International Journal of Non-Profit Sector Empowerment

Vol 3, No 1 (2024)

International Journal of Non-Profit Sector Empowerment

Exploring Coastal Societies' Ties with the Sea and the Impact of Ecosystem Regulations

Antonios Alevizos, Markella Mikhail, Alexandros Kaminas

doi: 10.12681/npse.37533

International Journal of Non-Profit Sector Empowerment
Volume 3, Issue 1 (2024)

ISSN: 5786-2432, e-ISSN: 7344-9856
https://doi.org/10.12681/npse.37533

RESEARCH ARTICLE

Exploring Coastal Societies' Ties with the Sea and the Impact of Ecosystem Regulations

Antonios Alevizos
Adjunct Lecturer, Department of Social Policy, Democritus University of Thrace; Researcher, Laboratory of Sociology of Culture and Civilization, Department of Sociology, Panteion University of Social and Political Sciences, Greece.

Markella Mikhail
Research Associate, Laboratory of Sociology of Culture and Civilization, Panteion University of Social and Political Sciences, Greece.

Alexandros Kaminas
Sustainability Research Fellow, UN Sustainable Development Solutions Network Youth Greece.

Abstract
This paper examines the close connection between coastal communities and the marine environment, which has long served as a vital source of sustenance and economic opportunity. Despite the numerous benefits derived from this profound relationship, human activities have increasingly imperilled the health and resilience of marine ecosystems. Overfishing, pollution, and habitat destruction are among the chief drivers of these impacts, which have contributed to a range of global environmental challenges. To better understand the implications of these issues for coastal communities, this paper considers the ways in which the collapse of aquatic ecosystems threatens human wellbeing in these regions. The article also presents a range of proposed policy interventions aimed at addressing these challenges, including sustainable development and corporate social responsibility initiatives, as well as more targeted interventions such as sustainable fishing practices, lifestyle changes on the individual level and the use of natural infrastructure. By addressing these challenges, it may be possible to safeguard both the livelihoods of coastal communities and the long-term health of marine ecosystems.

Keywords: Coastal Communities, Climate Crisis, Sustainable Development, Corporate Social Responsibility

Introduction

There are many different facets and a complex relationship between coastal settlements and the water. Coastal communities across the world have relied on the sea for generations as a source of food, income, and cultural identity. Living close to the water offers a wide range of goods and services, such as transportation, leisure, and tourism, as well as fish, shellfish, seaweed, and other marine life that can be collected for food. However, this close connection to the sea has also had negative effects on

human health and marine ecosystems.

Activities carried out by coastal communities like fishing, aquaculture, shipping, and tourism may lead to overfishing, habitat damage, pollution, and marine debris. These effects may in turn have wide-ranging effects on coastal communities' economies and social structures, as well as biodiversity loss, fish population losses, and increased disease risk (Sutton-Grier et al, 2015). The side-effects of coastal communities' activities on the oceans are further enhanced by a deteriorating climate change. Protecting marine ecosystems and the general people from these harmful effects has become more and more critical in recent years. As a result, new laws and policies have been created to lessen the impact of coastal towns' interactions with the aquatic biota. Sustainable Development (SD) and Corporate Social Responsibility (CSR) are two concepts that have also been created for the same cause. Laws and guidelines were created to strike a balance between coastal communities' requirements and the needs of the public's health and the environment. Furthermore, there are more than just economic and environmental factors at play in coastal towns' interactions with the marine environment. Additionally, life in coastal areas is marked by significant social and cultural components (Dolan & Walker, 2006).

