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Restoration for Net Zero: Improving Impact and Reporting

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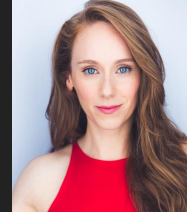
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I. Executive Summary

How can companies achieve net zero without greenwashing?

How can they go *beyond carbon* and improve their metrics and reporting to maximize benefits for ecosystems and local communities?

Executive Summary

In recent years, private companies have received an extraordinary amount of pressure from the public over the climate crisis. In response, many companies have set goals to reduce emissions to “net zero” by 2050, which is in line with the Paris Agreement. To meet these net zero pledges, many corporate strategies involve land restoration as a means to offset emissions. These net zero restoration projects focus on carbon removal and sequestration, with socioeconomic and other ecosystem services not often considered. Improving reporting on co-benefits, such as ecosystem services and socioeconomic impacts, provides an opportunity for net zero companies to increase their positive impact and garner confidence from the public. Restoration projects can provide opportunities, increase income, and many other benefits to local communities through meaningful stakeholder engagement. Often these projects occur in lower income countries and/or in close proximity to Indigenous populations.

A team of twelve graduate students created this report as part of a capstone project for Columbia University's Master of Public Administration in Environmental Science and Policy program. The World Resources Institute (WRI) assigned the team to investigate how companies can improve measuring and reporting the impacts of their net zero restoration projects on both communities and natural ecosystems.

The team analyzed 78 companies with net zero pledges that use land restoration and carbon offsets to better understand the current reporting landscape. Key takeaways include that: (1) hectares/acres restored is the most rigorously reported metric; (2) ecosystem services metrics and indicators are more commonly reported than socioeconomic; and (3) among industries, Consumer Packaged Goods and Private Equity represent the highest and lowest reporting industries, respectively, according to a weighted scoring system.

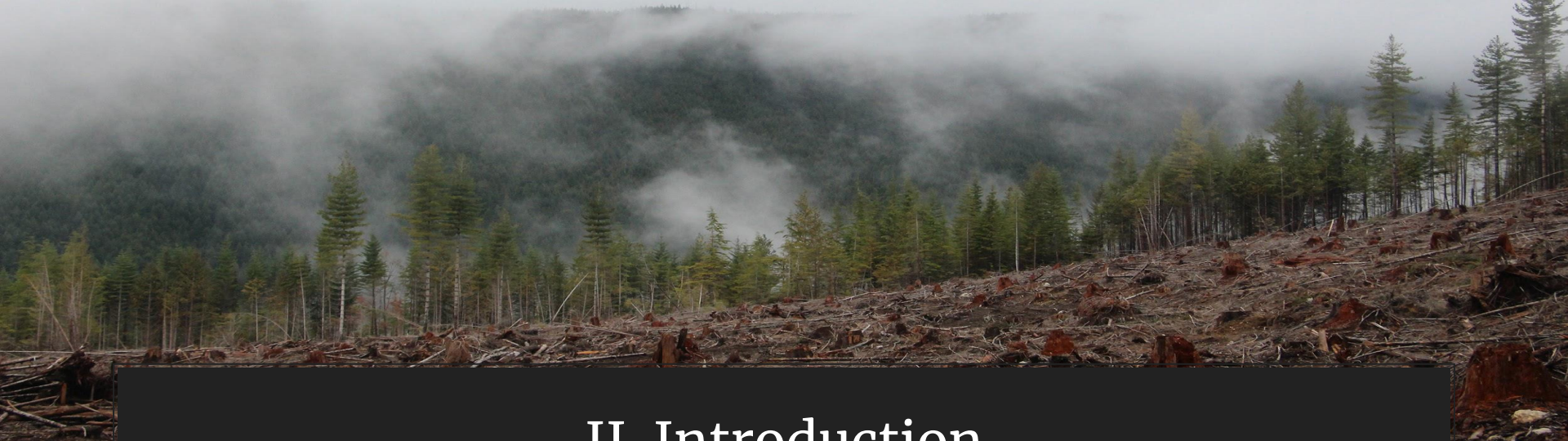
Executive Summary

A gap analysis between current and best practices culminated in a stepwise approach for net zero companies. In the absence of international standards, the leading frameworks and verifiers are recommended for target setting, data verification, and reporting. Additionally, this report includes guidance for partnerships, stakeholder engagement, and metric selection to encourage maximum impact on ecosystems and local communities. The stepwise recommendations are purposefully high level, allowing for flexibility due to the varying needs of projects and companies. Alternatives and weighted options are provided where applicable.

For future considerations, our data findings highlight opportunities for improvement in reporting regarding specific metrics, industries, and individual companies. Additionally, our research had limited access to project-level perspectives, and more investigation will be necessary to bring these voices into the net zero conversation.

The structure of this report begins with an introduction to the net zero landscape and the problems surrounding restoration offsets. A glossary provides key terms and definitions. The methodology describes processes used to develop our understanding of net zero efforts and to conduct our data analysis, including limitations that narrowed the scope. The data findings include infographics and discussions of the current net zero reporting landscape from 78 companies across 9 industries. The stepwise approach offers proven ways to achieve restoration-based emissions offsets for WRI and its partner companies. The discussion section poses future questions for WRI, followed by a conclusion, bibliography, appendix, and biographies.

We hope that this report can help WRI effectively guide companies in creating transparent, effective, and impactful measures to ensure trust and credibility with the public.



II. Introduction

Companies are increasing the use of restoration projects to achieve net zero emissions.

Often they are not well-equipped to take on the challenges in this arena...

Public Demand for Corporate Responsibility

Individuals, communities, and economies are rapidly transforming to address the climate crisis. Many consumers believe that businesses must commit to reducing their carbon emissions as well. A key finding in a global report from The Economist Intelligence Unit commissioned by WWF shows a staggering 71% rise in online searches for sustainable goods globally over the past five years.¹ Climate change and protecting the environment ranked as the top personal concern among young adults worldwide in February 2022, ahead of both unemployment and disease prevention.² This increase in awareness among consumers has increased sustainability efforts and actions across companies.

Consumer Trends

71% rise in searches for “sustainable goods”
globally over the past five years.

“Climate change & protecting the environment”
was the *top* personal concern among young adults worldwide in February 2022.

Corporate emissions reduction goals often reference The Paris Agreement, which came into effect in 2016. The Paris Agreement aims to limit temperature rise to below 2°C, and preferably to 1.5°C (compared to pre-industrial levels),³ which requires a 45% global greenhouse gas reduction by 2030 and a net zero world by 2050.⁴ Long-term goals are being set, particularly by major greenhouse gas emitters, and these steps will be imperative in the coming years to keep global warming to no more than 1.5°C. Net zero initiatives across the globe are at the forefront of these efforts. With companies pledging interim targets as soon as 2030, time is of the essence to get net zero initiatives on the right course. The private sector will need science-based guidance to become net zero by 2050.

Recent Rise in Net Zero Pledges

Because of public demand and pressure, net zero pledges more than doubled from 2019 to 2020, and about half of the pledges include land restoration as a means to sequester carbon.⁵ Without robust and transparent monitoring of restoration projects, companies are susceptible to greenwashing claims. Current reporting lacks a breadth of metrics, high quality disclosure methods, quantified targets, and third-party verification. Reports often do not mention socioeconomic metrics, and without these, restoration can become an unintended burden for local communities. Companies pursuing net zero goals could benefit from a standardized system to avoid greenwashing, have a greater positive impact, and avoid negative impacts on local communities. Many corporations are looking to nonprofits to provide these metrics and reporting standards. The recent rise in net zero pledges indicates that there will be a great need for experts like WRI to guide the private sector.

>100%

increase in net zero pledges from 2019 to 2020.

53%

of pledges include restoration projects.

\$133B

pledged annually on restoration projects.⁶

Project Deliverables

The primary focus of our research was investigating how companies can better measure and report on restoration projects through socioeconomic and ecosystem services metrics. Therefore, WRI tasked the team to research the current landscape of net zero restoration projects and highlight the opportunities to address data and sustainability reporting gaps. This culminated in two primary deliverables: (1) a comprehensive infographic with associated data visualizations to demonstrate net zero trends, metrics, and reporting efforts, and (2) a stepwise approach of recommendations and best practices that WRI can offer their partners as they pursue their land-based initiatives and emission reduction goals.

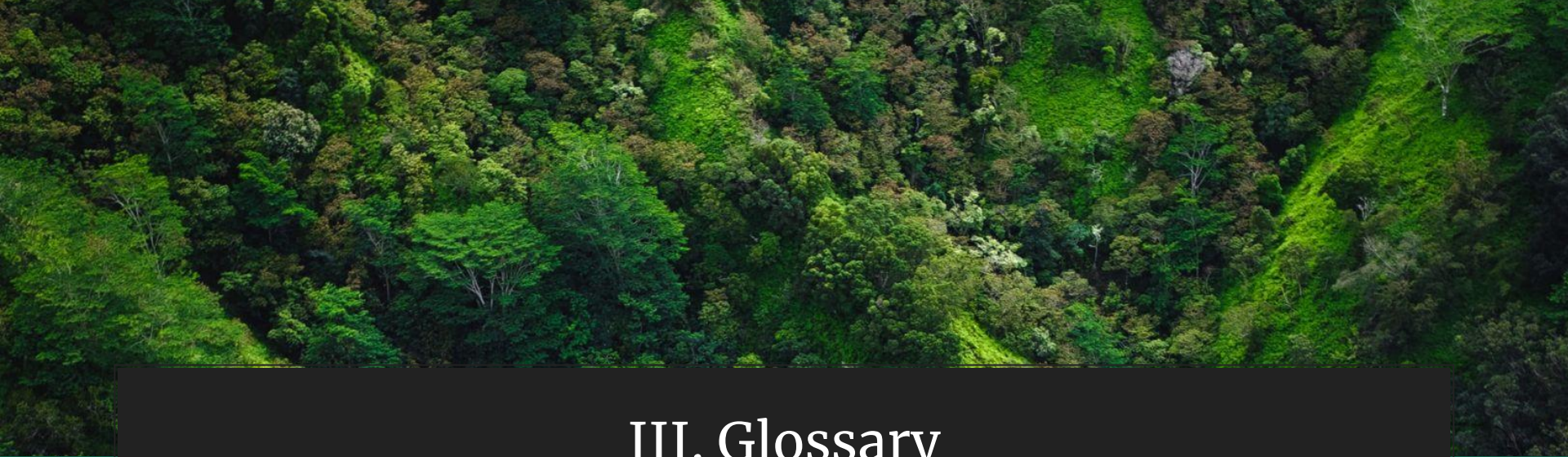




“I’m cautious about it and I’m all in on environmental protection. But if we are going to ask a company to buy a forest, what is it going to do in the long run?”

~Al Iannuzzi, VP Sustainability at Estée Lauder Companies

(See Appendix F for full interview summary.)



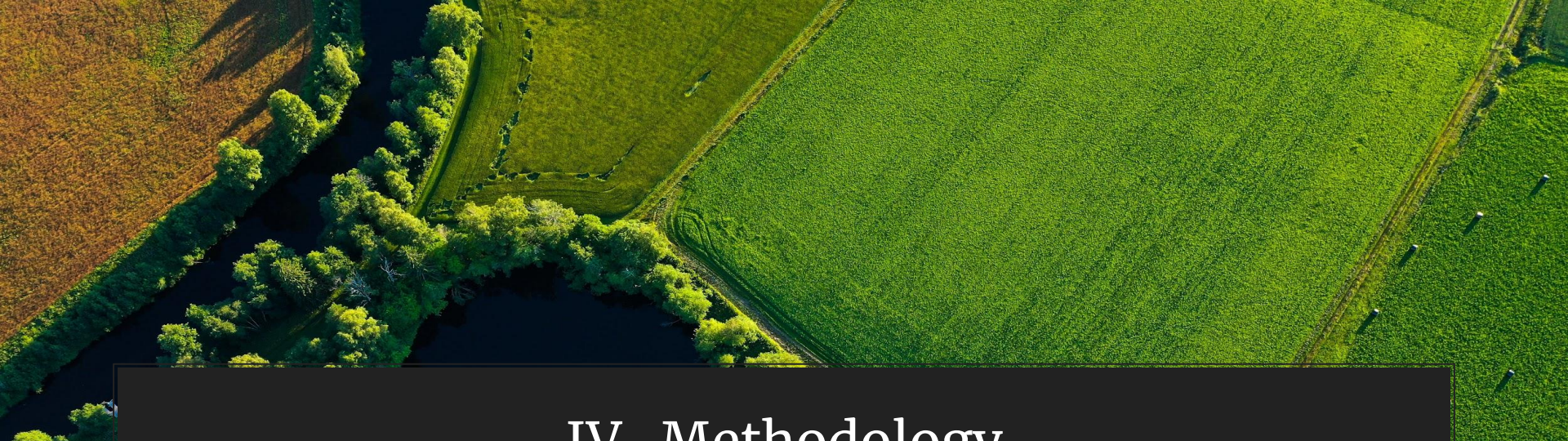
III. Glossary

Key terms and definitions

Term	Definition
<i>Additionality</i>	Additionality occurs when there is a net gain in greenhouse gas reductions from a project scenario that would not have occurred without the project. It is not additional if a reduction would have happened anyway without the project. ⁷
<i>Avoidance Offsets</i>	Offsets created by activities that reduce emissions by preventing their release into the atmosphere. Examples include stopping the conversion of grasslands to croplands and limiting timber harvest levels. ⁸
<i>Carbon Credit</i>	A carbon credit is a tradable permit or certificate that provides the holder of the credit the right to emit a certain amount of carbon dioxide or an equivalent of another greenhouse gas. ⁹
<i>Carbon Leakage</i>	Carbon leakage is the increase of greenhouse gas (GHG) emissions in one region in response to GHG reductions elsewhere. ¹⁰
<i>Deforestation</i>	According to the FAO, deforestation is the conversion of forest to another land use or the long-term reduction of tree canopy cover below the 10% threshold. Deforestation implies the long-term (>10 years) or permanent loss of forest cover. ¹¹
<i>Ecological Reclamation</i>	Ecological reclamation is "the process of assisting the recovery of severely degraded ecosystems to benefit native biota through the establishment of habitats, populations, communities, or ecosystems that are similar, but not necessarily identical to surrounding and naturally occurring ecosystems." ¹²

