

A CASE STUDY REVIEW OF THE ACTUAL AND POTENTIAL  
ROLE THAT MULTINATIONAL CORPORATIONS PLAY IN  
GLOBAL MANGROVE GOVERNANCE

by

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## **Executive Summary:**

Working to update the United Nations Food and Agriculture Organization report from 2017 titled “*Law, Policy, and Governance of Mangroves in Small Island Developing States*” revealed that mangroves are not only important to these small island nations, but to all members of the global community with coastlines. When governments choose to invest in mangrove related projects they are essentially targeting Sustainable Development Goals 13, 14, and 15: climate action, life below water, and life on land. The client for this project, the Nicholas Institute was interested in further understanding the ways in which non-government actors were contributing to funds for mangrove related projects.

Coastal communities benefit greatly from the presence of mangroves as they provide protection from hurricanes, are a source of wood for timber products, and act as nursery grounds for fishery dependent fish species. Mangroves are also a great candidate for carbon offset projects as they have a large capacity for carbon storage compared to other vegetated ecosystems. Acting as a nature based solution, mangroves are at the forefront of carbon offset projects, as they work to combat impacts created from our built, human environment.

Mangroves are found throughout the equatorial region of the globe, with upwards of 50 species. Beginning around the 1970s mangroves experienced loss due to development leading to historically low coverage areas. With the help of recent conservation and restoration efforts these rates of loss have slowed and the ecosystem has begun to recover. However, the potential for future restoration is extremely high, leading to an overall increase in ecosystem services, and opportunities for large corporations to invest in nature based solutions.

To narrow the scope of this project, multinational corporations (MNCs), corporations that operate in two or more countries, were evaluated for their participation in mangrove related projects. MNCs have a large amount of disposable economic wealth that is not tied to specific functions, such as seen in local and national governments. Their global presence leads them to have a large consumer base, ultimately dictating the way in which people are interacting with their environment. MNCs have the ability to do well by their global community and promote sustainability and restorative practice or to alter critical ecosystem function by ignoring this inherent responsibility.

This project aims to answer the two research questions:

1. To what extent are MNCs voluntarily contributing to mangrove reforestation and afforestation over the last 10 years?
2. What are major driving factors behind this participation for some of the early participants in this phenomenon?

When working to update the UN FAO report from 2017, no published literature discussing MNCs and mangrove restoration were found. The rate at which publications are released led the project to believe that this is in fact a new phenomenon that was likely to be found in news articles instead. Systematic searches were conducted using GoogleNews and Mongabay with predetermined search strings to identify articles that could possibly be related to this subject matter. From this 1,147 articles were identified, only 18 of which we retained for relevance,

totaling five companies. From these articles metadata was extracted including basic information about company name, partner, location and project size. Motivation behind the project initiation was inferred and used as the variable of interest in the case study analysis that was used, modeled after Hak and Dul 2009.

Projects were distributed throughout the equatorial region, and were variable in size (see Table 1 and 2 for supporting data). All companies were found to be acting proactively, supporting the null hypothesis that they were acting without pressure from their consumer based. If found, reactive motivations would have included an uproar from a consumer base such as expression of discontent with a sourcing practice used by the company. All projects shared an interest in obtaining carbon credits for the work that was being completed, leading the project to conclude that this is a trend, rather than a series of coincidences. Mangroves are likely to remain at the forefront of this movement due to their ability to sequester more carbon per unit area than terrestrial trees. It may also be likely that companies are taking an interest in supporting coastal communities as a large percentage of the world's population is found here.

Despite these efforts being inherently good, there has been evidence in other carbon credit projects of over crediting on both the buyer and seller's side. Communities that seek to reap the benefits from these efforts are not receiving the same amount of benefits that they believe to be receiving, while the companies are not offsetting their emission and overall impact on the environment that they believe to be. Credit verification processes are one way in which this risk can be alleviated but should be used in conjunction with other methods.

Risk of additionality is also high in market based solutions such as carbon credits. The question rises regarding the project status without the interjection of the MNC. If these projects were to exist without their help, it is important to understand the impact that they are having on the local community that they claim to be helping. There are less benefits to jumping into pre-existing projects than ones that are looking for a source of funding to get started. In all cases there was no mention of the permanence of the efforts of the project, after obtaining the carbon credits. If mangroves are removed, or die due to lack of monitoring the credits that they created are not as viable as initially evaluated.

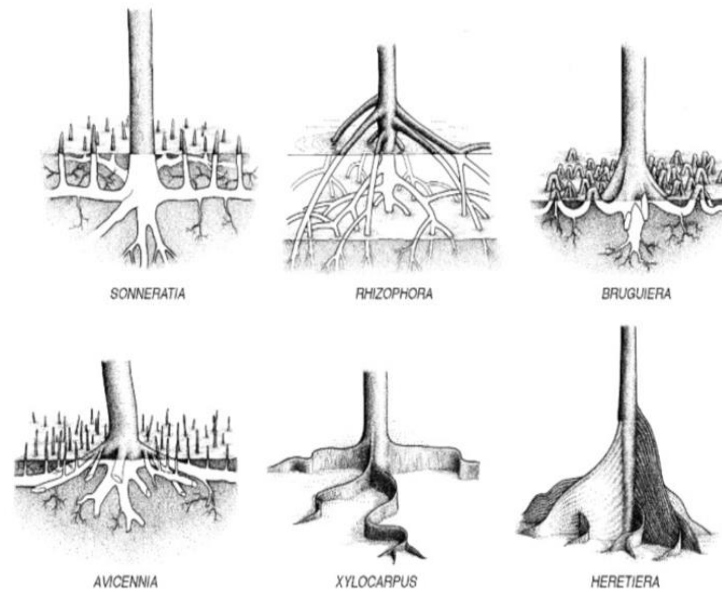
This projects sets up a basis for comparing the next identified MNC with others that are acting in the mangrove restoration space. The company's motivations should be dissected, along with the driving factors behind participation in the project to identify if it fits the trends found here. From the policy side, it will be important for governments to bring private sector actors to the table when creating policy related to mangrove restoration. There is a danger in fostering a relationship between these two sectors, but with proper care this relationship will be beneficial to both parties and the communities that are seeking help in restoring their mangroves to historic levels.