Coastal Communities and the Sea

The diverse populations of coastal villages are united by their proximity to the sea. There are coastal communities all throughout the world, ranging in size from small fishing towns to cities built around ports and harbours. Fishing and aquaculture are two of the main ways coastal people connect with the aquatic environment. For thousands of years, coastal societies have relied on fishing as a major source of food and revenue. Aquaculture has recently grown in importance as a source of sustainable seafood and as a source of employment in many coastal areas (Payne et al, 2001). Transportation is another way that coastal communities engage with the water. The flow of people and goods through ports and harbours, which offer access to international markets, is made a much easier affair on water. For daily commuting and transit, many coastal communities also rely on ferries and other nautical modes of transportation. In coastal communities, the sea is crucial to the tourism industry as well. The beaches, marine life, and water sports in coastal areas attract the attention of tourists. Coastal tourism has the potential to be a sizable source of revenue for local companies and to generate employment in the hotel and service sectors (Andrews et al, 2021). The sea is significant to coastal areas culturally as well as economically. Numerous coastal towns have created distinctive cultural customs and ways of life that are closely related to the sea. Traditional fishing techniques, artisanal fishing, coastal cuisine, and other local cultural practices that have evolved around the sea are some examples (Dolan & Walker, 2006).

The sea also contributes significantly to the social fabric of coastal communities by offering venues for social gatherings, recreational activities, and civic activities (Sutton-Grier et al, 2015).

However, the interaction of coastal populations with the marine environment can also have detrimental effects on its structure and natural processes. One of the primary challenges to marine ecosystems is overfishing, along with pollution and habitat destruction. Depletion of fish stocks due to overfishing may have a domino effect on the ecosystem (Daskalov et al, 2007). For instance, overfishing in some fish species may increase the populations of their prey, which may then result in a cascade event that ultimately reduces ecosystem health. The effects on the environment may be extensive, possibly rendering it unable to provide resources for years (Berzi et al, 2006). Ecosystems can also be harmed by pollution from sources such agricultural runoff, sewage, and oil spills (Islam et al, 2004). Additionally, pollutants can build up in the tissues of marine organisms, resulting in health difficulties and even death (Andrews et al, 2021). Another major hazard to marine ecosystems is habitat degradation. Wetlands and coral reefs are just two examples of the vital habitats that can be destroyed by coastal development, which includes building ports, marinas, and other infrastructure. Numerous species of marine life depend on these areas for breeding and foraging, and their local extinction could have a large negative influence on the ecosystem (Jackson et al, 2001).

The necessity of striking a balance between the economic advantages of coastal communities' interactions with the sea and the need to maintain the marine environment and public health has been increasingly evident in recent years. To address these issues, new laws and policies have been created, such as fishing quotas, marine protected areas (MPAs), and pollution control measures (Vikas & Dwarakish, 2015). The long-term survival of coastal communities and the maritime environment is meant to be safeguarded by these laws and policies. Implementing these restrictions, nevertheless, presents certain difficulties. One issue is that many coastal villages lack the capacity and resources necessary to adhere to the restrictions. For instance, small-scale fishermen might not have the tools and technology required to adhere to fishing restrictions (Tzanatos et al, 2007). The absence of political will to execute the laws, particularly when economic interests are at stake, is another problem. In addition to these difficulties, further study is required to comprehend the effects of human activity on marine ecosystems (Curtin & Prelezzo, 2010). The establishment of new laws and policies that are supported by best practices and scientific research can benefit from the knowledge gained from this research, and also assist in pointing out areas where additional work is required to protect the marine environment (Lascelles et al, 2012).

Sea Level Rise

The side-effects of global warming on our world are becoming more and more important when considering management decisions (Nicholis & Klein, 2005). One of its most important repercussions is the rising of sea levels. Increasing temperatures cause glaciers and land ice to melt, adding water to the ocean (Church et al., 1991). Also, the volume of the ocean is expanding as the water warms up (Church et al., 1991). The effects of such alterations to our ecosystems are significant and may prove catastrophic for vulnerable regions and communities (Rabani et al., 2010). In 2022, the French government published a map of 126 coastal towns and villages that will have to change their planning laws due to coastal erosion. Average global sea level has risen by 9cm since 1993 and is now rising by more than 4mm per year (Allan et al, 2021). There is an urgent need for action on two fronts: stabilising sea level rise at around four millilitres per year and adapting (either by protecting, relocating or avoiding building in low-lying areas) to actually limit the effects of sea-level rise. By the end of the century, every French coastal community should be prepared for catastrophic storms amplified by rising sea levels (Dumas et al., 2013). Higher sea levels are a more significant threat in the United States, where 40 percent of the population lives in coastal areas (Strauss et al., 2012). Globally, over hald of the world's 30 largest cities are built close to the coastal setting (Kumu et al., 2016).