Term	Definition
<i>Ecosystem Services</i>	Outputs, conditions, or processes of natural systems that directly or indirectly benefit humans or enhance social welfare, ¹³ including provisioning, regulating, supporting, and cultural services. ¹⁴
<i>Greenwashing</i>	Greenwashing is the process of conveying a false impression or providing misleading information about how a company's products are more environmentally sound. Greenwashing is considered an unsubstantiated claim that deceives consumers into believing that a company's products are environmentally friendly. ¹⁵
<i>Land Degradation</i>	WRI defines degraded land as "land that has lost some degree of its natural productivity due to human-caused processes. However, there is no single internationally-approved definition of degraded land." ¹⁶
<i>Land Restoration</i>	Land restoration, which may include naturalization or rewilding, is the process of ecological restoration of a site to a natural landscape and habitat, safe for humans, wildlife, and plant communities. Land restoration can enhance the supply of valuable ecosystem services that benefit people. ¹⁷
<i>Land-use change</i>	Change in the use or management of land by humans, which may lead to a change in land cover. Land cover and land-use change may impact surface albedo, evapotranspiration, sources and sinks of greenhouse gases, or other properties of the climate system and may thus impact climate locally or globally. In forestry, land-use change is not necessarily the same as land-cover change. Land cover is the observed biophysical cover of the earth's surface, whereas land use reflects people's actions and intentions. ¹⁸
<i>Net Zero</i>	Achieving an overall balance between emissions produced and emissions taken out of the atmosphere. ¹⁹
<i>Net Zero Pledge (related terms: net positivity, climate positivity)</i>	A commitment by an entity to reach net zero emissions.

Term	Definition
<i>Permanence</i>	When sequestered emissions cannot be re-released into the atmosphere. ²⁰
<i>Scope 1 Emissions</i>	The EPA's Scope 1 and 2 inventory guide defines Scope 1 emissions as "direct greenhouse (GHG) emissions that occur from sources that are controlled or owned by an organization (e.g., emissions associated with fuel combustion in boilers, furnaces, vehicles)." ²¹
<i>Scope 2 Emissions</i>	Scope 2 emissions are "indirect GHG emissions associated with the purchase of electricity, steam, heat, or cooling. Although scope 2 emissions physically occur at the facility where they are generated, they are accounted for in an organization's GHG inventory because they are a result of the organization's energy use." ²²
<i>Scope 3 Emissions</i>	The EPA's Scope 3 inventory guide defines Scope 3 emissions as " the result of activities from assets not owned or controlled by the reporting organization, but that the organization indirectly impacts in its value chain. Scope 3 emissions include all sources not within an organization's scope 1 and 2 boundary ... Scope 3 emissions, also referred to as value chain emissions, often represent the majority of an organization's total GHG emissions." ²³
<i>Socioeconomic Impacts (services)</i>	Impacts on socioeconomic factors such as education, income, and occupation. ²⁴
<i>Stepwise approach</i>	A step-by-step model for problem solving designed by taking all variables into consideration.
<i>Tree Cover Loss</i>	Tree cover loss is defined as the complete removal of tree cover for any reason, including human caused loss and natural events. ²⁵
<i>Verified Carbon Offset</i>	A verified carbon offset is a reduction or avoidance of greenhouse gas emissions, or the removal of carbon dioxide and its equivalents from the atmosphere, that a qualified agency has verified. ²⁶



IV. Methodology

Secondary Research → Literature Review

Primary Research → Interviews & Sustainability Reports

Data Analysis → Reporting and Metric Evaluation

Secondary Research: *Literature Review*

1. Investigate the Problem

To understand the problem of land degradation and the challenges of restoration in **Africa, Asia, and Latin America**, the team reviewed various scholarly articles, guided by the following research questions:

- Where are deforestation and degradation happening?
- What are the causes?
- What are the ecological and socioeconomic effects of degradation and deforestation?
- What restoration efforts are taking place and what are their challenges?

2. Net Zero Practices

As a preliminary investigation, the team looked at 36 companies (Appendix L) of varying sizes and sectors that are participating in restoration efforts to gain insight into the following questions:

- What restoration pledges are companies making?
- Which metrics are they using to report on socioeconomic and ecosystem services?

Not all 36 companies were included in the final analysis of 169 companies outlined below.

Secondary Research: *Literature Review*

3. Restoration Best Practices

The team researched scientific articles and publications to find ***which metrics can and should be measured in restoration projects.***

A special emphasis was placed on restoration techniques eligible for TerraMatch's Terrafund for AFR100:²⁷

- mangrove tree restoration
- assisted natural regeneration
- agroforestry
- reforestation
- riparian restoration
- enrichment planting
- applied nucleation/tree islands
- silvopasture
- seed dispersal/direct seeding



Primary Research: *Interviews*

Process

The team conducted informational interviews with three main groups of restoration and net zero experts.

After seeking the help of Columbia-affiliated experts and utilizing the team's previous connections, cold outreach and WRI's connections, the team interviewed **1 scientist, 3 restoration project managers, and 3 corporate sustainability specialists** (Appendix D).

A comprehensive list of questions were created tailored to each group's expertise (Appendix C). These interviews helped identify restoration organization capacity, markers of a successful restoration project, and restoration project challenges.

Challenges

The main hurdle to conducting primary research lay in the difficulty of accessing experts, especially restoration workers and specialists in the implementation field, which limited our access to first-hand "on-the-ground" knowledge.

Establishing contact with restoration-related NGOs proved to be especially difficult due to the rigorous project priorities that restoration NGO members adhere to and the lack of time outside of their work responsibilities to meet with researchers such as the workshop team.

Primary Research: *Sustainability Reports*

The team analyzed company sustainability reports to fulfill the two primary objectives of analyzing current trends and providing a stepwise approach. Ten or more top-performing companies by revenue within each of nine industry categories were selected to understand how companies with the highest financial capabilities report and track restoration projects. The nine industry categories used were: Consumer Packaged Goods, Private Equity, Financial Services, Manufacturing, Oil and Gas, Pharmaceuticals, Airline, Media, and Technology. From this list of 169 companies, the team first determined if each company had a net zero pledge, resulting in 115 companies (68%). From those 115 companies, the team determined which companies are also involved in ecosystem or land-based restoration projects, which resulted in 78 (or 46% of 169). For the 78 companies that met both criteria, data on the companies' reporting and disclosure practices were analyzed and entered into a spreadsheet (Appendix A).

169 companies selected

68% have net zero goals

46% also have restoration projects

Data Analysis

“Is the company demonstrating transparency and progress in their reporting through key metrics?”

Report Evaluation:

A series of evaluation criteria were developed to evaluate the rigor (transparency and progress) of the company reports (Appendix B):

- For qualitative criteria, the contents of the cell reflect the specific research criteria (e.g., Year Goal: 2050)
- For Boolean criteria, the cell was marked 0 if the company did not meet the criterion and 1 if it did

The criteria seek to measure both the transparency and progress of a company's restoration efforts.

Metric Evaluation:

Six Boolean criteria were developed to evaluate rigor (transparency and progress) in the reporting practices for each metric. The criteria as as follows:

1. Is the metric included in the company's report?
2. Is the metric reported numerically in the report?
3. Is there a numerical goal for the metric in the report?
4. Is the metric reported annually?
5. Is there a goal year specified for the metric in the report?
6. Is the data for the metric third-party verified?

The cell was marked 0 if the company did not meet the criterion and 1 if it did.

Challenges and Considerations

01

Boolean Criteria - The Boolean criteria used for analysis is a useful tool, but also have limited potential to represent nuanced answers, since we only marked the yes or no for each criterion.

02

Metric Selection - Given the time constraints, the metrics analyzed account for only a subset of the potential list. Some metrics and indicators were given broad definitions (such as hectares restored) because a clear industry standard definition does not exist yet.

03

Industry Variation - Among the nine industries analyzed, there is varying industry representation because some did not have as many companies with net zero restoration pledges as others.

04

Time Scale - This project only captures the last two years of performance and goal setting, which includes pandemic disruptions to existing initiatives or hindrances to new projects. Most of the reports evaluating 2021 performance will be rolling out in the second half of this year.

Which metrics and indicators did we analyze?

Ecosystem Services

- Biodiversity
- Trees/Seedlings Planted
- Carbon Sequestered
- Hectares/Acres Restored
- Water Quality
- Reduction of Freshwater Withdrawal
- Soil Health
- Crop Yield/Productivity
- Use of Chemical Inputs
- Progress in Vegetation Class
- Spatial Mapping

Socioeconomic

- Conservation Investment
- Forest Protection Investment
- Community Well-Being
- Income to Community Members
- Community Resource Management
- Jobs Created
- Job Training
- Farmers Trained
- Farmers Transitioned to Sustainable Practices
- Opportunities for Women
- Youth Programs/Empowerment

These metrics and indicators are commonly used and can demonstrate impacts beyond carbon offsetting. For the purposes of the remainder of this report, “metrics” will serve as a shorthand for “metrics and indicators.”

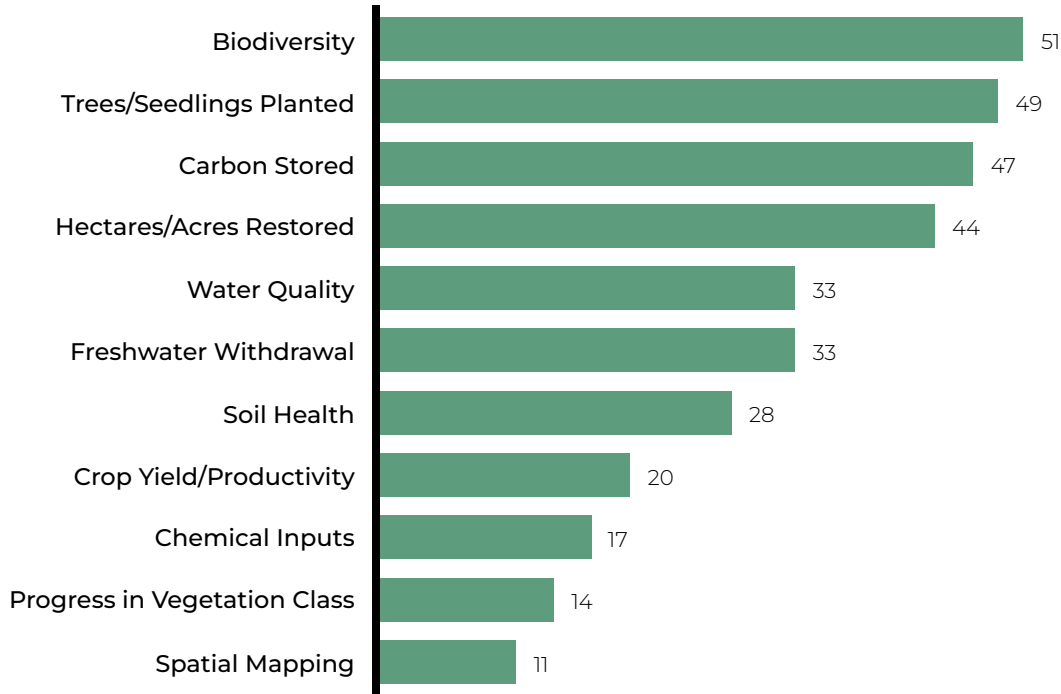


V. Data Findings

What is the landscape of top companies and their net zero initiatives?

How frequently and rigorously are ecosystem and socioeconomic metrics reported?

Frequency of Ecosystem Services Metrics (Fig. 1)



Top Metrics

- Biodiversity (67%)
- Trees Planted (64%)
- Carbon Stored (59%)
- Hectares Restored (56%)

347 unique ecosystem services metric mentions across **78** companies.