## Introduction:

### *Mangroves:*

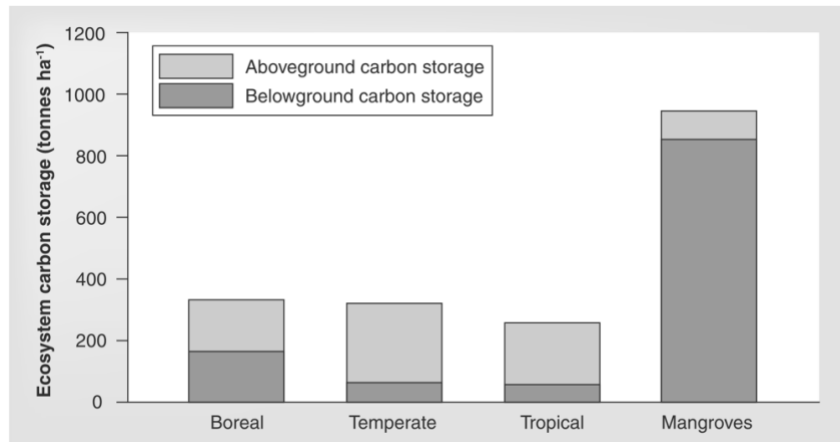
Mangroves are trees and shrubs found in tidal environments between tropical and subtropical latitudes (Kathiresan and Bingham 2001), reaching their maximum development between 25°N and 25°S (Michel 2014). These woody plants show characteristics of both marine and terrestrial ecosystems embodying a true ecotone (Alongi 2012). Mangroves have an extreme tolerance for salt, which they combat through exclusion conducted via the lenticles on their roots, followed by excretion through specialized glands on their leaves (Kathiresan and Bingham 2001). Because of their coastal habitat, mangrove ecosystems combat several harsh conditions such as anaerobic soils, high wave action and atmospheric temperatures (Kathiresan and Bingham 2001). Some species, such as *Avicennia germinans*, use aerial roots known as pneumatophores to combat the oxygen poor soils and extract oxygen through the air alternatively (Alongi 2012) (Figure 1).

**Figure 1.** Various mangrove root types (modified from Göltenboth and Schoppe 2006)



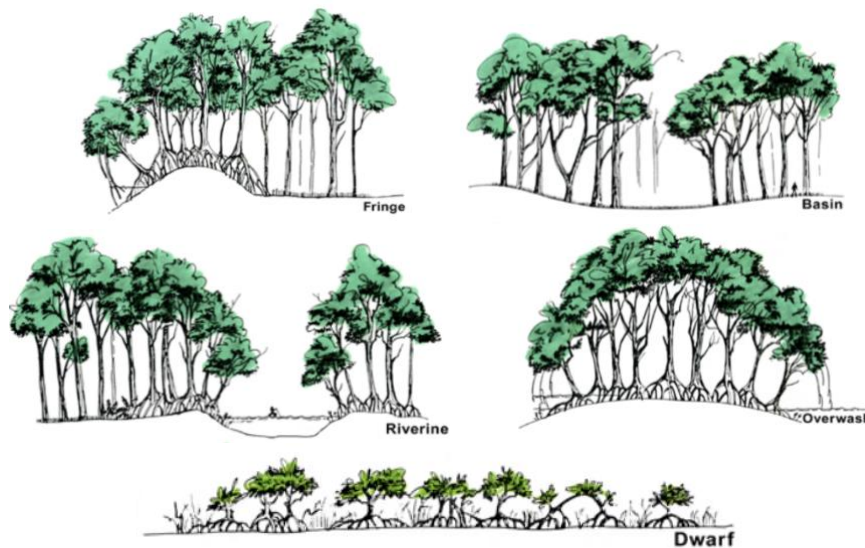
Covering an estimated 150,000 square kilometers of coastlines, the diversity of mangrove species varies through each region in the world (Michel 2014). Of the 70 known species only one, a mangrove fern, can be found in both the northern and southern hemisphere (Michel 2014). Highest levels of diversity can be found in the Indo-West Pacific with species totaling 58, compared to lower species counts of 12 in the Atlantic (Michel 2014). Each species has adapted specialized root systems that help stabilize the plants and combat the localized environmental conditions (Srikanth et al. 2016). Each plant will not just have one type of root, rather many that each perform a specialized task (Göltenboth and Schoppe 2006) (Figure 1). It is estimated that each mangrove allocates half of the increase in biomass to the roots, making this an ample place for long term carbon storage within the plant (Srikanth et al. 2016) (Figure 2).

**Figure 2.** Comparison between ecosystem carbon stocks (as seen in Alongi 2012)



Mangroves provide both ecological and economic benefits that have local, regional, and in some cases global benefits. It is estimated that roughly 120 million people globally live near and depend on mangroves for both their goods and services (Borges et al. 2017). Because of their complex root structures and spread from coastlines inland, these ecosystems are at the forefront for storm protection for coastal communities (Othman 1994). An intact mangrove ecosystem has the potential to decrease wave size between 50-99% across a 500 meter distance (McIvor et al. 2012). Alternatively, in the absence of this buffer, flooding from storm events and surges is expected to increase by 70% (Zhang et al. 2012). As the effects of climate change continue to rise, the likelihood of intense weather events will increase compared to historic times (Zhang et al. 2012) making the priority of mangrove protection for storm mitigation of utmost importance.

**Figure 3.** Variations in mangrove hydrology and topography (modified from Michel 2014)



Variation in mangrove ecosystems also occurs in their topographic and hydrologic distribution, with five common combinations found throughout a horizontal zonation in the landscape (Figure 3). Fringe forests experience the daily tidal changes and can be found along shorelines, while

basin mangroves experience stagnant water as they are found within the interior of mangrove areas (Michel 2014). Riverine mangrove are exposed to brackish water which is higher in nutrients allowing for faster growth within these areas compared to the over wash area which only gets tidal water during higher tides (Michel 2014). Dwarf mangroves are seen in areas where surface temperature are high, and little water can be found ultimately stunting their growth (Michel 2014). Due to the variations in topographical and hydrological factors, each mangrove ecotype varies in productivity, soil characteristic, and overall rugosity against disturbances (Michel 2014). Though, a study conducted in Indonesia concluded that between ecotypes of riverine and overwash (Figure 3) there is no significant difference in average soil bulk density and carbon content (Purbopuspito et al. 2014).

The removal of mangroves not only exposes coastal communities and surrounding development to storms, but also contributes to climate change more broadly with a stronger localized effect (Pendleton et al. 2012). Mangroves are some of the most carbon rich ecosystems, accumulating and burying carbon at a rate of  $174 \text{ gC m}^{-2} \text{ year}^{-1}$  (Alongi 2012) (Figure 2). Estimates conclude that mangroves sequester between 8 and 15% of carbon annually in marine environments (Breithaupt et al. 2012). That said, the removal of mangroves at any scale could be detrimental to local and regional health as this would negatively impact air quality due to the release of organic carbon into the atmosphere (Vo et al. 2012).

