation a country then it would be the world's third largest emitter. It is estimated that globally we deforest tropical forest equal to the size of New York's Central Park in every 15 minutes.

Hence, it is impossible to halt climate change and stay well below 1.5 degree C temperature rise relative to pre-industrial revolution days, until or less we can stop deforestation.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

ALARMING FACTS OF THE GLOBAL BIOMASS OF ALL MAMMALS AND BIRDS

Even though farmed animals (mainly cows, pigs, sheep, goats, and horses) constitute a handful varieties but compared with wild animals, farmed animals now constitute 60% of the global biomass of all mammals.

Single human species constitute 36 % of the global biomassof all mammals.

Wide varieties of wild mammals make up only 4 %.

Similar facts also noticed in the case of birds.

One single bird, the farmed chicken, constitute 57% of global bird biomass, whilst wild birds' make-up 29%.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

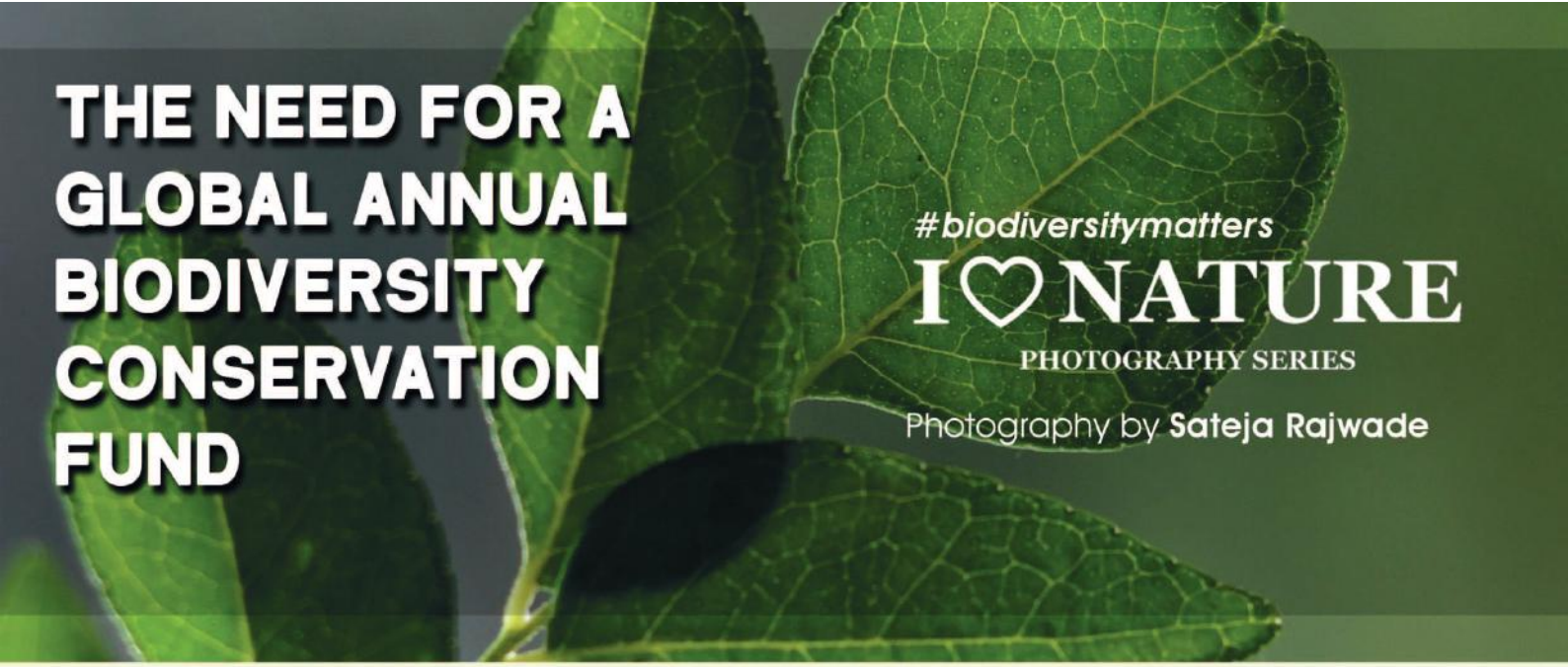
The Aichi Biodiversity Target was the Strategic Plan for Biodiversity 2011-2020. It had five strategic goals and 20 targets.

- Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society.
- Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use.
- Strategic Goal C: Improve the status of biodiversity by safeguarding ecosystems, species, and genetic diversity.
- Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services.
- Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building.

Out of 20 targets only six targets had been partially progressed and these six targets are:

- Target 9: Controlling invasive alien species pathways and preventing their establishment.
- Target 11: 17% of terrestrial and inland water areas and 10% of coastal and marine areas are conserved.
- Target 16: Use of Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of benefits arising from their utilization is present in signatories.
- Target 17: Submission, development, and implementation of national biodiversity strategy plans.
- Target 19: Research, scientific support and technology relating to biodiversity conservation are improved and widely shared.
- Target 20: Signatories have mobilised the needed amount of financial resources to implement their national biodiversity strategy plans via domestic spending and international financial flows.