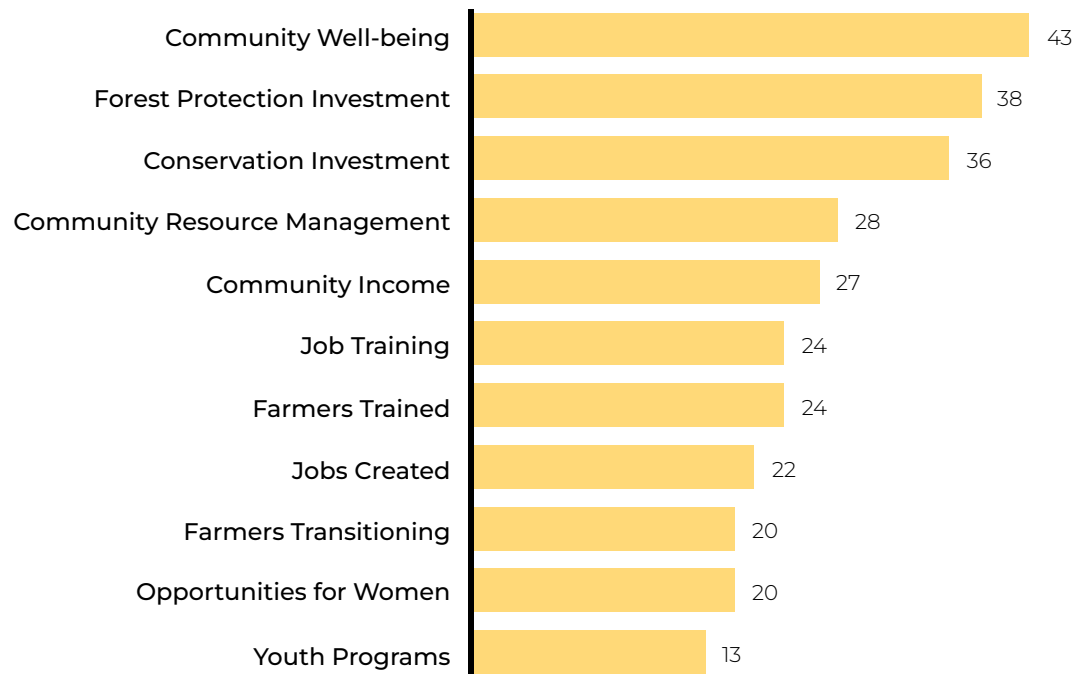
The average number of ecosystem services metrics mentioned was **4.5 out of 11**.

Figure 1. Number of companies (out of 78) that mentioned the metric in their report

Ecosystem Metric	Definition
Trees/Seedlings Planted	Number of new plants planted in the restoration area as a result of the project.
Biodiversity	Biodiversity is often measured as the species count in a given area. Biodiversity can also be measured as genetic diversity (total variety of genes within a single species) or a measure of a given area's number of endemic species (species that are restricted to one location; they do not occur anywhere else in the world). ²⁸
Carbon Stored (related term: carbon sequestration)	"The long-term storage of carbon in plants, soils, geologic formations, and the ocean. Carbon sequestration occurs both naturally and as a result of anthropogenic activities and typically refers to the storage of carbon that has the immediate potential to become carbon dioxide gas." ²⁹
Hectares/Acres Restored (related term: ecological restoration)	Ecological restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. Ecosystems are dynamic communities of plants, animals, and microorganisms interacting with their physical environment as a functional unit. Restoration helps recover these dynamics. ³⁰
Progress in Vegetation Class or Species	Measuring and/or tracking the progress of one or more specific vegetation species within the project area. Ecological vegetation classes are groupings of vegetation communities based on floristic, structural, and ecological features. ³¹
Soil Health (related terms: soil contamination, soil quality)	"The capacity of soil to function as a vital living system, within ecosystem and land-use boundaries, to sustain plant and animal productivity, maintain or enhance water and air quality, and promote plant and animal health." ³² A contaminated soil can be defined as a soil with a concentration of a contaminant that exceeds the level defined by applicable regulations. ³³

Ecosystem Metric	Definition
Water Quality (related term: water contamination)	Water quality concerns the amount of contamination in a body of water. Water contamination is defined as the presence in water of toxic chemicals and biological agents that exceed what is naturally found in the water and may pose a threat to human health and/or the environment. This includes chemicals introduced into the water bodies as a result of human activities. ³⁴
Chemical Inputs (related terms: pesticides, fertilizers)	For the purposes of this report, chemical inputs refer specifically to agricultural chemical inputs. These include different types of chemical applications in agricultural production, such as pesticides (including natural and biological pesticides), chemical fertilizers, veterinary drugs and feed additives, among others. ³⁵
Freshwater Withdrawal (related terms: water stress, withdrawal intensity)	For the purposes of this report, freshwater withdrawal includes withdrawals that damage an ecosystem or reduce freshwater sources to concerning levels. The focus was particularly on efforts to reduce withdrawals to help restore ecosystem function. ³⁶
Spatial Mapping (related terms: precision agriculture, ecological management tool)	Spatial mapping systems create, manage, analyze, and map all types of data. ³⁷ Spatial mapping in relation to agricultural practices uses mapping software (via satellite or drone) to create maps that can provide useful insights on soil quality, water availability, and crop yield that allow for more precise/strategic agricultural management. Spatial mapping can also be used for tracking the progress of restoration efforts. ³⁸
Crop Yield/Productivity	The harvested production per unit of harvested area for crop products. ³⁹

Frequency of Socioeconomic Metrics (Fig. 2)



Top Metrics

- Community Well-being (55%)
- Forest Protection Investment (49%)

***295** unique socioeconomic metric mentions across **78** companies.*

*The average number of socioeconomic metrics mentioned was **3.8 out of 11**.*

Figure 2. Number of companies (out of 78) that mentioned the metric in their report

Socioeconomic Metric	Definition
Jobs Created	Number of new jobs that result from the program/restoration project.
Job Training	Training of community members to enable them to start jobs related to restoration or sustainable land use.
Farmers Transitioning to Sustainable Practices	The measurement of farmers transitioning to practices that improve soil health, reduce waste, and conserve water, among other things.
Farmers Trained	Number of community members trained as new farmers in sustainable practices and or methods of improving yields.
Opportunities for Women	Opportunities that empower women to participate and take leadership roles in sustainable agriculture or restoration.
Youth Programs	Project related programs that provide skills, critical awareness and opportunities to positively impact the lives of youth, so that they can impact the lives of other individuals, organizations, and communities. ⁴⁰
Community Well-being	Within the project scope, community well-being is a combination of social, economic, environmental, cultural and political conditions identified by individuals and their communities as essential for them to flourish and fulfill their potential. ⁴¹
Community Income	Increased income to community members as a result of the project.
Community Resource Management	Community-based natural resource management is a people centered integration of conservation of natural resource base (water, soil, trees and local biodiversity) and development to overcome poverty, hunger and disease. ⁴²
Conservation Investment	Investment in conservation efforts generally (usually to a specific organization).
Forest Protection Investment	Investment in forest protection generally (usually to a specific organization).

Frequency of All Reported Metrics (Fig. 3)

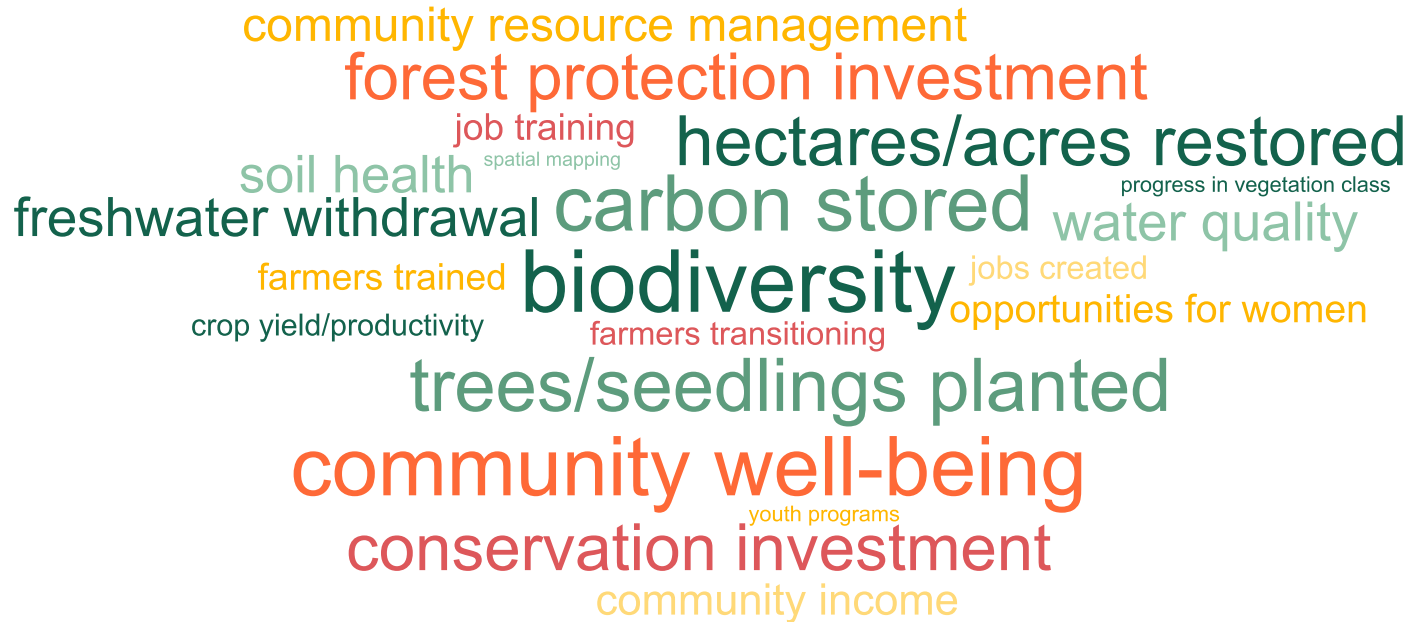


Figure 3. The larger the text size, the higher the metric frequency in the word cloud

Rigor of Reporting by Industry (Fig. 4)

Industry	Trees/Seedlings Planted	Biodiversity	Carbon Stored	Hectares/ Acres Restored	Progress in Vegetation Class	Soil Contamination	Water Contamination	Use of Chemical Inputs	Freshwater Withdrawal	Spatial Mapping	Crop Yield/Productivity	Jobs Created	Job Training	Sustainable Farmers	New Farmers Trained	Women's Opportunity	Youth Programs	Community Benefits	Increased Community Income	Localized Land Management	Conservation Investments	Existing-Forests Investments	Average
Consumer Packaged Goods	0.37	0.25	0.26	0.51	0.09	0.18	0.14	0.15	0.34	0.08	0.23	0.12	0.20	0.23	0.36	0.25	0.14	0.23	0.19	0.14	0.18	0.25	0.22
Private Equity	-	-	-	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00
Financial Services	0.16	0.13	0.27	0.28	0.05	-	0.03	0.01	0.20	0.04	-	0.07	0.13	0.18	0.18	0.15	0.09	0.21	0.11	0.16	0.21	0.18	0.13
Oil and Gas	0.28	0.29	0.41	0.42	0.05	0.06	0.29	0.09	0.38	0.01	0.05	0.15	0.14	-	-	0.10	0.02	0.24	0.22	0.07	0.22	0.15	0.17
Technology	0.25	0.13	0.21	0.35	0.03	0.03	0.15	0.05	0.38	0.02	0.01	0.01	0.04	-	0.02	0.06	0.06	0.03	0.06	0.05	0.17	0.21	0.11
Airline	0.12	0.13	0.13	0.19	0.13	-	-	-	-	-	-	0.12	0.02	-	-	0.09	-	0.13	0.02	0.09	0.13	0.17	0.07
Manufacturing	0.05	0.14	-	0.26	-	0.05	0.05	0.10	-	-	0.03	0.03	-	-	-	-	-	-	-	0.03	0.33	0.11	0.05
Pharmaceuticals	0.25	0.27	0.29	0.07	0.03	0.04	0.15	0.04	0.37	0.01	0.10	0.03	0.01	0.01	0.01	0.27	-	0.19	0.10	0.01	0.11	0.06	0.11
Media	0.11	0.14	0.36	0.19	-	0.03	0.03	-	0.03	-	0.03	0.09	0.03	0.03	0.03	-	0.03	0.11	0.03	0.03	0.08	0.05	0.06

Scale
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0

Figure 4. Average reporting scores for each metric for each industry

Takeaways (Fig. 4)

Top Metric - Hectares/Acres Restored:

This was reported the most rigorously across several industries. Highest industry scores for this metric:

0.51 - Consumer Packaged Goods

0.42 - Oil and Gas

0.35 - Technology

Highest Average Industry Scores:

0.22 - Consumer Packaged Goods

0.17 - Oil and Gas

0.13 - Financial Services

Lowest Average Industry Scores:

0.00 - Private Equity

0.06 - Media

0.07 - Airline

Ecosystem vs. Socioeconomic:

Ecosystem services were reported *more rigorously, on average*, than socioeconomic metrics. Manufacturing was the one industry where the highest score was a socioeconomic metric: Conservation Investment.

Weighted Criteria Per Metric (Fig. 4)

Data Weighting:

Weights were developed to reflect each criterion's importance.

Higher weight was given to criteria reflecting transparency (numeric reporting), progress (annual reporting), and thoroughness (verification).

This weighting system allowed the team to better distinguish the companies and industries with more robust reporting on metrics.

Criteria	Weights
Is the metric included in the company's report?	1
Is the metric reported numerically in the report?	2.5
Is there a numerical goal for the metric in the report?	1
Is the metric reported annually?	2.5
Is there a goal year specified for the metric in the report?	1
Is the data for the metric third-party verified?	2

Technical Details (Fig. 4)

Formula:

Cell values = the sum of the weighted scores for that metric across all companies in an industry divided by the number of companies in the industry.

Final column = the average of the values in the row.

See Appendix A for the location of figure 4 in the excel document.

Limitations:

Each of the industries has a different number of companies in them leading to varying statistical significance across industries.

Metric Reporting Trends (Fig. 5)

This chart shows the percentage of the time that the remaining criteria were met, given that a metric was mentioned.