Ecologically, mangroves are known to provide vital nursery habitat to plethora of tropical and subtropical fish and marine megafauna species (Kathiresan and Bingham 2001). For example in the Caribbean, 17 species were documented in areas with mangroves, 11 of which are commercially important species (Nagelkerken et al. 2002). Furthermore, it is argued that the presence or absence of this ecosystem can act as an indicator for fishery health and catch yields at large (Benzeev et al. 2017). Studies show that mangroves neighboring coral reefs have a positive correlation with overall fish biomass, with some cases resulting in biomass that is 25 times greater when compared to only patch reefs (Mumby et al. 2004). Thus, the importance of mangroves lies within both their ecological function (Rog et al. 2017) as well as their ability to mitigate the overall effects of climate change (Richards et al. 2020).

#### *Ecosystem Conservation and Management:*

Within the last 50 years mangroves have been under increasing threat from coastal development, experiencing intense degradation across the globe (Richards et al. 2020). Despite geographic location, threats remain constant from aquaculture, agriculture, and other modified land types (Richards et al. 2020). Many of these threats stem from one of the leading economic sectors, tourism (Romanach et al. 2018). However, more recent reviews of the global status of mangroves reveals that loss is slowing worldwide (Spalding and Leal 2021). Much of this improvement lie in the 193 members of the United Nations (UN) voluntarily adopting some of the UN Sustainable Development Goals (SDGs). It should be noted that SDGs are not legally binding, though countries are expected to take ownership of their impacts and create frameworks to address these issues (United Nations). Members are rated on all SDGs through use of an SDG index, with some being evaluated on an individual level (i.e. Sweden) and some from a regional standpoint (i.e. Central Africa). Goals 13, 14, and 15 encompass language that promotes mangrove restoration and afforestation (Folke et al. 2019). With that said, that does not mean

that these ecosystems are ‘out of the woods’ as additional support and maintenance of plans could prove to be extremely beneficial to long term success by adding this level of accountability (Folke et al. 2019).

The difficulty in managing mangroves lies in the fact that decision making powers which govern this resource are spread across multiple tiers of government (Friess et al. 2016). For example, mangroves in Indonesia are governed by 18 different government agencies and are covered under 22 laws (Friess et al. 2016). This could be the reason that management of this ecosystem has had little success until the recent past, as communication between sectors can be difficult (Friess et al. 2016). Alternatively, customary management and tenure rights in most countries are not clear and leads to confusion (Angelsen et al. 2009). The UN FAO’s Voluntary Guidelines on Tenure aims to address some of these issues by emphasizing the need for definitions, specifically for marginalized and vulnerable people (Food and Agriculture Organization of the United Nations 2012). Promoting comradery between all actors involved in managing, maintaining, and ensuring that these rights are respected. To combat the downfalls in these two systems among others, alternative mechanisms have been developed and implemented to ensure that these ecosystems do not suffer, one of which is the use of private-public partnerships (Friess et al. 2016). Private sector companies have the potential to provide large sources of funding due to their high concentration across all sectors, making this one of the many benefits of including them in conversations about conservation (Folke et al. 2019). When participating in these partnerships, companies are urged to place emphasis on promoting ecosystem protection and aiding in the evolving livelihood of the local communities (Gevana et al. 2018).

To date, success from these partnerships has been found when utilizing market based ecosystem service instruments (Friess et al. 2016). That said, this is not that only instrument that has led to success in mangrove conservation. An example of this is community based management programs that are self-governed by the individuals with an emphasis placed rewarding community members for protecting the ecosystems (Gevana et al. 2018). Voluntary environmental programs (VEPs) have been one of the front runners during the peaked interest in placing a price tag on our environment (Potoski and Prakash 2013). The nature of VEP participation is seen as ‘club based’ which brings into question the ultimate goal of companies participating in this market solution, and in some cases, making this a less than ideal management recommendation in certain countries (Potoski and Prakash 2013). That said, there is evidence that these partnerships are following the defined standards within the economic community (Vellema and van Wijk 2015). Though, even with the presence of standardization, VEPs still fail to fully address the political issues raised from such partnerships if implemented alone (Potoski and Prakash 2013).

Alternatively, privatizing environmental resources is a potential market based solution to ensure the persistence of healthy mangrove ecosystems (Vatn 2018). Payment for ecosystem services (PES) could be utilized to increase the value of mangroves and other coastal ecosystems (Gevana et al. 2018). Success utilizing this mechanism means adequately defining tenure rights, quantifying blue carbon credit values, and inclusion of local community needs, among other items (Gevana et al. 2018). Blue carbon is the term coined to define carbon found within coastal carbon stocks (Pendleton et al. 2012). Carbon credits fall into this same category, having a market that was valued at 176,020 million USD back in 2011 (Kossov and Guigon 2012).

Because these credits are highly sought after by major polluters, the quality of the credits created in the market is ignored bringing into question the validity of this mechanism (Vatn 2018).

Despite these downfalls, there are many benefits to expending resources on fostering such relationships between public and private sectors. For example, such projects allow for project shells to be created for replicable implementation across various locations as seen in the IUCN-Marriott partnership (Mather et al. 2014). The benefit to sharing these frameworks includes a lessened upfront cost of planning resources being consumed by companies attempting to accomplish something of the same scale other places around the world. There will however not be a one size fits all scenario that can be applied across all mangrove related projects, so it is important to review the role that any and all actors could potentially play moving forward (Slobodian and Badoz 2019).

Multinational corporations (MNCs) which are thought to possibly be the next major player in increasing the efficacy of a nation's efforts to restore and conserve mangroves (Folke et al. 2019). MNCs fit the general qualifications for a private sector relationship to be formed and tend to have a high percentage of disposable economic wealth. Multinational corporations are defined as companies that are actively participating in two or more countries (Aggarwal et al. 2011). Throughout scientific literature MNC is used interchangeably with both transnational corporation and multinational enterprise (Aggarwal et al. 2011). MNCs tend to be frequently reported in the news as their actions on a global scale will impact more people than a smaller, local private company (Friess et al. 2016). Though other smaller private companies are actively working to preserve and conserve local mangroves, the impact that MNCs can have will be much larger. (Folke et al. 2019) states that a handful of corporations have the ability to shape the way the planet and people interact with one another. These corporations have the ability to alter and impact critical ecosystem functions while also hold the power to enforce and promote sustainable practices and conservation more broadly (Folke et al. 2019).

Published literature emphasizes that governments alone have not been able to prevent mangrove loss or restore what has been lost by previous degradation (Friess et al. 2016). Because of this, it is important to begin identifying alternative mechanisms of management one of which can be bringing MNCs to the table. Incorporating these actors could have a significant impact on achieving global mangrove conservation goals. Initial scoping revealed that only a few companies have been actively contributing to projects of this stature. At large, the private sector could potentially play a sizeable role in mangrove conservation and restoration as they have the capability to expand economic resources that will allow for the opportunity to conserve and or restore mangrove ecosystems. However, to date, little research has reviewed whether MNCs are playing this role, and what the driving factors behind this are. This paper therefore aims to answer the following questions to in order to address this gap:

1. To what extent are MNCs voluntarily contributing to mangrove reforestation and afforestation over the last 10 years?
2. What are the major driving factors behind this participation for some of the early participators in this phenomenon ?