Rising seas threaten infrastructure necessary for local jobs, regional industries and they also mean that deadly storm surges (like those associated with Hurricane Katrina) will become more and more habitual (Mirza, 2003). Coastal communities are also very much affected by the deteriorating climate crisis. According to Depledge et al., (2017) "*communities along the coast are on the front line in facing climate change and marine pollution impacts, furthermore their economies are deeply embedded with coastal and other marine activities, making these communities particularly affected*". The sea-level rise and the extreme weather events that coastal communities must deal with expose them to increased risk for not just their economy, but for their wellbeing as well. The increased pollution in the oceans has been found to further affect human health. According to the same article "coastal populations are more likely to report poorer general health than those further inland". By 2080, the health and wellbeing of global coastal communities are projected to face exacerbated challenges from climate change, attributed to anticipated sea-level rise of up to one meter (potentially extending to two meters), heightened occurrences of winter storms, more frequent and dangerous coastal flooding, elevated temperatures, amplified levels of winter precipitation predominantly along the northern and western coastlines, and escalated rates of coastal erosion and sediment reworking, leading to the reconfiguration, relocation, and diminution of coastal sedimentary processes (Depledge et al., 2017).

Sustainable Development for Coastal Communities

In 2015 the 2030 Agenda for Sustainable Development (SD) was adopted by all the United Nations Member States. Its goal was to provide a universal guide to achieve sustainability, meaning a state in which the needs of the present are fulfilled without endangering the fulfilment of the needs of future generations (Agbedahin, 2019). The 2030 Agenda is made up of 17 goals that according to the UN "recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests" (United Nations, 2023a; Sustainable Development Commission).

Financial crises that affect millions of people and a deteriorating climate crisis are just two mere side effects of uncontrollable human development (Agbedahin, 2019). Sustainable Development seeks to achieve "living within our environmental limits". However, the focus of SD isn't limited to just the environment. A healthy and well-managed society is just as important to it. As the Sustainable Development Commission declares this means "meeting the diverse needs of all people in existing and future communities, promoting personal wellbeing, social cohesion and inclusion, and creating equal opportunity" (Sustainable Development Commission) SD is of great significance in the achievement of equitable systems concerning the oceans as it entails a relevant SDG. In particular, the 14th SDG has set the goal to "Conserve and sustainably use the oceans, seas and marine resources for sustainable development". The targets of the aforementioned SDG are mentioned in Table 2 (United Nations, 2023c). However, it isn't only the 2030 Agenda For Sustainable Development that has connected SD with sustainability for the oceans. This connection is recognised by the international community as well and it is also a part of the Chapter 17 of Agenda 21, the Johannesburg Plan of Implementation and various decisions taken by the Commission on Sustainable Development (Sustainable Development Goals, 2022). The ecosystem services provided by the oceans very important for the harmonious function of the whole of humanity (Mitra, 2020). However, it is a fact that some particular groups, usually indigenous people, and vulnerable groups may be even more dependent on relevant resources. Achieving equality and the fulfilment of their rights is an integral part of sustainable growth (Sustainable Development Goals, 2022). A more sustainable use of resources, changes in consumption patterns and production habits concerning the oceans, sustainable land- and marine- based human activities and adequate relevant measures could be decisive in the propagation of ocean sustainability. A good governance and an enabling environment are mandatory for the achievement of the goals (Sustainable Development Goals, 2022).

Corporate Social Responsibility towards oceans' sustainability

Special significance is to be given to enterprises in the achievement of overall sustainability and ocean sustainability. The prior are major contributors to climate change and its many side-effects. As the Guardian pointed out in 2017 just 100 companies are responsible for 71% of global emissions. In this data, however, a key to achieving sustainability is revealed (The Guardian, 2017). Corporate social responsibility (CSR) aims at propagating sustainability through the sustainable management of corporations. In a contemporary reality of advanced climate awareness, a demand for enhanced transparency in the strategy of enterprises has prompted businesses into examining their value chains and controlling their effects on the environment and on society (ElAlfy et al, 2020).