	Is the metric reported numerically in the report?	Is there a numerical goal for the metric in the report?	Is the metric reported annually?	Is there a goal year specified for the metric in the report?	Is the data for the metric third-party verified?
Consumer Packaged Goods	48.1%	22.3%	36.4%	23.1%	25.8%
Private Equity	--	--	--	--	--
Financial Services	39.0%	7.3%	22.0%	4.9%	23.2%
Oil and Gas	53.2%	17.0%	47.9%	13.8%	21.3%
Technology	41.9%	32.4%	21.6%	21.6%	16.2%
Airline	48.0%	8.0%	28.0%	8.0%	24.0%
Manufacturing	28.6%	4.8%	14.3%	--	4.8%
Pharmaceuticals	49.0%	10.2%	26.5%	12.2%	42.9%
Media	24.0%	8.0%	--	20.0%	16.0%
Average	45.0%	17.8%	30.7%	16.6%	23.4%

Scale

100%

90%

80%

70%

60%

50%

40%

30%

20%

10%

0%

Figure 5. Reporting rates of supplementary criteria across industries

Takeaways (Fig. 5)

- **Top Scorers**
 - **Pharmaceuticals** companies used third-party verification the most.
 - **Oil and Gas** companies reported metrics year over year the most often.
 - **Technology** companies had numerical goals the most frequently.
- **Private Equity** companies never went beyond merely mentioning metrics. However, only two Private Equity companies - out of 18 analyzed (**11%**) - met our criteria for inclusion, illustrating Private Equity's low engagement with land-based carbon neutralization.

45%

Reported Numerically

17.8%

Numerical Goals for a Metric

30.7%

Metrics Reported Annually

16.6%

Specified a Goal Year

23.4%

Third-Party Verified

Technical Details (Fig. 5)

Formula:

The cell values are the percentage of the time when one of the 5 criteria was met, divided by the percentage of the time a metric is mentioned.

The average is averaged across companies, not industries.

See Appendix A for the location of Figure 5 in the excel document.

Limitations:

As with all of our data collection, the more companies researched, the better our sample would be.

It would also be valuable to see a heat map like this for each metric. However, given time/space constraints, we only have an aggregated map.

Company Reporting Scores (Fig 6.)

by industry and individual company

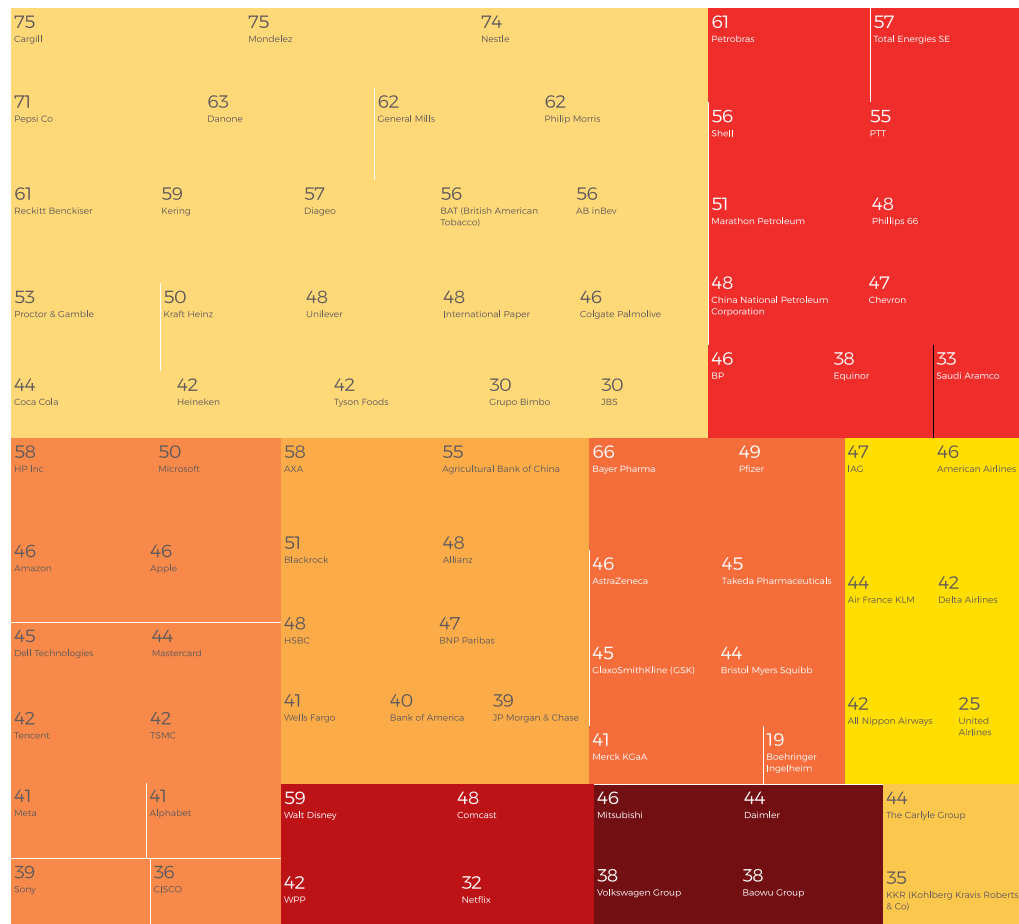


Figure 6. Tree map with total score for each company, grouped by industry

Scoring System: 0–100 (Fig. 6)

- **50 Points:** Report Score
 - Sum of 0-1 values from the Pledge and Report Criteria (for exact criteria, see Appendix B), adjusted to a scale from 0-50
- **50 Points:** Metric Score
 - 25 Points: Ecosystem Score
 - Sum of weighted company scores for Ecosystem Metrics, adjusted to a scale from 0-25
 - 25 Points: Socioeconomic Score
 - Sum of weighted company scores for Socioeconomic Metrics, adjusted to a scale from 0-25

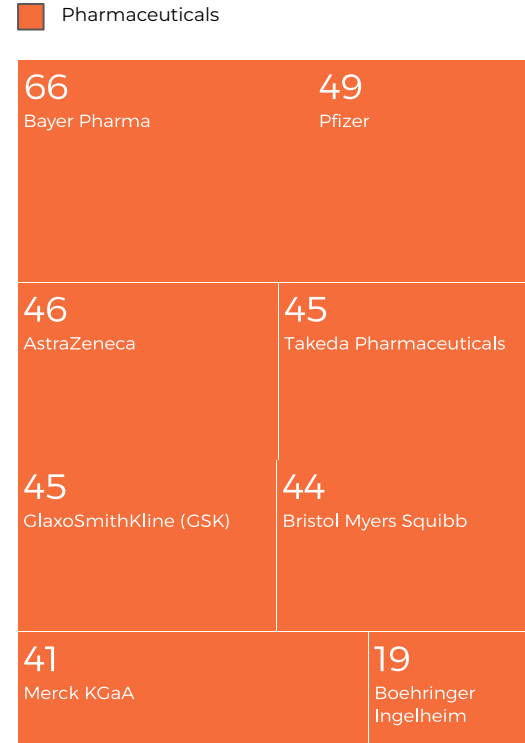
See Appendix A for the location of Figure 6 in the excel document.

Takeaways (Fig. 6)

The tree map (Fig. 6) shows that there is significant variation in reporting scores even within industries.

Comparing reporting scores within industries provides an opportunity to discover best practices tailored to each industry and create industry specific guidelines for reporting.

The largest variation can be seen in the pharmaceuticals industry (image to the right, taken from Fig. 6), where Bayer Pharmaceuticals received a score of 66, while Boehringer Ingelheim received a score of 19.



Highest and Lowest Ranked Companies (from Fig. 6)

Highest Ranked Companies

Rank	Company	Industry	Report Score	Metric Score		Total Score
				Ecosystem	Socioeconomic	
1	Cargill	Consumer Packaged Goods	47	17	10	75
2	Mondelez	Consumer Packaged Goods	50	10	15	75
3	Nestle	Consumer Packaged Goods	50	10	14	74

Lowest Ranked Companies

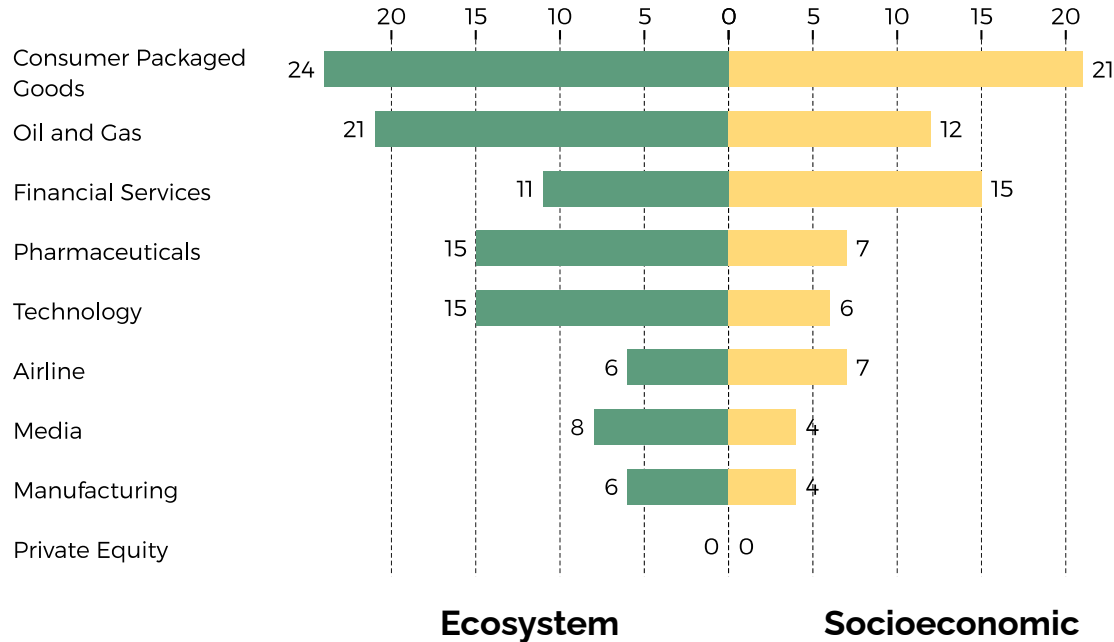
76	JBS	Consumer Packaged Goods	29	0	0	29
77	United Airlines	Airline	21	2	3	25
78	Boehringer Ingelheim	Pharmaceuticals	18	2	0	20

Subscores are rounded to the nearest whole number.

Limitations (Fig. 6)

- Scores are **not contextual**, meaning they:
 - Do not account for the company's negative impact
 - Do not account for the scale of their restoration efforts
- The report score is measuring for **reporting elements**, therefore a company with 1 small restoration project could achieve a perfect 50 in reporting if the report included all the evaluation criteria.
 - JBS's metric scoring related to restoration projects was the lowest (0), but the report score was 11 points higher than Boehringer Ingelheim's, resulting in a higher overall score.
- The metric scores average the company's scoring **across all metrics**, therefore a company with a small restoration project reporting on 1 metric, but reported very thoroughly, would still score low.

Metric Score Comparisons (Fig. 7)



Key Comparisons

- Consumer Packaged Goods performed **4.5x** better than Manufacturing.
- Financial Services and Airlines were the only two to score better on **socioeconomic metrics** than ecosystem metrics.
- Ecosystem total: 106
Socioeconomic total: 78

Figure 6. Average weighted metric scores on a scale from 0-100 for each industry

Methodology (Fig. 7)

Scoring System: (scale of 0-100)

- **Ecosystem Score**
 - Sum of weighted ecosystem scores in an industry divided by the number of companies in that industry, increased 4x to a scale from 0-100 for comparative clarity
- **Socioeconomic Score**
 - Sum of weighted socioeconomic scores in an industry divided by the number of companies in that industry, increased 4x to a scale from 0-100 for comparative clarity

Case Study #1: High and Low

Nestle and Heineken demonstrate high and low reporting scores in the Consumer Packaged Goods (CPG) industry. These two companies have different market shares and carbon footprints; however, being CPG companies, they both face similar environmental challenges in their respective value chains that they are trying to offset through land-based restoration. From this comparison, we pose questions for future investigation:

1. Are these Reporting Scores predictive of actual environmental and social impacts?

This assessment does not investigate how well or how much these two companies are doing environmentally or socially but instead assesses how well each company is transparently addressing their restoration initiatives in their respective sustainability reports.

2. What would it take for Heineken to improve reporting?

Can a low-reporting CPG company like Heineken learn from a high-reporting one like Nestle?

Nestle	Heineken
Reporting Score (CPG Company scores ranged 30-75)	
74	42
Metrics Mentioned	
10 ecosystem 11 socioeconomic 95% of total metrics	6 ecosystem 6 socioeconomic 55% of total metrics
Adequately Reported Metrics	
43%	17%

Note: for a company to "adequately report" its metrics, its report had to include, at minimum, 3 out of the 6 criteria.

Case Study #2: Before and After Data Assessment

Company A is a major US Airline

- Emitted 19,454,628 metric tons of CO₂ in 2020⁴³
- 75,000 employees⁴⁴
- 5,000 flights per day⁴⁵
- 200 million customers annually⁴⁶

Company A	Company B
Pledge	
Carbon Neutrality by 2030	Carbon Negative by 2030
Restoration Efforts	
Carbon offset program Conservation project	Reforestation Sustainable farming
Ecosystem Metrics	
Metric tons of CO ₂ avoided	Metric tons of CO ₂ removed Acres of land protected Spatial mapping Investment in carbon removal R&D
Socioeconomic Metrics	
Community well-being Natural resource management Jobs created Income to community	Increased income to farmers Number of people with new access to safe drinking water

Company B is a major US Tech Company

- Emitted 14,073,139 metric tons of CO₂ in 2021⁴⁷
- 181,000 employees⁴⁸
- Products: computer software, consumer electronics, personal computers, and related technology services, including data storage

Case Study #2: Before and After Data Assessment

Initial Qualitative Assessment:

At the beginning of the project, the team conducted a qualitative comparison of these companies' sustainability reports. At first, it seemed as if ***Company B was reporting with more rigor than Company A.***

Company A reported minimally on ecosystem services, despite aggressively undertaking avoidance offsets. Company B's metrics were easily available in the sustainability report, making it simple for consumers to track their progress.