## **Methods :**

### *Scoping:*

During the summer prior to determining this project, scoping was conducted in order to identify a relevant research question. Working alongside a group from the Nicholas Policy Institute, a UN FAO report was written that was looking at mangrove policy in small island developing states (SIDS), updating a previously written report in 2017. Systematic searches were conducted using various published and grey literature databases to gain insight on mangrove conservation and policy documents for SIDS. GoogleNews was searched using the same key terms in order to cover any missing trends between the current point in time and the most recent publications. The scope of this Masters project was determined from the news searches as this is where knowledge gaps lie. On average it takes 12.18 months once a paper is submitted to be published (Björk and Solomon 2013), making this an imperative part of the process. This project was cross checked with the scientific literature prior to conducting the follow analyses.

To ensure data exists on a proper scale, preliminary searches were conducted to identify corporations actively participating in voluntary initiatives to restore or conserve mangroves. Throughout this process, several strings of key words were tested to ensure that the language in the published literature, and common day use were being targeted simultaneously. To narrow the scope of the project, multinational corporations (MNCs), or businesses that operate in two or more countries were targeted (Aggarwal et al. 2011). MNCs were chosen over transnational corporations because a concrete list of companies could be found for the former. In order to answer the first research question, a systematic search of news outlets modeled after (Moher et al. 2010) was conducted. The second research question was answered through using a case study review modeled after (Yin 2009) pattern matching analysis.

### *Systematic Search:*

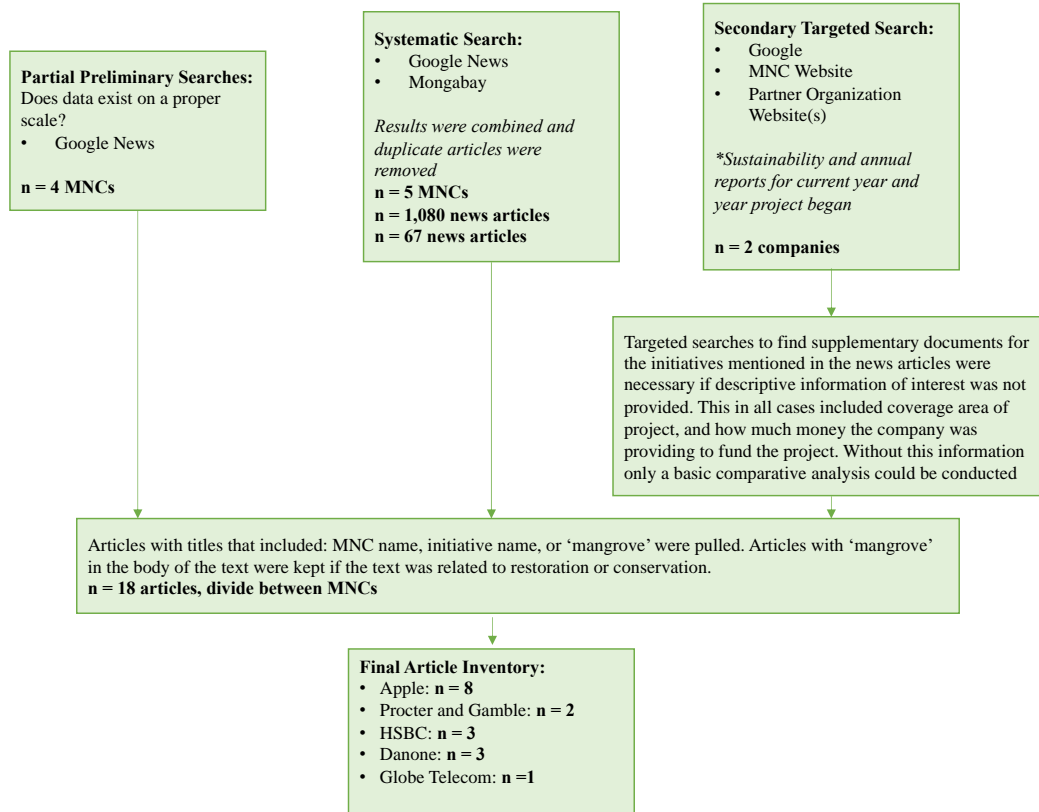
The systematic search used pre-defined key term combinations in order to grab the most relevant news articles. This methodology has been chosen over others because it will maintain a consistency across outlets that are being searched while minimizing aspects of systematic reviews that are not relevant to a study such as this one. Outlets searched included Google News, a search engine that aggregates all relevant articles based on the search algorithm, and Mongabay, an environment focused news search. Articles were filtered again by dates between 2011-2021 and use the key strings listed below:

- Mangrove restoration multinational corporations
- Mangrove restoration partnerships
- Private sector mangrove commitment
- Private sector mangrove restoration projects

The language used in key strings do not align with the terms that are found throughout published literature, but rather commonly used language found in news articles. This is important to note because if terms such as afforestation and reforestation were used in searches, articles with vital information would likely not be returned in search queries. Similarly for multinational

corporations versus the use of the term private sector, the commonality in the use of the words will lead articles to be missed as the two are interchangeable for those familiar with published literature to a degree, but not the general public who is the audience of the article. These combinations were chosen as they returned articles about all of the companies found through initial searches.

**Figure 4.** Comprehensive Search Methodology



The searches revealed roughly 30 pages of GoogleNews results per search string, for a total of 1,080 articles (Figure 4). Fewer results were found on Mongabay totaling 67 articles (Figure 4). Of the combined 1,147 articles, only 18 were retained based on search criteria (Figure 4). For two of the identified MNCs, articles did not contain enough descriptive information to complete data collection. Systematic Google searches were conducted again to identify sustainability and or annual reports to fill knowledge gaps (Figure 4). Final article inventory lead to no less than 2 articles per MNC, which was deemed to be sufficient for information of interest.

When reviewing articles returned from the key strings, the titles were evaluated based on relevance to the project. Meaning, if a MNC name was in the title with an initiative name or the word mangrove it was clicked on for further review. When clicked on, if the article did in fact have 'mangrove' in the body of text then it was maintained. Upon further review, the articles were skimmed to determine if mangrove ecosystems were just being mentioned, or if there was

voluntary participation in mangrove restoration. If there was an instance of this being discussed the article was maintained.