Even though the concept of CSR has existed in relevant academic literature for over 50 years, a standard definition to describe it or criteria to apply it don't exist (Yadlapalli et al., 2020). However, a general understanding of it is prevalent in corporations strategic planning. It relates to addressing social and environmental issues and with topics such as philanthropy and sustainability. Its foundation is the belief that companies ought to have responsibilities that overcome profitability and include environmental issues and social concerns. As corporations' agendas according to CSR should entail tackling societal and environmental issues while achieving profit, it becomes apparent that there is a very close connection between CSR and SD. However, their connection is not limited to that sole fact. Their relationship heightens in complexity due to the reality that SD is achievable without the parallel sustainable development of corporations (ElAlfy et al., 2020).

Scholars have carried out much research on the topic of CSR, a lot of which depended on the outcomes of China's 2008 mandate requiring firms to disclose CSR activities. The results of the relevant works tackled the question "why hasn't CSR already become mandatory?". Findings of the analysis of the 2008 mandate highlighted that the cities that were the most influenced by the CSR disclosure experienced a decrease in their industrial wastewater and SO2 emission levels (Chen, Hung and Wang, 2018). Furthermore, according to a different article by Balon et al (2022), "*Firms that adapt to mandatory CSR reporting have shown significantly higher green innovation performance, i.e., on average, a 26% increase in green patents, relative to non-CSR reporting firms, and this effect is stronger for state-owned firms, for firms with greater media coverage, and for firms situated in areas with stricter environmental rules. [...] From a global perspective, these advantages help firms to increase brand reputation, manage foreign subsidiaries efficiently and thereby improve overall performance in that host country*" (Balon et al., 2022) Another article by Mbanyele et al. (2022) argues that as CSR disclosure laws increased green innovation output and quality, they are a very significant

factor of turning enterprises green and propagating their efforts against climate change. According to the authors "*our findings support that firms' engagement in CSR activities maximizes social welfare through the production of sustainable technologies that mitigate climatic risk*" (Mbanyele et al., 2022). Therefore, the committed adoption of CSR practices would be a great step towards the achievement of sustainability (Mbanyele et al., 2022).

However, mandatory CSR is not a prevailing concept. That is as CSR reporting firms experience a decrease in profitability subsequent to the mandate (Chen, Hung and Wang, 2018). Achieving sustainability demands questioning the significance that enhanced profit has at the expense of values that are determinant for the wellness of our planet and of our kind. Given the magnitude of the effects of enterprises on the environment it is to be suggested that the concept of mandatory CSR isn't taken lightly by public opinion and stakeholders (The Guardian, 2017).

Positive Steps Towards Sustainable Coastal Communities

Mangrove forest restoration with the help of local communities is one of the policies towards oceans' sustainability (Lewis et al., 2000; Ellison, 2000). Even though mangrove forests represent less than one percent of tropical forests, they hold great importance due to their ecosystem services (Holl et al., 2020). They provide coastal hazard reduction and enhance human livelihoods. They are not only great natural barriers to coastal floods, typhoons and tsunamis but they are very helpful for the creation of local and commercial fisheries, and they have been proven to be great contributors to the wellbeing of coastal communities and of the ocean as well. As mangroves filter sediments, they improve water quality. They have also been found to be one of the "*most productive ecosystems, in large part due to the high amounts of carbon stored in their soils, making them an increasing focus of efforts to mitigate climate change*" (Mitra, 2020). Lastly, it has been noted that they bring about significant economic benefits as well. According to relevant literature "*mangrove forests in Thailand have a value of US$8,966-10,821/ha for storm protection, US$484-595/ha for products provided to communities, and US$708-987/ha in increased offshore fisheries production*" they also "*avert US$1 billion in property damages through floodwater protection each year in the Philippines alone*" (Holl et al., 2020).