Post-Data Analysis Assessment:

After we completed our company "deep dive," it was a surprise to find that **Company A and Company B had similar Reporting Scores: 42 and 50, respectively.** This discrepancy highlighted the need for a standardized reporting framework for reporting and restoration-based impact to be assessed objectively. Without some form of standardization, corporations will continue to struggle to iterate on—and consumers and shareholders will struggle to assess—corporate restoration progress.



VI. Stepwise Approach

Research, data analysis, and a gap analysis between current and best practices culminated in the development of a stepwise approach. These recommendations offer proven ways to achieve restoration-based emissions offsets for WRI and its partner companies. Weighted options, with pros and cons, are provided where applicable.

How can companies achieve net zero with maximum impact for ecosystems and local communities?
How can they instill confidence with the public?



“Coming in with a solution to a single issue when it’s a multi-issue problem just makes the problem worse.”

~Srishti Kochhar, Senior Program Associate For WRI India

(See Appendix H for full interview summary.)

Stepwise Approach

FOR WRI BY MPA-ESP, SIPA
COLUMBIA UNIVERSITY



STEP 01
**Assess
Footprint**



STEP 02
Set Targets



STEP 03
**Establish
Partnerships**



STEP 04
Plan Projects



STEP 05
**Implement
Projects**



STEP 06
**Track
Progress**



STEP 07
**Disclose &
Report**



Stepwise Approach



STEP 01
**Assess
Footprint**

Our Recommendation

- *Assess the company's carbon emissions across Scopes 1, 2, and 3.*
- *Identify opportunities for emissions reductions.*



Step 1. Assess Carbon Footprint

Scope 1:

Direct emissions from sources that are owned or controlled by the company

Scope 2:

Indirect emissions from purchase of electricity, steam, heating, and cooling

Scope 3:

Emissions from the entire value chain, including inputs and waste management

Why is this an important first step?

The three scopes are needed to understand the full impact of a company and its products. Scopes 1 and 2 cover the direct and indirect emissions of a company's operations, including emissions from its plants as well as the energy needed to run those factories. Scope 3, which often accounts for the largest portion of a company's emissions, includes emissions from an entire value chain, including those associated with raw inputs, distribution, and waste management.

Example: PepsiCo

A case study outlining the net zero practices of PepsiCo demonstrates the importance of setting up a net zero strategy that stems directly from the comprehensive carbon footprint of the corporation. Citing PepsiCo as an example, this study asserts that "after assessing the carbon emissions of the entire value chain, enterprises can formulate corresponding emissions reduction targets and strategies."⁴⁹

How does this further advance ecosystem and socioeconomic benefits to stakeholders?

Carbon footprint assessment advances communication of their emissions sources to stakeholders by illuminating the scale of the problem and, therefore, the scale of the work needed to abate these emissions. Through targeted and focused restoration projects, companies ensure the promotion of vital ecosystem services and socioeconomic benefits while aiming to reach their net zero targets.

Stepwise Approach



STEP 02 Set Targets

Our Recommendation

- *Partner with the Science Based Targets Initiative (SBTi) to determine how much and how quickly to reduce emissions.*
- *Publicly disclose targets.*



Step 2. Set Targets

The Science Based Target Initiative assists companies in setting goals and defining pathways to reduce their greenhouse gas emissions. A “science-based” target is both based on the most current climate science and also works towards limiting global temperature increase to 2°C while pursuing efforts to limit warming to 1.5°C.⁵⁰

Why should a company partner with the SBTi?

The SBTi is a well respected framework for setting GHG reduction targets and aids companies in fostering transparency and accountability with investors and consumers. The SBTi also helps companies set achievable, science-based goals. CDP, UN Global Compact and We Mean Business websites publicly recognize the commitments made by companies that work with SBTi. The SBTi states that using their initiative “future-proofs growth, saves money, provides resilience against regulation, boosts investor confidence, spurs innovation and competitiveness.”⁵¹

What is the process?

The SBTi outlines the following steps for setting, validating, and reporting science based targets:

1. Commit: submit a letter establishing your intent to set a science-based target.
2. Develop: work on an emissions reduction target in line with the SBTi's criteria.
3. Submit: present your target to the SBTi for official validation.
4. Communicate: announce your target and inform your stakeholders.
5. Disclose: report company-wide emissions and track target progress annually.⁵²

Can any company partner with SBTi?

No. The SBTi recently announced that they will not accept commitments from companies in the fossil fuel industry.⁵³ (See Page 56 for alternatives.)



Step 2. Set Targets

How does a company determine the percent of emissions that cannot be abated within their operations?

The SBTi works on a case-by-case basis with companies but generally allows for only 5-10% of emission neutralization through offsets. Companies can invest in restoration and conservation in the early stages of their net zero initiative, but these activities cannot replace the initial 90-95% operational reductions target by 2050.⁵⁴ A company cannot use restoration or nature-based solutions to meet near-term SBTi targets unless the company already has land-based emissions in its supply chain.⁵⁵

Does SBTi validate that companies are doing all they can to abate within their operations?

The SBTi does not yet have a robust system for monitoring companies' reporting. "The SBTi is currently undergoing a process to track company progress against targets, and released initial results in our 2020 Progress Report. In the coming year, the SBTi will issue more specific guidance on what companies are required to report annually on a public basis to facilitate this process in the future."⁵⁶

Companies using SBTi:

Cargill and Mondelez are two companies that use the SBTi to set targets, and their pledges illustrate how the SBTi helps companies set clear science-based goals. Cargill's current goals extend until 2030 and focus on reducing emissions, which aligns with the SBTi's prioritization of greenhouse gas emission reduction.⁵⁷ Mondelez has interim greenhouse gas reduction targets in addition to having a net zero by 2050 goal, and Mondelez clearly states what percentage of their emissions will be reduced versus offset in reaching their 2050 net zero target.⁵⁸



Step 2. Set Targets



Option 1

Partner with the SBTi.

Pros: The SBTi is a leader in setting standards for targets and helping companies achieve emissions in line with the Paris Agreement.

Cons: Some companies might not be able to afford the fees, and others might not be eligible.



Option 2

The SBTi is not an option for the oil and gas industry. *Suggestion: Ipieca*

Pros: Ipieca is tailored specifically to the oil and gas industry.⁵⁹

Cons: Ipieca is run in part by oil and gas executives. So they may not have maximum transparency and impact.⁶⁰



Option 3

Alternative: Use a private carbon accountant. *Suggestion: Greenly*⁶¹

Pros: Private accountants are a viable alternative to SBTi.

Cons: Reporting will not induce the same level of confidence or have the same scientific backing as working with the SBTi.



STEP 03
**Establish
Partnerships**



STEP 04
Plan Projects



STEP 5
**Implement
Projects**



Steps 3, 4, 5 “The Partnership Phase”

These steps provide guidance for partnership selection, stakeholder engagement, and navigating implementation challenges.

Companies can simply opt to buy offsets from a trustworthy intermediary, effectively playing the role of a “philanthropic funder,” but we include Steps 3, 4, and 5 for companies who want to engage in deeper, intentional work with their projects.

Based on our data findings, industries with low socioeconomic reporting – Airlines, Pharmaceuticals, and Media – might enhance their reporting and impact by learning from these steps.

Stepwise Approach



STEP 03 Establish Partnerships

Our Recommendation

- *Partner with an organization that meets as many of the recommended criteria as possible.*
- *Ensure that the Partner Organization choice best suits the company's net zero goal.*



Step 3. Establish Partnerships

What are the criteria for choosing a restoration organization?

1. Proven historical success in restoration within the area.
2. Local representation.
3. Has previously partnered with private companies.
4. Already works with a verifier and takes measures to avoid double-counting.
 - a. Alternative: If the NGO is not currently working with a verifier, then the company should take steps to hire a verifier recommended in Step 7.
5. If applicable: partner with organizations in regions where the company has caused the most impact.

Why were these criteria chosen?

Past experience and success in implementing restoration projects can indicate an organization's effectiveness in achieving outcomes. Also, local representation ensures local community involvement, which reduces the possibility of corporate exploitation and helps in identifying what is best for the community and the local ecosystem. Lastly, working with restoration organizations that have a history of partnering with private companies ensures that the organization has an existing framework for collaboration.



Step 3. Establish Partnerships

Why do net zero companies need to partner with restoration organizations?

Without proper knowledge of the community, local language, or geographic area, restoration efforts can be implemented incorrectly. Restoration organizations can be key players in getting the projects up and running, as well as providing first-hand knowledge and expertise on managing projects. Restoration organizations with a history of community engagement can ensure the inclusion of socioeconomic metrics in their restoration efforts, which companies may find difficult to establish on their own. Partnerships can also help companies build trust with local communities, which is critical to ensure the success of projects and the success of carbon offsetting for the company (See Appendix H).



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Step 3. Establish Partnerships



Option 1

Partner with an expert organization with historical success in all the required criteria.

Pros: With proven success and expertise on board, concerns can be minimized or addressed efficiently and effectively.

Cons: Since restoration efforts by companies are still a new concept, it might be difficult to find expert organizations who have experience in the field as well as in collaborating with corporations.



Option 2

Partner with an organization that meets criteria 1 and 2 - With proven historical success in restoration within the area and local representation.

Pros: With two of the most important criteria met, expert partners can ensure high efficiency with the project rollout.

Cons: If the organization has not worked with a private partner before, there could be challenges during collaboration and the delegation of responsibilities.



Option 3

Companies can fund and develop their own initiative instead of partnering with restoration organizations. Companies can hire sustainability experts to create a project implementation team.

Pros: By avoiding the use of an intermediary, the company will be closer to the project, ensuring more direct involvement.

Cons: Access to communities and knowledge needed to make the project conducive to the local environment may be missed. Without an expert who can speak the language, the implementation may prove to be difficult, altering the project's planned timeline.

Stepwise Approach



STEP 04 Plan Projects

Our Recommendation

- *Work with a Partner Organization to determine appropriate restoration projects.*
- *Establish scale, scope, location(s), and timeline.*
- *Engage with local stakeholders.*



“If projects don’t account for local needs and priorities and do not lend adequate considerations to inclusion and equity, local community members may not have confidence and thereby motivation to keep seedlings and saplings alive.”

– *Srishti Kochhar, Senior Program Associate For WRI India*

(See Appendix H for full interview summary.)



Step 4. Plan Projects

What is an “appropriate” restoration project?

Project selection should consider one project—or several—that has the potential to capture carbon on a scale comparable to that of the company's unmitigated emissions and, where applicable, is located within regions and communities that are most impacted by the company's operations. The Partner Organization will consider the number of carbon offsets and the timeline required for the company's reduction target to plan a restoration project that can feasibly meet these goals.

What is an example of meaningful engagement?

Nestle, with its history of deforestation and overexploitation of natural resources, has been incorporating restoration projects into its sustainability strategy and pledge to end deforestation in its supply chains through the 'Forest Positive' strategy.⁶² By aiming to conserve and restore the world's forests and natural ecosystems while promoting sustainable livelihoods and respecting human rights, the company intends to reverse its adverse impact. The Global Reforestation Program aims to grow 200 million trees by 2030 and help conserve and restore natural ecosystems in their production regions while prioritizing Indigenous people and local communities.

63



Source: Istock photos



Step 4. Plan Projects

How can companies engage with local stakeholders and why should they?

Based on the project location, the company and Partner Organization must identify all stakeholders and establish communication channels with members of local communities and organizations. Corporations must collaborate with local communities (including Indigenous communities) through workshops, surveys, and bilateral discussions to determine the length of each project and ensure that any disruption is accounted for, even once the restoration project is completed. Community members can ensure that corporations are measuring meaningful and important data for their livelihoods, well-being, and natural resources. It is also critical for companies to collaborate with local stakeholders as a way to respect local knowledge and expertise.

How are the location and timeline determined?

The Partner Organization will then determine the appropriate location(s) for restoration work. Multiple small to medium-sized projects in various locations are preferable to one large project. This tactic spreads the potential risk of losses and setbacks caused by natural disasters across multiple projects. Restoration projects also need short, medium, and long-term ecological, social and economic goals. To ensure that these goals are met, companies should establish a timeline with data-backed justifications that support feasible progress for a project. Using the UN Decade's on Ecosystem Restoration Restorative Continuum, restoration projects must measure data that shows whether a project is reducing the societal impacts of introducing a new project, improving ecosystem management, repairing ecosystem function, initiating native recovery, and partially recovering native ecosystems.⁶⁴



Step 4. Plan Projects

Permanence

Is the carbon permanently sequestered? ⁶⁵

Additionality

Is the project bringing about new carbon sequestration? ⁶⁶

Leakage

Is the project causing more degradation elsewhere? ⁶⁷

What are important ecological considerations?

Restoration projects often encounter unintended ecological setbacks and challenges. The company and its Partner Organization must take measures to avoid conversion of natural ecosystems, emissions from tropical deforestation, and double counting. Projects must often prove permanence, additionality, and avoided leakage to qualify for third-party verification.

Permanence: This means that carbon emissions sequestered by the project cannot be re-released into the atmosphere.

Additionality: Additionality occurs when there is a net gain in greenhouse gas reductions from a project that would not have occurred without the project. It is not additional if a reduction would have happened without the project.

Leakage: Carbon leakage is the increase of greenhouse gas (GHG) emissions (from activities such as land degradation or deforestation) in one region that occurs in response to GHG-reducing activities elsewhere, such as land conservation or restoration.