### *Case Study Analysis:*

Once articles of interest were identified, content analysis was conducted. Prior to data collection, a blank template created that encompassed the relevant information to be pulled from the articles. A metadata table was used to summarize the information to be extracted from each article which included:

- Article Name
- Publisher
- Date of Article (Month/Year)
- Company
- Report title/Organization partnership name
- Location of Project
- Time frame for completion
- Motivation
  - o Proactive or Reactive (drivers)
- Coverage area (Small, Medium, Large)
- Reforestation or Afforestation (R/A)
- Total Cost

These items were chosen after close consideration of the research questions for this project, as they either aim to answer the extent this is happening at, or why the corporations are doing it. General information such as company, organization partnership, location of project, and total cost were used to gain a general scope of the project. Project location would help identify if this phenomenon was in fact concentrated or diffuse across the globe. Time frame is an important variable to see the anticipated trajectory of the project and when the companies expect the benefits to arrive. Environmental organizations that are partnering with MNCs were of interest determine whether these partnerships are being formed at the local level, or with conservation organizations that function at a global scale. With the small number of contributing MNCs, motivations matter as they can be used to predict what the future in this space looks like. The coverage area is intended to identify the impact in a given area for the MNC and later was used as a gauge for funding as most funding sources were not explicitly stated. Finally, determining whether a project was reforestation or afforestation allows for the project to be reviewed and speculated against for the overall impact of the MNC's effort. That being, are mangroves being restored, and carbon credits claimed based on existing ecosystems, or are they being planted.

When articles failed to report some of the target information specified above, a targeted search on each company was conducted. This was completed using Google, searching each corporation's name with the initiative mentioned in the news article. Generally, sustainability and annual reports for the MNCs were returned, and were searched for explicitly if not, using the company name or environmental partner. This identified the initiative's role in the corporation's sustainability commitments. These documents were an important part of identifying case study information as documents are one of the six viable sources of evidence used in case study

analysis (Yin 2009). This step of the process is necessary to make proper conclusions and identify any patterns between the corporations as it will allow for the analysis to include many sources of evidence to increase the overall quality (Yin 2009).

In order for this project to have an impact on the scientific community and provide a basis for future research, the cases identified here must be externally relevant. Case studies are not something that individually will contribute to scientific development, though are useful in generating hypotheses to be tested further (Flyvbjerg 2006). Flyvbjerg 2006 continues on to mention that clarifying the causes rather than effects of the phenomenon is important to consider when drawing conclusions and creating suggestions for next steps (Flyvbjerg 2006). To identify the way in which the cases are related to each other, pattern matching will be utilized, specifically using a dependent variable design (Yin 2009) comparing whether actions were proactive or reactive.

Pattern matching compares two patterns to determine whether or not they match, by testing an observed pattern to an expected pattern (Hak and Dul 2009). In this case, it is assumed that corporations are proactively, and voluntarily participating in mangrove restoration. This expected pattern was identified prior to any analysis that was conducted, as it is crucial to this methodology to be determined before matching takes place (Hak and Dul 2009). Specifically, dependent variable designs require that an expected pattern is determined as the outcome, and this outcome is either present or absent (Hak and Dul 2009 ) (Yin 2009). Alternatively, independent variable designs would require cases to be reviewed based on an outcome for each variable rather than a cumulative sum (Hak and Dul 2009 ) (Yin 2009). Because the majority of the topics of interest are summary information, dependent variable searches were chosen, with the outcome of motivation (proactive or reactive) will be evaluated.

Hak and Dul 2009 conclude that this methodology of case study review is a core producer in all theory-testing studies (Hak and Dul 2009). By using a methodology that is theory-based, this process will be valid for future review if more MNCs or companies of other sizes are to be compared and contrasted with a predetermined pattern hypothesis. If patterns exist between the corporations used in this study, policy can target these motivations and identify how to include these corporations in the decision making process. However, it is important to note that the importance of all stakeholders should be heard throughout the decision making process, despite the conclusions of the possible role MNCs play in mangrove restoration (Bergen and Carr 2003). The concerns and needs of each individual stakeholder, although are each important, should be ultimately directed by those with intimate knowledge about mangrove restoration in order for such initiatives to be successful, as at the end of the day the protection of these systems is at the forefront (Bergen and Carr 2003).

## **Results:**

### *Search Results*

Partial preliminary searches revealed 4 MNCs participating in these initiatives, suggesting that voluntary mangrove restoration is a relatively new phenomenon. Additional searches continued to reveal more information on these four corporations. Completed searches revealed an instance

of additional case, totaling 5 MNCs; Apple, Procter and Gamble (P&G), HSBC, Danone, and Globe Telecom. The small return values (n=5) validate the use of case study analysis (Yin 2009). There is evidence of smaller, localized organizations and companies that are smaller than MNCs participating in similar projects. For the scope of this project, they were not included in analysis to allow for the project size to be manageable while also understanding these cases were less likely to be reported widely throughout social media.

### *Case Descriptions*

**Figure 5.** Project Locations for Cases



### ***Apple:***

Apple's Earth Day 2018 Give Back campaign, aligned them with Conservation International and communities in Cispatá Bay, Colombia. This project originated as an effort from local environmental groups, community members, and Conservation International to protect and restore mangrove forest (Apple Newsroom 2019 Apr 22). Apple's interest in this project lies in the estimated 1 billion metric tons of CO<sub>2</sub> the mangrove forest is expected to absorb throughout its lifetime (Apple Newsroom 2019 Apr 22). The article shows that Apple has stated an objective of carbon neutrality by 2030, and considers this project as a way in which they will meet their goal (Apple Newsroom 2020 Jul 21). The philanthropic funding provided to support this project will be used to ultimately support the local partners and communities that have been working to maintain the efforts. The creation of the carbon credits from the work being done here is only an added benefit to the end result rather than being the main focus (McVeigh 2021 Nov 4). Apple claims to have taken a recent interest in mangroves due to the ecosystem's ability to store up to 10 times more carbon (McVeigh 2021 Nov 4). It should be noted that Conservation International is one of the first to create verified blue carbon credits. This partnership is one of the first examples of a relationship like this (Apple Newsroom 2019 Apr 22).

***Procter and Gamble (P&G):***

Working in the United Arab Emirates (UAE), P&G has partnered with the Emirates Marine Environmental Group to plant mangroves in the Jebel Ali Wildlife Sanctuary. The company has dubbed this project 'P&G Dubai Mangrove Forest Project', and hopes to create a place of global significance, as this site has been listed on the Ramsar List of Wetlands of International Importance (Dadlani 2021 Apr 23). Funding commitments for this project has not been stated by P&G as the project is in the early stages. This project is beneficial to the UAE as it helps them reach their 2040 Urban Master Plan goals. Procter and Gamble will seek to gain certified carbon credits from the mangroves planted throughout this project to work to offset their emissions and trade the credits in the market to other organizations (Dadlani 2021 Apr 23).