Natural infrastructure, meaning natural habitats and features designed to mimic natural processes, is also suggested by relevant bibliography. Natural infrastructure, instead of traditional infrastructure, is becoming more and more widespread in time, but it still represents a relatively small fraction within portfolios of coastal risk-reducing strategies. Such an infrastructure brings on many different benefits, fulfilling a plethora of biological, cultural, social, and economic goals (Dundas, 2017). It significantly

helps with risk reduction against sea level rise, storms and flooding and it brings on many benefits to socio-ecological systems such as supporting, regulating, culturally sustaining, and provisioning ecosystem services. It also brings enhanced erosion control, recreation, and habitat preservation to coastal communities (Powell et al., 2019).

Despite the difficulties facing coastal communities and the marine environment, progress in the direction of sustainability has been made. To maintain the long-term wellbeing of both people and the environment, sustainable coastal communities balance economic, environmental, social, and cultural issues. The expansion of sustainable fishing methods has been a step in the right direction toward sustainability. These procedures are intended to fulfil the economic requirements of coastal communities while simultaneously ensuring the long-term sustainability of fisheries and marine ecosystems. Fishing limits, gear restrictions, and the use of selective fishing techniques that only take targeted fish species and sizes are just a few examples of sustainable fishing practices. These methods can lessen the effects of fishing on the marine environment and help to prevent overfishing (Edwin, 2020). The growth of eco-tourism has also been a successful step in the direction of sustainability. Eco-tourism is a subset of tourism that emphasizes environmentally responsible visits to natural regions (Welford, & Ytterhus, 1998). Communities around the coast may benefit financially from ecotourism, which is centered on protecting and preserving the marine environment. Ecotourism may also encourage the conservation of marine ecosystems and help to increase tourist understanding of the value of maintaining the maritime environment (Blamey, 2001).

Furthermore, in many coastal areas, sustainable aquaculture has become a significant economic sector. Aquaculture that minimizes its negative effects on the marine environment is referred to as sustainable aquaculture. This includes practices like minimizing waste and water use, utilizing low-impact feed, cutting back on the use of antibiotics and pesticides, and more. In addition to helping to preserve marine habitats, sustainable aquaculture can generate revenue for coastal communities (Chua, 1992; Frankic & Hershner, 2003). In addition to these commercial endeavours, marine protected areas (MPAs) have been established to safeguard marine ecosystems. To preserve the biodiversity and ecosystems of the ocean, MPAs are sections of the sea that are off-limits to fishing and other activities. Through ecotourism, MPAs can help coastal communities make money while also promoting the preservation of marine habitats (Cicin-Sain, B & Belfiore, 2005). The significance of including traditional knowledge and practices in the management of coastal resources is becoming increasingly clear. Coastal communities have established their traditional knowledge and practices through many generations, and they can offer important insights into the management of marine ecosystems. The

long-term sustainability of coastal communities and the marine environment can be supported by integrating traditional knowledge and practices into resource management (Chen & Cheng, 2020).

The Importance of Sustainable Coastal Communities

The long-term health of the ecosystem and the population of sustainable coastal communities depends on an equilibrium between human needs and environmental carrying capacity and resources (Graymore et al., 2010). Coastal communities rely heavily on the sea for their food, livelihoods, and sense of cultural identity, yet this tight connection can put pressure on the marine environment (Arthurton & Korateng, 2005; Suchanek, 1994) A balance between community needs and environmental protection requirements is thus necessary for coastal towns to achieve sustainability. Sustainable economic development aims to balance environmental protection and economic growth. The growth of sustainable sectors, like ecotourism, sustainable aquaculture, and renewable energy, can help to achieve this. These sectors can help to preserve the marine environment while also giving coastal people a source of income (Hossain et al., 2020; Jurado et al., 2012). Social sustainability is a crucial component of well-managed coastal communities. Making sure that everyone in the community, especially the most vulnerable members, has their needs met is essential to social sustainability. This can be accomplished by offering essential services like housing, healthcare, and education, as well as by fostering social inclusion and equity (Gilek et al, 2001). Coastal towns must also conserve and protect their natural resources to be sustainable. This includes managing coastal resources like fisheries and water quality, protecting significant habitats like wetlands and coral reefs, and conserving marine biodiversity. The long-term welfare of both humans and the environment depends on the protection and preservation of natural resources (Hossain et al, 2020; Loizou et al, 2014).