Step 4. Plan Projects



Permanence

Recommendation:

Projects should account for potential natural disasters that may damage restoration areas and effectively remove carbon sequestered. It is recommended to bundle multiple smaller projects as opposed to depending on one large restoration project. Additionally, projects can adjust their carbon credit compensation by some factor to create a “buffer” for potential losses since a project may not achieve its entire projected outcome.⁶⁸



Additionality

Recommendation:

Projects may prove additionality by first establishing a baseline and comparing new carbon sequestered to the baseline measure.⁶⁹



Leakage

Recommendation:

This is the most difficult to monitor. Leakage is often most easily avoided when there are national-level baselines. However, in the absence of national carbon tracking, projects can make efforts to avoid leakage by maintaining engagement with subnational trends surrounding the project area.⁷⁰



STEP 05
**Implement
Projects**

Our Recommendation

- *Provide funding for on-site staff.*
- *Set short and long-term goals.*
- *Identify and establish communication channels between the company and on-site staff.*



Step 5. Implementation



"Field trip to Parque Nacional Natural Farallones de Cali" by World Resources is marked with CC BY-NC-SA 2.0.

How do companies determine how much funding is necessary?

Companies can take two approaches:

1. Commit a fixed amount for all net zero related initiatives to determine the options and timeframe for restoration projects available.
2. Decide which restoration projects are of interest or priority and then decide the scale and number of projects. This will then determine the amount of funding necessary. To determine the cost of the project, consider these factors:
 - a. Scope
 - b. Number of personnel required to complete the project
 - c. Equipment and materials required to achieve restoration and track progress
 - d. The project's timeframe

How do companies determine short and long-term goals?

1. Short-term: include performance metrics related to successful implementation and onboarding of personnel.
2. Long-term: include measurements of ecosystem services and socioeconomic benefits once the project is more mature.



Step 5. Implementation



Who may be involved in the implementation process?

1. **Restoration Project Managers** are responsible for on-site monitoring, measurement, and maintenance. These on-site responsibilities could include tasks such as watering, weeding, etc.
2. **GIS and Mapping Specialists** will monitor the implementation process by remote sensing. Remote sensing can be done from anywhere.
3. **An Environmental Stewardship Team Officer** employed by the net zero company will ensure accurate data reporting. The Stewardship Team Officer can also act as a diversity, equity and inclusion advocate; taking into account the well-being of local employees involved in implementation to ensure incidents of exploitation or mistreatment are avoided.



Step 5. Implementation



"Agroecology" by Global Justice Now is marked with CC BY-NC 2.0.

What challenges exist in the implementation process?

1. Delays in recruitment and training of on-site personnel
2. Learning curve among on-site personnel that can result in improper handling
3. Difficulties with measurement if tools or protocols are unfamiliar

There are also other uncontrollable risks and challenges that can negatively impact the implementation process. For example, the effects of climate change, such as storms and wildfires, can hinder the progress of restoration efforts.⁷¹ This reiterates the mission of these restoration projects as part of a wide portfolio of climate solutions and serves as a reminder to embed resiliency measures into the projects, if possible. In addition, monitoring, accounting, proof of additionality, and the risk of leakage that could occur due to the lack of clear and enforceable standards in the current environment could prove to be challenging to the project implementation, which can ideally be overcome through consistent monitoring and reporting.



STEP 06
**Track
Progress**

Our Recommendation

- *Track and record 22 baseline metrics.*
- *Include additional project-specific metrics to maximize impact.*



“Branch outside of carbon sequestration, but acknowledge the challenges with reporting other ecosystem benefits.”

~Professor Ralph Schmidt, Earth Institute at Columbia University

(See Appendix E for full interview summary.)



Step 6. Track Progress

Why were these 22 ecosystem services and socioeconomic metrics chosen?

These metrics are commonly used and have the potential to demonstrate impact on local communities and ecosystems. Metrics not included in this list were determined too niche, infrequently reported, or challenging to measure or quantify.

Should companies report on additional metrics?

Yes, companies should work with their Partner Organization to establish project-specific metrics related to the initial natural landscape and restoration techniques used. Additionally, consider the company's operations and what is valued to include company-specific metrics.

Temporal and spatial considerations:

- Establish the baseline, target and observed progress for every metric.
- Provide spatial details (e.g., spatial mapping) to visualize restoration progress.

Ecosystem Services

- Biodiversity
- Trees/Seedlings Planted
- Carbon Sequestered
- Hectares/Acres Restored
- Water Quality
- Reduction of Freshwater Withdrawal
- Soil Health
- Crop Yield/Productivity
- Use of Chemical Inputs
- Progress in Vegetation Class
- Spatial Mapping

Socioeconomic Metrics

- Conservation Investment
- Forest Protection Investment
- Community Well-Being
- Income to Community Members
- Community Resource Management
- Jobs Created
- Job Training
- Farmers Trained
- Farmers Transitioned to Sustainable Practices
- Opportunities for Women
- Youth Programs / Empowerment



Step 6. Track Progress



Option 1

Track any applicable metrics from the 22 baseline metrics provided, as well as additional metrics that are suitable to the chosen project.

Pros: This strengthens the positive impact on ecosystems and communities. Companies can actively compare different restoration projects with normalized progress changes.

Cons: Tracking certain metrics might require extra training, expensive equipment, and technicians.



Option 2

Track only 22 baseline metrics where applicable.

Pros: Monitoring the baseline metrics will encourage both ecosystem and socioeconomic benefits beyond just carbon sequestration.

Cons: By not addressing project-specific metrics, companies fail to consider the restoration projects' full impact.



Option 3

Track a time scale of carbon sequestration gains and losses with multiple time periods to ensure transparency.

Pros: This option is the easiest to implement.

Cons: Excluding metrics beyond carbon could lead to unintended negative impacts on ecosystems and local communities and leave the company susceptible to greenwashing claims.



STEP 07
Disclose & Report

Our Recommendation

- *Verify carbon data with a third-party verifier.*
- *Publish reports and verify metrics according to the recommended third-party frameworks.*
- *Ensure accessibility and transparency.*



Step 7. Disclose & Report

Why partner with third-party carbon verifiers?

Third-party carbon verifiers add an extra layer of credibility to the corporation's sustainability reports. Further, they provide standardized protocols to quantify the carbon intake of restoration projects and account for critical concerns of permanence, additionality, and leakage.



The Verified Carbon Standard (or Verra) is the world's most widely used verification standard in the voluntary carbon market. Verra's rigorous rules ensure that greenhouse gas credits are "real, additional, permanent, independently verified and transparently registered."⁷² Verra uses a pooled buffer account, the non-permanence risk tool, and a leakage assessment requirement to account for project risks.⁷³



The Gold Standard creates requirements and methodologies to measure and verify a project's impact. The Gold Standard ensures permanence and baseline certainty, and will only partner with projects that control for leakage. Other safeguards of the Gold Standard include: protecting against soil erosion & degradation, ensuring access to food, livestock well-being, and conservation.⁷⁴



The Climate Action Reserve (CAR) is an offset project registry that "lists offset projects, collects project reporting documentation, facilitates verification, and issues Registry Offset Credits (ROCs) for offset projects being implemented using an Air Resources Board (ARB) Compliance Offset Protocol."⁷⁵ The CAR only works in the USA.



The American Carbon Registry "oversees the registration and verification of carbon offset projects following approved carbon accounting methodologies or protocols and issues offsets on a transparent registry system."⁷⁶



Step 7. Disclose & Report

What are the recommended third-party reporting frameworks?

Task Force on Climate-related Financial Disclosures (TCFD): supports informed capital allocations; pushes effective climate-related disclosures to prompt informed decisions and awareness in the financial sector.⁷⁷

Sustainability Accounting Standards Board (SASB): enables companies to communicate financially-material sustainable information to their investors; offers industry-specific benchmarks and guidelines.⁷⁸

Global Reporting Initiative (GRI): enables any organization to assess and report their impacts on the economy, environment, and people comparably and credibly; relevant for many stakeholders, including investors, policymakers, capital markets, and civil society.⁷⁹

Carbon Disclosure Project (CDP): measures the environmental disclosures of organizations for their critical stakeholders and scores companies based on their disclosures. Scores aim to incentivize companies to improve their environmental transparency and take action against climate change.⁸⁰



Which frameworks should be used?

Use as many of these frameworks as possible. Pepsico's sustainability reports achieve high levels of transparency, and their reports use four frameworks: GRI, CDP, SASB, and TCFD.

How should information be disclosed?

A variety of formats can be helpful: interactive, animated web pages, sustainability pdf reports, and press releases. For optimal accessibility, it is ideal for information to be available through the company's website and located within "three clicks" from its home page.

Who is responsible for reporting?

Dedicated reporting specialists within the company will help streamline information sources, data collection efforts, and ultimately, enhance detail accuracy.



Step 7. Disclose & Report



Option 1

Use all four frameworks

Pros: Each framework varies slightly. Combining all four allows companies to maximize the information they report and enhance the depth of their performance assessments.

Cons: This could mean greater managerial and time investments to carry out multiple reporting frameworks.



Option 2

Follow the GRI framework

Pros: The audience for this framework includes all stakeholders. GRI is useful for its flexibility as it allows organizations to focus on relevant standards based on their specific needs. This is the most commonly used framework.

Cons: Using only one framework will limit the depth of detail in the report.



Option 3

Follow the SASB Framework

Pros: SASB offers industry-specific metrics that allow for more enhanced comparisons within industries and normalizes for cross-industry studies. This makes it easier for companies to determine which disclosures are most relevant to their financial performance.

Cons: This framework is geared more toward investors, which could limit other stakeholders' (i.e. customers, local communities, etc.) access to key information.



VII. Discussion

What are potential options for next steps for WRI?

Future Considerations for WRI

01

What project considerations exist for thoughtful and effective integration with local communities?

Our research had limited access to those who are most impacted by net zero restoration projects, and it will be critical to bring them into the process, considering that projects will affect them directly and these communities have autonomy over these areas. Additionally, restoration efforts themselves are complicated to implement, and projects will never go exactly as planned. This makes it crucial for a company to frequently communicate with its stakeholders, establish regular check-ins on progress, and adjust its efforts as needed.

02

How might net zero trends change in the future?

Our analysis reflects reports from 2019 to 2020, and the findings will shift as more sustainability reports are released and more projects targeting net zero get implemented. This is a rapidly changing landscape where many actors, including regulators, the private sector, local stakeholders, and public pressure, contribute to net zero trends.

Future Considerations for WRI

03

Will these recommended frameworks bridge the gap between net zero companies and restoration partners?

In our research, it seemed that the Partner Organization often decides how to measure project progress. Whether those metrics ultimately make it into the company's sustainability report varies greatly across companies. Some of our heavily researched companies required multiple degrees of separation (analyzing their partners' reports) to determine what metrics were being tracked. Our hope is that if a company sees the value in reporting and publishing metrics as a means to garner more trust from consumers and investors, it will take a greater interest in restoration project metrics and bridge the information gap by making these metrics more available.

04

Why are Consumer Packaged Goods (CPG) companies reporting so well in comparison to other industries?

Among the nine industries chosen, CPG is the clear leader in rigor of reporting. One possible reason for this is that compared to other industries, a greater number of CPG companies met the two criteria for inclusion in our company deep dive: (1) having a net zero pledge and (2) using land restoration offsets. Another possible explanation is that CPG supply chains consist of land-based operations, so these companies may have more immediate access and familiarity with farmers and landowners involved in restoration projects, leading to more robust reporting.

Future Considerations for WRI

05

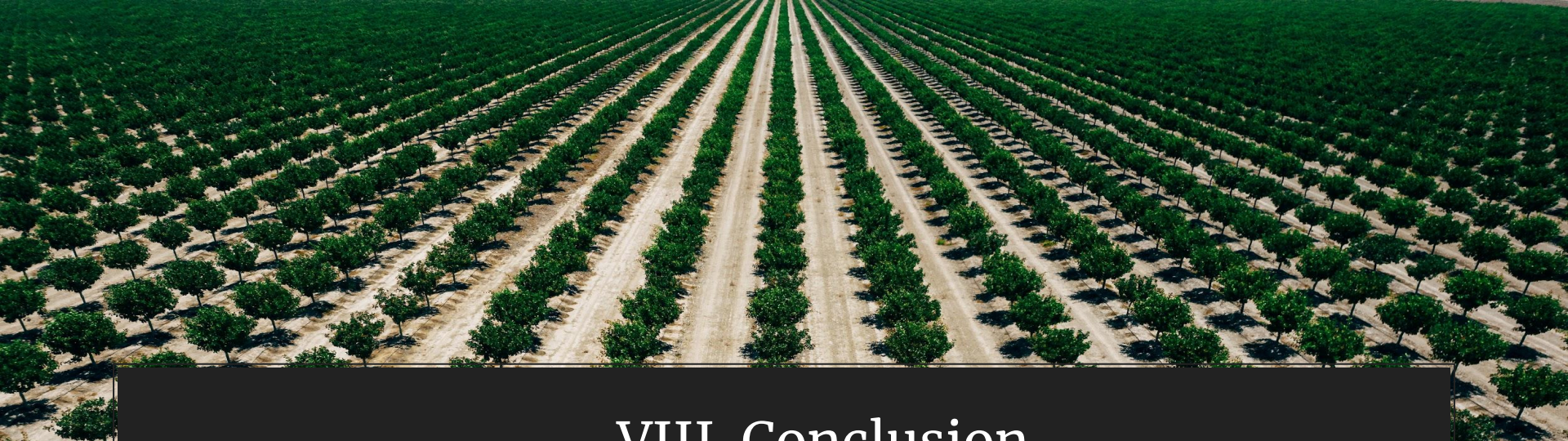
Would standardized reporting result in greater impact?