***HSBC:***

HSBC has recently begun to invest in supporting new technologies for transitioning to alternative energies to fossil fuels. HSBC has latched onto the efforts of Egypt's coastal ecosystem project in the Red Sea as a part of this interest (Daily News Egypt 2021 Jun 21). Part of their 100 million (USD) Global Climate Solutions Partnership will be delegated to this project while the bank partners with universities, and environmental organizations to protect and restore the mangroves along the coast of the country (Daily News Egypt 2021 Jun 21). These partners include World Resource Institute, World Wildlife Fund, American University in Cairo, and Applied Research on the Environment and Sustainability Funding (Cario Science 2021 Jun 24). As stated in the article, HSBC hopes to have an added benefit of funding projects that add comfort to the local communities, which includes proper toilets and food storage capabilities. HSBC hopes their efforts will allow them to gain trust and networks with organizations that are targeting the technologies of interest relating to climate change while also gaining carbon credits to offset their emissions (Daily News Egypt 2021 Jun 21).

***Danone:***

Danone joins other companies in the creation of Livelihoods, an organization that partners economic sources and institutions with environmental expertise in order to achieve a shared goal of supporting rural and agricultural communities who wish to live sustainably (Livelihoods Funds). Livelihoods has three funds, two of which Danone invests in; the first launched in 2011, followed by the second in 2017 (Livelihoods Funds). Specifically, Danone has partnered with the Senegalese NGO, Océanium, who has successfully planted 79 million mangroves. The group claims that this the largest mangrove reforestation project in the world to date (Livelihoods Funds). Reporting from this program concludes that 130 million tons of CO<sub>2</sub> will be sequestered over a 20 year time frame, with a total of 3 million project beneficiaries (Livelihoods Funds). Due to the partnerships held within the Livelihoods group, the group believes that the carbon credits produced will merely be an added benefit to the projects (Bird 2016 Nov 3). These credits are stated to have high carbon value, as well as high social value, which are two of the main focus of their restorative management (Bird 2016 Nov 3). Because of contributions from multiple companies into the same fund, Danone's individual contribution is unknown, but funds will be taken from Livelihoods Fund 1.

### ***Globe Telecom:***

Partnering with the Zoological Society of London (ZSL) Philippines, Globe Telecom wishes to aid in the protection of local mangrove forests under threat of aquaculture development (Castillo 2021 Jan 18). ZSL instated projects to rehabilitate once healthy mangrove areas that were turned into ponds and then later abandoned back into their health state. The projects that Globe Telecom supports directly include restoration in eco-parks locally known as Katunggan It Ibajay and Pedada, Iloilo (Castillo 2021 Jan 18). The hope is that healthy mangroves will draw in tourists, bringing in a source of funding for upkeep and maintenance. Globe's benefit to this will be the carbon credits it will receive from the established forests as the company works to 'step up' their carbon offset efforts. Ultimately, the group wishes to be net zero by 2050 aligned with United Nations Framework Convention on Climate Change and COP26 Presidency (Castillo 2021 Jan 18).

### ***Findings from comparison of the case studies***

Searches revealed in every case the MNC partnered with other companies or conservation organizations rather than initiating their own restoration projects? to meet the sustainability goals (Table 1). Without having a staff to source environmental knowledge from, the MNCs are acting as a secondary supporting role while conservation organizations are at the forefront of project design and implementation. Despite the status of the project when the MNC joined, the addition of blue carbon credits has been what some articles note as being 'the cherry on top'. This is a commonality between all the projects as protecting and restoring these ecosystems and improving local livelihood is the main stated goal for MNCs. For the projects that have not yet begun, gaining support from MNCs has allowed the planning process to continue. In many of these cases, preliminary information that has yet to be determined include the area of coverage they would support as well as how much funding would in turn go into the project.

Each of these corporations are pledging to restore and or protect mangroves all over the globe, attacking areas of various sizes (Table 1). Small project areas are defined as acreages less than 1,000 acres, medium between 1,000 acres and 100,000 acres and large projects being greater than 100,000 acres (Table 1). Project size is limited by the available projects that MNCs can participate in, as well as the amount of funding the corporation wishes to contribute overall. In some cases, such as Danone and the Livelihood Fund partnership, it's hard to discern the amount of funding coming from strictly one organization.

**Table 1.** Summary of Descriptive Data from News Articles

<b>Multinational Corporation</b>	<b>Conservation/ Organizational Partners</b>	<b>Initiative</b>	<b>Location of Project</b>	<b>Date to be Completed</b>	<b>Reforestation or Afforestation</b>	<b>Size of Project</b>	<b>Money to be Invested (USD)</b>
Apple	Conservation International	Apple's Earth Day Give Back Campaign; 10 Year Climate Plan	Cispata Bay, Columbia	2030	Reforestation	Medium	600,000
Procter and Gamble	Emirates Marine Environmental Group	P&G's Dubai Mangrove Forest	Jebel Ali Wildlife Sanctuary, UAE	2030	Afforestation	Small	N/A
HSBC	World Resources Institute, World Wildlife Fund	USD 100 Million Global Climate Solutions Partnership	Red Sea Coast Line, Cairo	2025	Reforestation	Large	Supported by USD 100 Million Global Climate Solutions Partnership
Danone	Schneider Electric, Credit Agricole S.A., Michelin, Hermes, SAP, Groupe Caisses des Depots, La Poste, Firmenich, Voyageurs du Monde, Eurofins, Océanium	Livelihoods Carbon Funds	Saloum Delta, Senegal	2045	Reforestation	Medium	Supported by Livelihoods Carbon Fund 1
Globe Telecom	N/A	UN's Race to Zero global campaign	Philippines	2026	Reforestation	Small	738,736



**Table 2.** Motivations and Driving Factors Behind Participation in Initiatives

<b>Multinational Corporation</b>	<b>Conservation/ Organizational Partners</b>	<b>Initiative</b>	<b>Location of Project</b>	<b>Motivation (Proactive or Reactive)</b>	<b>Driving Factor</b>
Apple	Conservation International	Apple's Earth Day Give Back Campaign; 10 Year Climate Plan	Cispata Bay, Columbia	Proactive	Working to identify a nature based solution for carbon neutrality goals; blue carbon credits to be certified by Conservation International. Working to pave the way for business investors in the future
Procter and Gamble	Emirates Marine Environmental Group	P&G's Dubai Mangrove Forest	Jebel Ali Wildlife Sanctuary, UAE	Proactive	Ensure that the company's growth is sustainable by holding themselves accountable for their emissions. This project helps the UAE meet their sustainability goals to protect endangered species, both plant and animal)
HSBC	World Resources Institute, World Wildlife Fund	USD 100 Million Global Climate Solutions Partnership	Global wetlands, mangroves, and forests	Proactive	Attempts to assist the company and world in achieving the Paris Agreement goals by 2050 or sooner
Danone	Schneider Electric, Credit Agricole S.A., Michelin, Hermes, SAP, Groupe Caisses des Depots, La Poste, Firmenich, Voyageurs du Monde, Eurofins	Livelihoods Carbon Funds	Senegal, India, Indonesia	Proactive	Aims to reduce greenhouse gas emissions and create positive social and economic impact in the local communities that the projects are working in. Organizations wish to gain carbon credits; as of December 2021, 142,000 verified carbon credits had been generated
Globe Telecom	N/A	UN's Race to Zero global campaign	Philippines	Proactive	Restore impacted ecosystems to support future and current eco-tourism in the area. Ultimately the project will yield carbon credits that the company can use to offset emissions