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)



THE NEED FOR A GLOBAL ANNUAL BIODIVERSITY CONSERVATION FUND

The World Economic Forum, estimates that about USD $44 trillion of economic value or over half of the world's GDP, is moderately or highly dependent on nature. The Biodiversity and Ecosystem Services (BES) Index has estimated that one-fifth of all countries, with both developing and advanced economies, have more than 30% of their territory at risk of ecosystem collapse due to a decline in biodiversity.

For example: countries such as Kenya, Nigeria and Pakistan are particularly at risk as they are highly dependent on their agricultural sectors and, additionally, they have highly fragile ecosystems.

A recent study shows about 60% of global biodiversity loss happens to seven countries: Indonesia, Malaysia, Papua New Guinea, China, India, Australia, and the USA. It is estimated the world needs USD 722-967 billion per year by 2030 as Global Annual Biodiversity Conservation Funding and out of that 76% will be required to halt and reserve global biodiversity loss.

A) Funding requirement for Biodiversity Conservation

- Expand the global protected area network to 30% of all terrestrial and marine ecosystems — USD $149-192 billion
- Global conservation and restoration of critical coastal ecosystems including mangroves, seagrass, saltmarshes, and oyster reefs — USD $27-37 billion

B) Funding requirement for mainstream biodiversity conservation

- Global sustainable management of agricultural lands (cropland, and rangelands), forests, and fisheries — USD $438-580 billion
- Global invasive species management — USD $36-84 billion
- Biodiversity conservation in urban environments and reducing water pollution — USD $72.6-73.2 billion

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Katan Talati

ROOTS – THE INVISIBLE HEROES

Roots remain out of sight and out of mind, but the root is almost half of the overall plant. It is extremely important to stop soil erosion, to hold nutrients in the soil and to fight climate change. Forest soil holds 60 to 70% of carbon and the way to pass carbon from the atmosphere to the soil is through roots. Through photosynthesis plants and trees absorb carbon dioxide and store the carbon throughout their biomass including the roots and then transferred to the soil.

Conti...

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...Roots – the Invisible Heroes...

... Roots also creates a new hotspot of ecosystem under the soil and creates a symbiotic relationship with fungi to source minerals.

In future we may prefer plants with longer roots keeping in mind longer dry spell due to climate change. Plants may need to grow deep in the soil to source water. Longer roots can also maintain soil fertility.

As roots form a web of network it hold the soil, absorbs sediments, and helps to protect coastal erosion and plants diminish the energy of larger waves, thereby, helps in coastal protection.

New research also suggesting that roots can be used to mine resources such rare earth minerals

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

Soil – reservoir of Biodiversity & stock of Carbon

Soil is the reservoir of global biodiversity, and home to more than 25% of global biological diversity. It supports the range of micro-organisms, alongside flora and fauna. It is estimated that 1 gram of soil contains up to 1 billion bacteria cells, up to 200 meters of fungal hyphae and a wide range of nematodes, earthworms, and arthropods. Hence, arguably, soil contains the most diverse terrestrial communities on the planet.

Conti...

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

...Soil – reservoir of Biodiversity & stock of Carbon...

...Soil organisms vary from 20 nm to 20-30 cm body width and divided into four sizes: Microbes includes virus, bacteria, archaea, fungi (20 nm to 10 um) and Microfauna like soil protozoa and nematodes (10 um to 0.1 mm). They facilitate decomposition of soil organic matter, weathering of minerals.

Mesofauna (0.1 mm to 2 mm) are soil microarthropods (mites, springtails, enchytraeids, apterygote and small larvae of insects). They facilitate transformation of soil organic matter and increases the surface of active biochemical interactions in the soil.

Macrofauna (2 nm to 20 mm) are large soil invertebrates (earthworms, woodlice, ants, termites, beetles, insect larvae). They act litter transformers, increases water permeability and soil aeration.

Megafauna (greater than 20 mm) are vertebrates (mamalia, reptilian and amphibia). They create spatial heterogeneity on the soil surface and in its profile through movement.

Conti...

Issue: 4 Volume: 1 2022 ISSN: 2652-7987 (Online) ISSN: 2652-7995 (Print)

...Soil – reservoir of Biodiversity & stock of Carbon...

..Soils holds largest stock of carbon on earth and in a broad sense, the carbon in soil is recycled within a microbe-driven soil food web. Microorganisms are thus central players in the transformation of plant and animal residues and are also key reservoirs of organic carbon in soil.

Carbon is either fixed or released from soils, depending on the activity of the soil microbiomes, and driven by abiotic conditions such as water content, temperature, oxygen level and pH level. Soil has a tremendous potential for regulating the atmospheric carbon content by sequestering carbon and mitigating climate change.

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...Loss of Biodiversity is one of the TOP EXISTENTIAL THREATS for mankind...

Source: Global Risk Report

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