While our framework is robust in the number of metrics analyzed and in measuring the thoroughness of reporting, it does not weigh a company's final score relative to its overall emissions and impact. We observed that a high reporting score does not always equate to high environmental and socioeconomic impact. Also, under-reporting companies might be achieving positive real-world results but have no clear means to report those impacts. However, more transparency and information can lead to higher accountability for companies and improved projects, which can mean better outcomes for the people and the planet.

06

How can companies learn to be better funders?

With 3.2 billion people affected by land degradation⁸¹ and 10 million acres deforested annually⁸², net zero companies will have an important role to play in this relatively new landscape of restoration-based offsets. Put simply, these companies need offsets, and restoration projects need cash flow. This relationship can be mutually beneficial if diligence to the local communities and ecosystems is maintained. If companies use our recommendations and frameworks to measure project progress, they can also use measured outcomes to determine their priorities for restoration and social initiatives, the associated risks for the company, and assess the effectiveness of their funding.



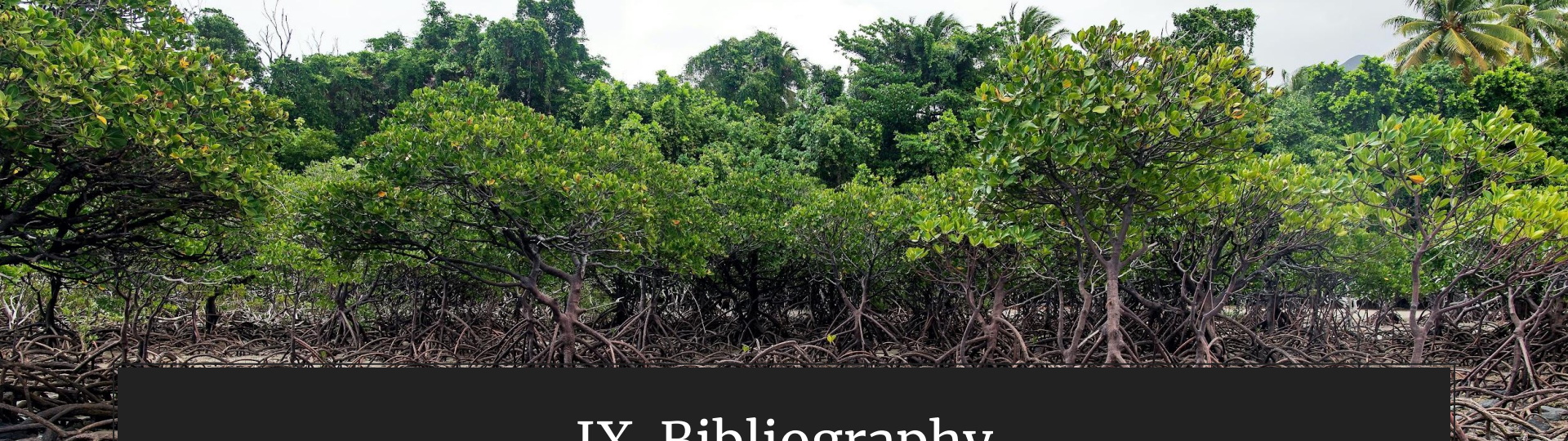
VIII. Conclusion

Conclusion

With a deep dive into the sustainability reporting trends and ecosystem restoration efforts of companies across the world, this report is meant to analyze the current landscape of net zero efforts and provide WRI with recommendations to help companies meet their net zero targets. While the ambitious goals and pledges made by organizations deserve recognition, the analysis of their sustainability reports shows that qualitative statements about progress often lack the numerical evidence to support those claims. Carbon sequestration and related metrics are commonly mentioned, while other ecosystem services and socioeconomic metrics are significantly lacking across various industries. Realizing that no restoration project will be successful without tracking effective socioeconomic metrics, there is a need to report them along with the company's other sustainability efforts. The irony of the biggest emitters having the most rigorously reported metrics is not unnoticed, pointing to the need for stringent standards and monitoring methods to ensure accountability and avoid greenwashing.

The study leaves us with several questions, which we hope will be addressed when this project is further developed. For example, the stepwise approach recommends actions by corporations, usually from high income countries, which can generate a power imbalance. Would this process be more equitable if local communities have full ownership and initiation of projects and carbon credits, as opposed to external forces entering the space of local communities?

With the landscape of corporate sustainability changing rapidly and regulations shifting, this landscape analysis may need an update in the near future. The infographics and the stepwise approach presented in this report can inform WRI and its partner companies about what is lacking and what needs to improve under current conditions, while the recommendations can hopefully support the journey to net zero and a greener future.



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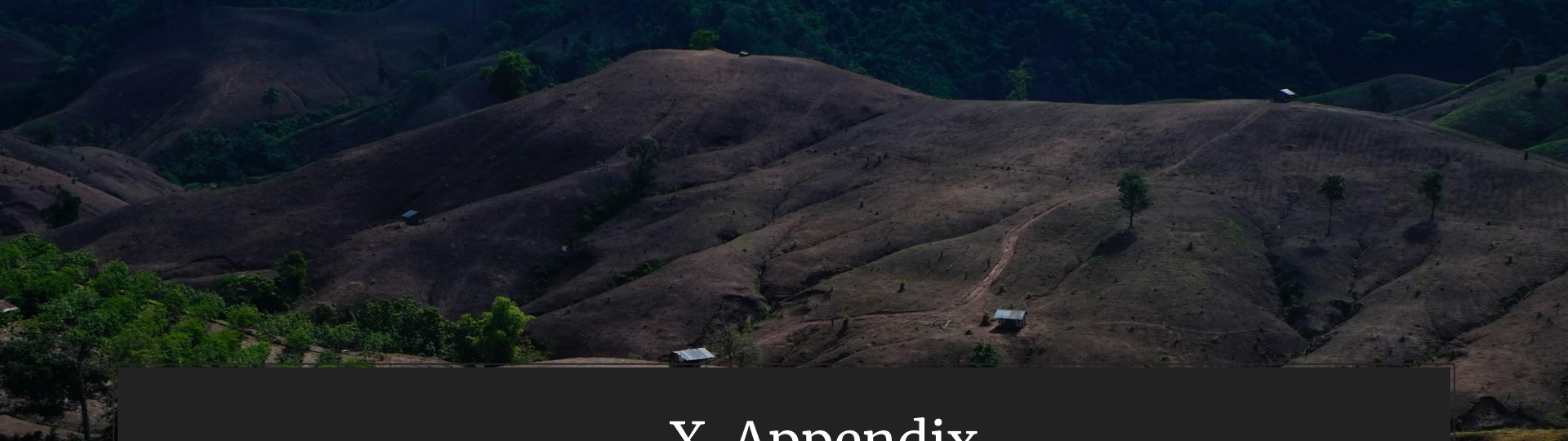
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X. Appendix

Appendix A: Data

Restoration for Net Zero_Data_Columbia.xlsx

- | | | |
|--------------------------------|---|--|
| <i>Frequency_Formulas Tab</i> | { | ○ Figure 1: Frequency of Ecosystem Services Metrics |
| | | ○ Figure 2: Frequency of Socioeconomic Metrics |
| | | ○ Figure 3: Frequency of All Reported Metrics |
| <i>HeatMap_Infographic Tab</i> | { | ○ Figure 4: Rigor of Reporting by Industry |
| <i>HeatMap_Formulas Tab</i> | { | ○ Figure 5: Metric Reporting Trends |
| | | ○ (not featured): Heatmap of Company Scores |
| <i>TreeMap_Formulas Tab</i> | { | ○ Figure 6: Company Reporting Score |
| | | ○ Figure 7: Metric Score Comparisons |
| <i>Codebook Tab</i> | { | ○ (not featured): Codebook |

Restoration for Net Zero_Infographic_Columbia.pdf

- **(not featured, attached separately):** Infographic

Appendix B: Pledge and Report Evaluation

This information was researched and evaluated in the spreadsheet for each company's report:

- The company's net zero pledge
- Does the pledge reference national or global goals?
- What national or global goals are referenced?
- What is the stated end goal year?
- Does the pledge include an interim target prior to the end goal year?
- Is there a publicly available sustainability/ESG/net zero progress report?
- Provide link to the most recent report
- Year released
- Was the most recent report for the prior fiscal year?
- Is the reporting time frame stated?
- What is the reporting time frame?
- Does the report identify operational risks/opportunities?
- Does the report identify regulatory risks/opportunities?
- Does the report include the company's carbon emissions?
- Does the report follow a standard reporting framework?
- Reporting framework used
- Is the report third-party verified?
- Third-party verifier(s)
- Are third-party verifier(s) listed?
- Number of third-party verifiers
- Does the sustainability or progress report appear in the top 3 results from a Google search?
- Can you locate the progress report within 3 clicks from the company's homepage?
- Is there a mention of land, restoration, or reforestation?
- Is there a qualitative report of a land-based project?
- Is the company part of an industry net zero or sustainability coalition/initiative?
- Is a specific project partner(s) listed?
- Restoration project partner(s) listed

Appendix C: Primary Interview Questions

Questions for Scientists

- (1) What are some common metrics used to measure performance of projects?
- (2) To demonstrate clear ecological benefits from restoration projects, what needs to be measured?
- (3) Is this/are these easy to measure?
- (4) Do these metrics require additional technology and labor to monitor?
- (5) What challenges exist for reforestation and restoration work?
- (6) What challenges exist for measuring progress in reforestation and restoration projects?

Questions for Restoration Partners

- (1) What are your primary objectives for projects related to restoration and reforestation?
- (2) What challenges do you encounter during the implementation of these projects?
- (3) What indicators are you measuring on site, if any?
- (4) If you do not measure any indicators, what has inhibited you from doing so?
- (5) How do you currently report your progress to managers or other points of contact?
- (6) How many people are engaged with the restoration work?

Questions for Corporate Sustainability

- (1) What information are you most interested in learning from your net zero investments?
- (2) What are you most interested in communicating to your customers through your sustainability report?
- (3) What indicators do you measure to evaluate your company's sustainability performance?
- (4) How does your company plan to meet its sustainability targets? (through clean energy investments, nature-based solutions, integrated solutions, etc.)

Appendix D: Interview Summaries

- (1) **Ralph Schmidt** is a forestry expert who has worked for many research institutions from the FAO in Rome to the UNDP. The main takeaway: branch outside of carbon sequestration but also acknowledge the challenges with reporting other ecosystem benefits.
- (2) **Jo Giessler** is an ESG professional for a global law firm whose insights involve the problem with offsets in supporting a net zero pledges. Giessler emphasized that offsets are becoming less acceptable in corporate efforts because associated projects may not produce its intended outcomes.
- (3) **Al Iannuzzi** is VP of Sustainability, Global Corporate Citizenship & Sustainability at Estée Lauder. Iannuzzi mentioned that concerns about permanence and accounting have led the company to consider restoration projects with more caution.
- (4) **Srishti Kochhar** is Senior Program Associate for Sustainable Landscapes & Restoration for WRI India. Kochhar discussed challenges with tree planting in certain environments and the need for local stakeholder buy-in.
- (5) **Bruce Usher** is a professor at Columbia Business School who specializes on the intersection of climate change and business. Usher reiterated that companies are most interested in choosing the cheapest, lowest-risk projects.
- (6) **Yashodhan Gharat** is Country Director of Malawi at One Acre Fund, who specializes in agriculture and agro-ecology projects. Gharat discussed the economic and environmental considerations for restoration projects.
- (7) **Anonymous** is a land restoration professional and GIS expert at a major consumer packaged goods (CPG) company. This individual discussed the complications with existing reporting frameworks and challenges within their CPG supply chain.

Appendix E: Ralph Schmidt Interview

Professor Ralph Schmidt is a forestry expert who has worked for many research institutions ranging from the FAO in Rome to the UNDP. He specializes in ecosystem services for forests, specifically tropical climates. During this conversation, he discussed how the metric of carbon sequestration is most common and perhaps overemphasized when there are also other ecosystem services to consider, including water conservation, biodiversity recovered, etc. Schmidt also reviewed the requirements for reforestation projects such as additionality, permanence, no leakage and verification. The main takeaway here is to branch out beyond carbon sequestration and also acknowledge the challenges of reporting other ecosystem benefits. As an example, Schmidt asked “What is the value of a butterfly?” signaling that recovered biodiversity is challenging to measure and value.

Appendix F: Al Iannuzzi Interview

Al Iannuzzi, the VP of Sustainability, Global Corporate Citizenship & Sustainability, discussed his work at Estée Lauder and provided a high-level overview of the three levers of their sustainability strategy: (1) sustainable operations, (2) supply chain, and (3) product and innovation. The company is newly stepping into restoration projects as a means to offset Scope 3 emissions, but this is difficult as it involves influencing suppliers. Estée Lauder is involved with some nature-based solutions, such as forestry in Massachusetts, and currently focuses more on avoiding deforestation than planting new trees. The company's philanthropic arm has created partnerships with NGOs to promote restoration projects.

For example, they partnered with Conservation International on a forestry project in Peru that tracked women's empowerment opportunities. They also partnered with BSR on the "HER" project in Indonesia and South Africa about which Iannuzzi said, "When you can conserve an area and help women benefit from it, that's a win-win." Iannuzzi also mentioned concerns over permanence, poor accounting, and greenwashing, which has led the company to approach restoration project proposals with caution from an investment standpoint. He said, "I'm cautious about it, and I'm all in on environmental protection, but if we are going to ask a company to buy a forest, what is it going to do in the long run?"