## *Case Analysis*

Pattern matching revealed that the null hypothesis was true in all cases; that MNCs are voluntarily participating in mangrove restoration (Table 2). To determine this, the motivation behind each of the MNCs participating in the initiative was extracted from the articles identified through searches. Proactive participation was defined as MNCs who piggy backed onto already ongoing projects, or helped fund the planning stages of other projects that had support from conservation organizations. Reactive participation was defined as MNCs responding to public calls or consumer concerns about their products, or production behaviors in order to protect their reputation.

In each case, MNCs state that they are interested in identifying a way to grow sustainably and hold themselves accountable for their emissions. By wanting to achieve this for themselves and in some cases, specific countries or the UN, they have turned to blue carbon as being the solution. However, in most cases blue carbon is just one of many items in their sustainability portfolios, which also include terrestrial carbon credits, and in the case of P&G an company funded employee plant-a-tree program through EcoMatcher (Dadlani 2021 Apr 23). Quantifying the carbon sequestration of coastal ecosystems, and determining mechanisms for organizing these markets has been under development to ensure that the markets achieve their goals across all sectors (Ullman et al. 2013). With the array of project statuses seen throughout this review, there is evidence the sector has a lot of room for growth and learning about best practices for managing these areas.

With the presence of conservation organizations we know that the success of these projects is highly dependent on having partners that are knowledgeable in mangrove planting projects and restoration more broadly. By partnering with these organizations, there is a buffer for insuring that the social and economic well-being of local communities be kept in mind and engaged throughout the projects. Conservation that includes active participation from local communities is shown to improve overall health and wellbeing of community members, increases their social capital, and increases the success of the project when compared to studies that do not (Moore et al. 2007).

## **Discussion:**

To date, searches through published literature have not revealed reports on the impacts of multinational corporations on mangrove conservation. Five instances of this within the past ten years suggest that there has been an uptick in this phenomenon, more specifically within the last two years considering the cyclical process of publishing data (Björk and Solomon 2013). With the global distribution of the case studies reviewed for this report, the impact of projects like this should continue to be reviewed as both the successes and failures will inform future partnerships. Currently, this distribution suggests that there is not a specific area in which opportunities for investment in mangrove restoration will be more prominent than others. This case study analysis begins to delve into what multinational corporations are seeking to gain from investing in the conservation of mangrove ecosystems. Further research should be conducted into identify cases of partnerships between private companies of smaller scale and conservation organizations to determine if the phenomenon is occurring at all levels of the economic playing field.

Published literature on blue carbon tends to focus on the review of policies in place without the voices of private sector included (Thomas 2014). Understanding the needs and goals of multinational corporations is important to strengthen the connection between policy makers and the financial assets that will ultimately aid funding. Evidence of these relationships can also be seen between private companies and the United Nations. The UN supports this as a funding source as their goals would not be accomplished in their timeline otherwise. Onlooking critics caution against this relationship formation due to the possible bias introduced (Seitz and Martens 2017). In the space of mangrove conservation, private sector involvement may step in to play a similar role as a major source of funding for projects moving forward.

More broadly, the role of MNCs in mangrove conservation relies on their objective to meet sustainability standards set by their competitors and consumers. Large global presence backed by funding has the potential to uplift mangroves in critical need for support moving into the future (Folke et al. 2019). MNC experience in working with business partners and project managers likely exceeds that of smaller environmental organizations, or local community members. Does this mean that groups of this size could act as a new era of governing bodies when it comes to natural resource conservation (Bennet 2005) or should they merely be a part of the conversation? Such a presence brings great responsibility as some believe they should take ownership for the negative toll operations of such a large scale take on natural systems (Bennet 2005).

Because of their global reach, MNCs have the ability to enact change and bring issues that are not popular in the media to light. The influence of social media has caused a change in the public attention to what companies are and are not posting on their outward facing websites, and social media accounts (Bouquet and Birkinshaw 2008). Multinational corporations already challenge the way that literature has thought of and discussed the functionality and role of companies (Bouquet and Birkinshaw 2008). They have spread their wings past the distance of traditional organizations, leading towards their positive ability to influence through social media moving forward. Using the number of interactions from the public with media platforms can help determine future areas of investment in ecosystem conservation through feedback mechanisms seen similarly in product development strategies (Bouquet and Birkinshaw 2008). Such methods would be beneficial to companies as they have a way to grow their consumer support while also directing investments in areas where others in the global space share an interest.

MNCs have taken an interest in consumer opinions as sustainability has come to the forefront of consumer decisions. Corporate social responsibility is the driving factor for these corporations as each voluntarily participated in funding these projects (Yan and Zhang 2020). Not exploring this avenue further in published literature could lead to a lack of inclusion of these actors in the conservation space, with potential of loss of interest and a decrease in project completion in the long term. Similarly to local governments, the needs and goals of MNCs must be understood alongside the home country and conservation organizations that are working to conserve and restore these vulnerable spaces. This instance of case study analysis reveals that there has been consistent mention of sustainability goals of the company that will be achieved through investments made in mangrove ecosystem protection.

The concept of corporate social responsibility (CSR) was coined in 1953 with an original emphasis placed on the social conscious of the businessman rather than their outward facing image as an entire company (Valor 2005). CSR fits into the space of current and future projects as it acts as the binding glue between what is legally required of each group and the economic actions needed for a successful business model (Yan and Zhang 2020). Over time it is likely that this trend will continue and more corporations and companies of all sizes will be looking to invest in projects that improve their public perception as the global community works to address our changing climate. With the additive benefit of more carbon sequestration per unit area occurring in blue carbon spaces than terrestrial there should be more polarization towards this space (Alongi 2012). Caution should be used with this philanthropic approach and directed through policy. Without proper regulation there may be a lack of community involvement, and unequal access to opportunities for companies to participate among other issues such as project maintenance over the life time of the benefit gained from participation.