Additionally, for coastal regions to be sustainable, local communities must be involved in decision-making processes. Local communities can contribute significantly to the development of policies and management plans since they have valuable knowledge and understanding of the marine environment (Loch & Riechers, 2021). Local community involvement and engagement can also ensure that policies and management strategies are suited to the unique requirements and conditions of coastal areas. Subsequently, the creation of management plans and regulations based on best practices and scientific research is necessary for coastal communities to remain sustainable. Policies and management plans must be adaptable and flexible to consider shifting social, economic, and environmental factors. Collaboration between scientists, policymakers, and coastal communities is also necessary for the creation of policies and management plans (Karim et al., 2009).

The Role of Individuals in Achieving Sustainable Coastal Communities

Not only are governments, scientists, and coastal communities themselves responsible for creating sustainable coastal communities, but also every capable individual. Through their daily deeds and decisions, people can significantly contribute to the sustainability of coastal communities. By lowering their carbon footprint, individuals can make a significant contribution to the sustainability of coastal communities (Jones et al., 2011). Climate change is a growing hazard to coastal communities and the marine environment, and carbon emissions play a part in it. By using more environmentally friendly modes of transportation, such as walking, bicycling, or using the bus, as well as by using less energy at home and at work, people can lessen their carbon footprint. Reducing single-use plastic usage is another way that individuals may support sustainable coastal communities. Single-use plastics are a significant source of marine pollution that harms ecosystems and marine life. By using reusable containers for their food, water, and bags as well as by properly disposing of their trash, people can cut down on the number of single-use plastics they use (Schwenkenbecher, 2014). Additionally, people can support environmentally friendly businesses and industries to help create sustainable coastal communities. In coastal towns, fostering these enterprises and sectors can help to advance sustainability. In addition to these initiatives, citizens may support sustainable coastal communities by encouraging sustainability awareness and education. Individuals can support the advancement of a sustainability culture in coastal communities by disseminating information and knowledge about the effects of human activity on the marine environment and the significance of sustainable behaviours. Finally, individuals can support sustainable coastal communities by getting involved in local projects and giving their time to environmental charities. Community-based programs like tree planting days and beach clean-ups can support sustainability while also building a sense of belonging and social inclusion.

Future Outlook for Sustainable Coastal Communities

The prospects for sustainable coastal settlements are both encouraging and difficult. On one hand, there is an expanding body of knowledge and experience on how to achieve sustainability in coastal communities, as well as increased acknowledgement of the significance of sustainable practices in coastal areas. However, due in part to the effects of climate change, the problems facing coastal communities are becoming more complex and urgent (Arthurton, & Korateng, 2005). Climate change is causing sea levels to increase, putting coastal areas at risk of flooding and erosion that could destroy buildings, houses, and businesses as well as other critical infrastructure (Kumar et al., 2021). The social and economic health of coastal towns may be significantly impacted by this (Depledge et al., 2017;

Dolan & Walker, 2006). Therefore, it's crucial to create sea level rise adaptation plans that include erecting sea walls, moving buildings and infrastructure, and implementing coastal land use planning (Toimil et al., 2020). The destruction of marine ecosystems brought on by pollution, overfishing, and climate change is a problem that coastal towns must also deal with. To safeguard and restore marine ecosystems, it is crucial to adopt solutions that include the establishment of marine protected areas, the use of sustainable fishing methods, and a decrease in plastic pollution (Sutton-Grier et al., 2015).

Additionally, the prospects of sustainable coastal communities depend on the development of sustainable industries and enterprises. Ecotourism, sustainable aquaculture, and renewable energy are examples of sustainable sectors that can generate revenue for coastal communities while also preserving the marine environment. Supporting the growth of sustainable industries and businesses in coastal areas is crucial (Agardy, 1993; Frankic & Hershner, 2003). A way to further ensure that policies and management methods are customized to the requirements and conditions of coastal communities is through the participation and engagement of local people in decision-making processes and the utilization of traditional knowledge (Chen & Cheng, 2020). It is also critical to support new initiatives and research in the area of sustainability in coastal towns. This can aid in the creation of novel technologies, plans, and methods for achieving sustainability.