Appendix G: Jo Giessler Interview

Professor Jo Giessler is an ESG professional for a global law firm and her insights involve offsets and how they can be problematic in supporting a net zero pledge. She reiterated the need for companies to reduce emissions first, remove what can be removed, and offset the remaining emissions with credible restoration projects. Jo emphasized that offsetting through restoration efforts is becoming less acceptable because of the danger that the project will not have the intended effect in the required timeframe, and companies may run into trouble with their net zero pledges if they rely heavily on offsets.

Appendix H: Srishti Kochhar Interview

Srishti Kochhar is a Senior Program Associate for WRI India's Sustainable Landscapes & Restoration Program. She discussed the challenges with restoration projects in India and their potential overlaps in other parts of the world. Firstly, regarding impact evaluation, one must consider if the right indicators, across socioeconomic and biophysical considerations are in place, especially if standardization is lacking. Secondly, the classification of land can be problematic in India (for ex, grasslands/savanna ecosystems incorrectly categorized as wastelands), which can lead to tree-planting that may not be amenable to local ecosystems. Also, target-driven mass-plantation projects in India tend to not take existing local conditions into account. This can result in poor survival rates of saplings.

Another major consideration is local community buy-in; if projects do not account for local needs and priorities, and do not lend adequate considerations to inclusion and equity, community members may not be motivated to keep seedlings and saplings alive. It can be an attractive option to restore larger farms over smaller farms from an impact perspective. However, Kochhar cautioned that restoration projects must be designed in ways that extend maximum socioeconomic benefits to the most marginalised communities. Finally, Kochhar discussed the importance of grounding restoration planning in robust, participatory research through tools such as the Restoration Opportunities Assessment Methodology, which was adapted by WRI India for the Indian context and accounts for issues around governance, ecosystem services, and livelihoods, among others. Kochhar also commented on the components of a stepwise approach that should include geographical context (where the project is located and what species are being planted), community confidence and buy-in, and a clear understanding of where benefits are going.

Appendix I: Bruce Usher Interview

Bruce Usher, a professor at Columbia Business School who focuses on the intersection of climate change and business, explained the challenges surrounding restoration: monitoring, accounting, proof of additionality, and the risk of leakage which occurs when deforestation simply shifts from a protected area to an unprotected one. He believes that solutions will come in the form of clear and enforceable standards, ideally global standards, and consistent monitoring and reporting. A key takeaway from this meeting is how a company considers options for fulfilling net zero commitments; there is an incentive to choose the cheapest projects, projects that yield the highest number of carbon credits, and projects with the highest possible level of certainty to produce carbon credits.

Appendix J: Yashodhan Gharat Interview

Yashodhan Gharat, Country Director of Malawi at One Acre Fund (1AF), has served in multiple roles to implement, measure, and manage impact from development projects, specifically surrounding agriculture and agro-ecology projects. One Acre Fund is exploring carbon offsets on a trial basis with a major Dutch Bank Gharat mentioned that a successful project addresses three things: adoption of proposed practices, high survival of planted species, and high dollar impact, which they measure through comparisons with non-1AF farms. Other metrics that 1AF will prioritize further in the pilot include: carbon sequestration, soil health, dollars per hectare added to the soil, and others. Another more specific metric that Gharat emphasized was the opportunity cost of what could have been in place of the project; it is essentially a cost-benefit analysis of what benefits can be drawn from the area in question.

Seedlings for this pilot are chosen based on host agroecology and ecosystem and what tree species might benefit farmers most. For the latter, an example could be a mix of species like-avocado and pine trees that are popular because avocado trees yield fruit that can be sold and pine trees provide wood for non-firewood value-add products. If the pilot program is successful, the organization will expand and try to incorporate other carbon sequestration payment mechanisms (like soil carbon sequestration) into 1AF's carbon credit program to provide additional income to farmers. In regards to challenges, he mentioned that the main challenge for these projects is verification of impact because this requires additional on-ground training or technology that isn't accessible. He also mentioned that in places such as Malawi, monitoring can be difficult because of the comparatively smaller land size and small scale of projects.

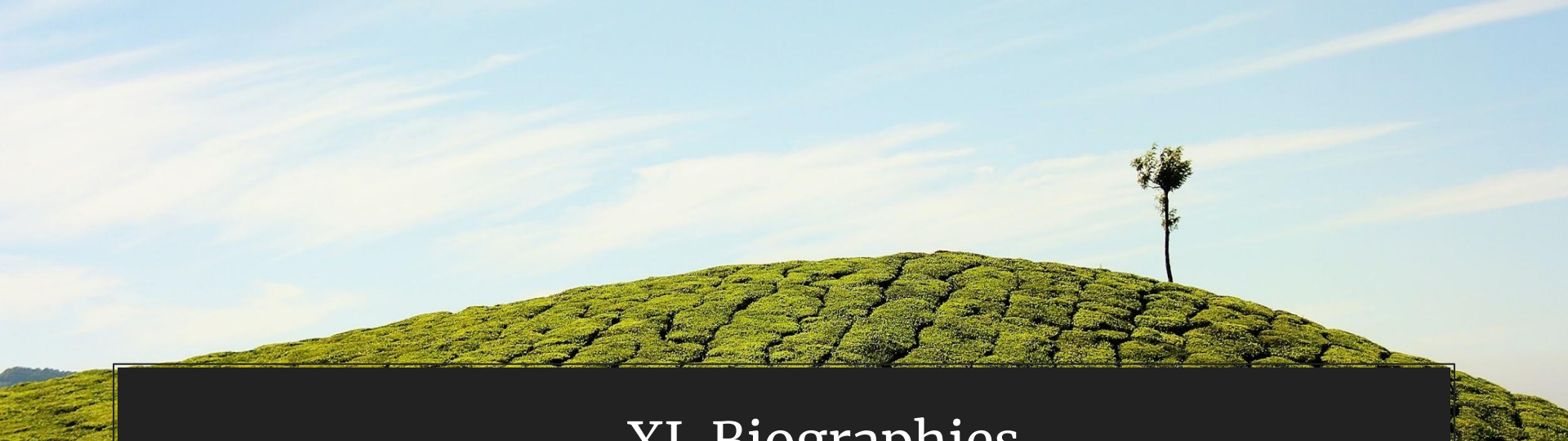
Appendix K: Anonymous Interview

A land restoration professional and GIS expert at a major consumer packaged goods (CPG) company with years of experience working in non-profit organizations and with governments spoke about their background in GIS sensing, map making, spatial analysis and integrating ecosystem services into decision-making. At the CPG company, the individual is currently working on achieving zero deforestation for a commodity that is central to their business. Farmers often want to deforest because the land is not producing, and they want to expand the land that they can grow on. Accounting and accountability can be difficult in this space because the commodity is sold from farmers to farm organizations, then sold to suppliers, which then sell directly to the company.

The individual also emphasized the need for credible data and mentioned that currently, reporting frameworks can be very vague. For example, the GHG Protocol can be confusing and produce different outcomes; the individual mentioned that two groups were evaluating the same farms and calculated different reporting numbers. That aside, currently, the company is only reporting emissions and not on carbon removal or sequestration as per current best practices. The individual emphasized the importance of NGOs and others in setting “hard rules” for the processes surrounding restoration, accounting, and reporting.

Appendix L: Full List of Literature Reviewed Companies

- | | | |
|----------------------|-------------------------|------------------|
| 1. Allbirds | 13. Clifbar | 25. Netflix |
| 2. Amazon | 14. Dell | 26. Patagonia |
| 3. American Tower | 15. Delta Airlines | 27. PepsiCo |
| 4. Apple | 16. Eddie Bauer | 28. Pottery Barn |
| 5. Asia Pulp & Paper | 17. Enterprise Holdings | 29. REI Co-op |
| 6. Avon | 18. H&M Group | 30. Salesforce |
| 7. Bank of America | 19. Hilton Hotels | 31. Shell |
| 8. Blackrock | 20. Hopper | 32. Timberland |
| 9. BMW | 21. Ikea | 33. UPS |
| 10. Burberry | 22. L'Oreal | 34. Verizon |
| 11. Canva | 23. Microsoft | 35. Volkswagen |
| 12. Cargill | 24. Nestle | 36. Walmart |

A landscape photograph showing a green, terraced hill under a blue sky with a single tree on the ridge. The hill is covered in a dense, green, textured vegetation, possibly a tea plantation. A single, tall, thin tree stands prominently on the right side of the ridge. The sky is a clear, light blue with some wispy clouds. The overall scene is peaceful and scenic.

XI. Biographies



Aaron Zweig
Deputy Manager

Aaron grew up in Hong Kong and graduated from Bowdoin College in 2018, where he studied psychology and international relations. Prior to his masters in Environmental Science and Policy at Columbia University, Aaron worked as a data analyst in the marketing industry. Aaron then pivoted into the environmental sector, where he is passionate about ESG, corporate sustainability reporting and strategy, conducting and analyzing GHG inventories, and supply chain management.



Avery Kayle
Research Lead

Avery Kayle graduated from Barnard College in 2019, where she studied Environmental Policy and Economics. She came to SIPA after working for two years as a field organizer for various environmental non-profits, honing skills in stakeholder engagement, public-speaking, and written communication. Since starting her MPA in June 2021, she has become immersed topics including ESG investing and corporate sustainability. She has also served as the Teaching Assistant for Sustainability Metrics and Sustainability Management.



Anupama K. Joseph
Research/Writing

Anupama completed her B.S. degree in 2019 with a triple major in Environmental Science, Chemistry, and Zoology. She has held multiple roles in the sustainability space at established organizations such as UNDP, TERI, Zoological Survey of India etc. Her technical writing and science communication skills have been harnessed through her leading the preparation of various reports and scientific papers both during her early work, as well as at her current position as a Research Assistant for Carbon Management Research Initiative (CaMRI) at the Center for Global Energy Policy.



W. Briana Fowler-Puja
Editor/Data

Briana has a B.S. in Mathematics and a B.A. in Asian Studies. She also has experience programming in Java, C++, and R, and has basic knowledge of GIS software. Prior to her master's program, Briana lived in Japan and taught English. Since starting the MPA in Environmental Science and Policy, she has been involved in various projects including participating in a consulting project for an EV charging company and managing a group studying the Break Free From Plastic Pollution Act of 2021.



Carolyn Wang
Data/Research

Carolyn is from Shenzhen, China. She holds a BS in Environmental Sustainability and Science from Cornell University. She is passionate about clean energy transitions and marine biology.



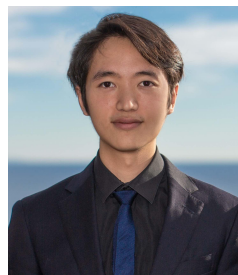
Jasmine Chiu
Outreach Lead

Jasmine is from Virginia and has a prior academic background in Public Policy and Chinese. She comes from 5 years of experience in the tech industry working for Oracle and an energy software company that tracks building performance. During her time at Columbia, she has done research on clean energy financing and carbon offsets for the Center on Global Energy Policy. She is passionate about sustainable food systems and nature-based solutions for decarbonization.



Evelyn Vivar
Manager

Evelyn Vivar was born and raised in Queens, New York. In 2020, she graduated from Wellesley College with a Bachelor of Arts degree in Environmental Studies and Latin American Studies. Upon graduation, she interned at the Youth Climate Collaborative and used her research, interpersonal, and communication skills to create an interactive map that connects youth with environmental organizations. Evelyn is passionate about food sovereignty, sustainable agriculture, and environmental justice.



Kevin Loo
Data

Kevin has an academic background in business administration and applied mathematics. His current venture, Endex App, is a broker-agnostic social trading platform that lets users create, publish, and copy custom stock indexes using their existing brokerage accounts. By eliminating barriers to custom indexing, he hopes to reduce greenwashing by facilitating ESG related dialogue among a larger group of investors and stakeholders rather than relying on corporate self-reporting as the primary data source.



Matthew Horne
Data Analysis Lead

Matthew graduated from Brigham Young University in 2019, where he studied Political Science and Environmental Science. As an analyst, Matthew has produced varied written content and data visualizations for blogs, social media platforms, subscriber email and other published material. He is passionate about ESG, corporate sustainability strategy, and supply chain management. After graduating he is hoping to pursue a career in either the apparel or cosmetics industries.



Meredith Spector
Presentations Lead

Meredith has over a decade of experience in the fashion industry, but has transitioned to strategic sustainability management to help define and assure best ESG practices for the private sector. She has experience in life cycle assessment, greenhouse gas accounting, and supply chain operations and impact assessment. Meredith has a BS in Communication from Boston University, an AAS in Fashion Design from FIT. She is a SIPA Environmental Fellow and a Bard College C2C Fellow.



Megan Ort
Report & Briefing Lead

Megan is a passionate collaborator who thrives in task managing, presentation, and communication roles. Megan has over ten years of experience as a musical theater artist, performing on Broadway and international tours. Previously, Megan worked as a sales agent for Green Mountain Energy, a wind and solar electricity company and currently works for National Shingles Foundation. Service and advocacy have been central to her pursuits, and she is most interested in nature-based solutions and environmental justice.



Niqat Patel
Data Visualization Lead

Niqat completed her Bachelor's degree in 2018 in Environmental studies and sociology. Since then she has worked in disaster preparedness and climate mitigation at the Aga Khan Agency for Habitat (AKAH). She was the youngest member on the Government of India and the World Bank's National Seismic Risk Mitigation Programme, wherein she gained experience in conducting social impact assessments, designing management plans and stakeholder engagement.