Case studies reveal that all instances of MNCs partnering with conservation organizations are not curated for the needs of the company, but rather are a piggy-back onto an existing or planned project that lacks a source of funding. MNCs were not contacted for interviews during this period of the study, but rather information was gathered from supporting sustainability documents from their websites. More direct answers may be found upon talking to these companies, if they are willing to speak on the subject. Each case revealed that companies seem to be interested in gaining carbon credits from projects to reach their sustainability goals, and or use extra credits to be traded within the market. All cases, except P&G's, consisted of working to restore pre-existing mangroves rather than planting mangroves in places where mangroves previously did not exist. With the overarching goal of offsetting emissions and decreasing the corporation's overall footprint, these restorative projects come to a cross roads with additionality. Additionality is defined as the measure of what would have happened to the ecosystem is intervention was not made (Sommerville et al. 2009), which in this case is a question of whether or not the mangroves would exist if the funding source from the MNC did not come to fruition.

Along these same lines, claims from these cases make several assumptions. First, that their actions in one part of the world, and running their organization elsewhere is truly combatting their emissions through the use of the ecosystem that they are investing in (Badgley et al. 2022), and second that these benefits would have not been possible without their participation in the project (Badgley et al. 2022). Evidence suggests that some projects are over crediting carbon credits to buyers and sellers throughout the market (Badgley et al. 2022). This raises the question of the validity of having payment for ecosystem services programs as the valuation for ecosystems depends on several variable factors which include place, time, and are resource specific (Spangenberg and Settele 2010). By adding a price tag and estimated carbon value to mangrove ecosystems for private sector corporations to purchase, the assumption of the impact of this is made once the transaction is completed. These dangerous assumptions may be leading to over crediting and the demise of the involved ecosystems, that ultimately could be detrimental to their existence. In this case, funding is being provided for the marketization rather than improving ecosystem health to truly achieve the promised benefits (Badgley et al. 2022). More pressure should be placed on ensuring that credits are created appropriately based on data rather than the market demand for this intangible product.

To broaden the scope of multinational corporations and their impacts on mangrove conservation, more research should be conducted regarding areas where this business strategy can be expanded. With potential to enact on pre-existing movements and align their goals more linearly with existing efforts to decrease climatic effects, MNCs may have a greater impact in this space than initially thought. Integrating sustainable development goals (SDGs) is one avenue through which MNCs could achieve these goals. This has fallen short in the past as companies in general are found to be vague in their sustainability reports as to how and which of the SDGs they are addressing (Giuffrida and Buil 2021). This is consistent with the findings of the case studies described in this report as if information was not found in news articles, it was also not found in the sustainability reports from neither the environmental partner nor the multinational corporation.

Despite the lack of reporting at the current time, it should be noted that there is potential for the most growth in areas including ending poverty, zero hunger, and achieving sustainable use of ocean and forest resources (Giuffrida and Buil 2021). These findings are promising for the future trajectory of mangrove conservation projects in this space. Enacting what some coin as a green agenda, all actors in the global space must be aligned by their overall objectives (Lasrado and Arora 2018). Without unification by a common goal or set of goals, organizations will have a lesser chance of voluntarily participating in conservation and restoration projects. Under the beliefs of the Paris Agreement, multinational corporations sit at the forefront of enacting positive change as they hold high economic power, while also playing a large role in emissions (Lasrado and Arora 2018). Working towards these goals will not only take economic investment, but likely the change of business models to incorporate sustainability from the beginning rather than trying to bend their current models to fit their needs (Lasrado and Arora 2018).

Asking MNCs and organizations of a similar size to take on these responsibilities begins to blur the line for some between their role as private entities are. Introducing privatization leads to the idea that as a public good the environment is no longer for the good of the people but rather for the good of the economic gains to be had. This has not yet occurred as the state is still found to have a strong presence in the efforts to manage and maintain ecosystems at large (Vatn 2018), which is assumed to be held true across both terrestrial and marine spaces. The costs and benefits of privatizing these markets remain unclear, as they may reduce the cost of protecting and investing in ecosystems in some places but not all (Vatn 2018). These actions could also cause a price inflation that would ultimately lead to a market creation failure at large, which emphasizes the importance of public actors remaining in control until further solutions have been identified (Vatn 2018).

### **Policy Implications:**

The aim of this report has been to evaluate and analyze the current role that multinational corporations are playing in mangrove conservation and restoration at large. Payment for ecosystem services, voluntary environmental programs, and market based solutions have become the way in which MNCs are working towards meeting their sustainability goals. More precisely in mangrove restoration, we find that this trend is relatively new as the published literature has yet to report findings about how these actors could serve as a 'saving grace' for these threatened, and recovering ecosystems. The report attempts to question the validity of the claims

surrounding the offsets created by investing in pre-existing projects to gain verified carbon credits as that appears to underly the point of participating in conservation for carbon offsets. Further research should be conducted to determine if this trend continues or if organizations follow suit of P&G and work to create new mangrove communities in areas that have been previously destroyed, or are to be restored to a new mangrove ecosystem.

To maintain the relationship between MNCs and public entities such as governments, policies that include interests of both sides will be necessary. Continuing to forge and explore avenues where these actors can participate will allow for a more successful launch of blue carbon projects (Gevana et al. 2018). Implementing policies regarding environmental action is difficult as the subject matter is constantly gaining an influx of changing perspectives that influence decision making (Gerlak et al. 2020). In order for such policies to be effective it is imperative to have open dialog across all stakeholders as knowledge is received, as well as defined rules and norms regarding investments and institutional motions (Gerlak et al. 2020). Such relationships between market actors can serve as a means to fill the spaces where traditional public policy has failed to enact and enforce governing actions (Gulbrandsen 2010). MNCs should be looking to become involved in regions of high priority, which could be defined as regions they source products from, or areas of high biodiversity. By continuing to perfect the certification schemes that are not controlled by the state, these corporations can work to gain validity and increase the standard that most consumers and global citizens accept (Gulbrandsen 2010).

Inclusive policy will not be the only necessary piece to finish the everlasting puzzle that connects sustainability of economic markets to fit with ecosystem demands. There are likely extenuating issues that have not been discussed throughout this report that should be considered on a case by case basis. For example, solutions to protecting and conserving mangroves could lie in adopting them into marine protected areas, or improving the ability of local communities to manage these systems using community based management strategies (Gevana et al. 2018). Researchers should be looking to identify the next instance of MNC or private sector involvement to identify whether they follow a similar trend as the cases presented here. It is important to continue reviewing and testing these theories in order to ensure that these actors will be included in the future. Policy makers should be looking to forge relationships and work to seek out MNCs if a source of funding is what they are seeking for their project. By targeting large corporations, the country or region will likely have greater success in identifying a source of funding, and ultimately both parties will benefit. To reiterate this study aims to identify possible trends and should be used with caution as drawing conclusions from a singular or grouping of case studies as this is both dangerous and could lead to misinformed management or policy strategies (Yin 2009). Place based conservation is important as the needs of local communities tend to follow trends, but cannot be generalized.

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