Conclusions

The prognosis for sustainable development is both positive and challenging. Due in part to the effects of climate change, the problems facing coastal communities are growing more complicated and urgent. However, it is possible to work toward achieving sustainable coastal communities that experience competitive development while also safeguarding the marine environment. Strategies to adapt to sea level rise, such as the implementation of sea walls, coastal land use planning, and infrastructure relocation, are imperative for mitigating the impacts of erosion and land loss on coastal settlements. Additionally, efforts to protect and restore marine ecosystems, such as the establishment of marine protected areas and the promotion of mangrove forests or coral reefs restoration, are crucial for preserving biodiversity and ecosystem services, which can be of significant economic importance. Supporting sustainable industries and activities, such as ecotourism, sustainable aquaculture, and renewable energy, not only generates economic opportunities for coastal communities but also contributes to environmental conservation. Moreover, promoting the engagement of local communities in decision-making processes ensures that policies and initiatives are tailored to local needs. Raising awareness and promoting education relating to the importance of sustainable coastal management is also essential for fostering a culture of environmental stewardship and empowering communities to

act. Lastly, relevant research and innovation in areas such as sustainable technologies to replace single-use materials, adaptation strategies to lessen the effects of climate change and/or human pollution, and ecosystem restoration methods is fundamental for identifying efficient solutions to complex coastal challenges, which can then be translated into effective legislation. It is thus important to overcome the intricate issues of coastal sustainability and work towards a future where coastal communities develop in harmony with the marine environment by utilizing interdisciplinary strategies and encouraging collaboration among stakeholders and research.

References

Adame, M. F., Arthington, A. H., Waltham, N., Hasan, S., Selles, A., & Ronan, M. (2019). Managing threats and restoring wetlands within catchments of the Great Barrier Reef, Australia. *Aquatic Conservation: Marine and Freshwater Ecosystems*, *29*(5), 829-839.

Agardy, M. T. (1993). Accommodating ecotourism in multiple use planning of coastal and marine protected areas. *Ocean & Coastal Management*, *20*(3), 219-239.

Agbedahin, A. V. (2019). Sustainable development, Education for Sustainable Development, and the 2030 Agenda for Sustainable Development: Emergence, efficacy, eminence, and future. *Sustainable Development*, *27*(4), 669-680.

Arthurton, R., & Korateng, K. (2005). Coastal and marine environments. Chapter 5, pp. 155–195. Section 2: Environmental State and Trends: 20-Year Retrospective. In: *Africa Environment Outlook 2–Our Environment, Our Wealth (AEO-2)*. United Nations Environment Programme (UNEP), 540 pp.

Andrews, N., Bennett, N. J., Le Billon, P., Green, S. J., Cisneros-Montemayor, A. M., Amongin, S., ... & Sumaila, U. R. (2021). Oil, fisheries and coastal communities: A review of impacts on the environment, livelihoods, space and governance. *Energy Research & Social Science*, *75*, 102009.

Balon, V., Kottala, S. Y., & Reddy, K. S. (2022). Mandatory corporate social responsibility and firm performance in emerging economies: An institution-based view. *Sustainable Technology and Entrepreneurship*, *1*(3), 100023. https://doi.org/10.1016/j.stae.2022.100023

Bearzi, G., Politi, E., Agazzi, S., & Azzellino, A. (2006). Prey depletion caused by overfishing and the decline of marine megafauna in eastern Ionian Sea coastal waters (central Mediterranean). *Biological Conservation*, *127*(4), 373-382.

Blamey, R. K. (2001). Principles of ecotourism. In *The encyclopedia of ecotourism* (pp. 5-22). Wallingford UK: Cabi Publishing.

Chen, T. L., & Cheng, H. W. (2020). Applying traditional knowledge to resilience in coastal rural villages. *International Journal of Disaster Risk Reduction*, *47*, 101564.

Chen, Y., Hung, M., & Wang, Y. (2018). The effect of mandatory CSR disclosure on firm profitability and social externalities: Evidence from China. *Journal of Accounting and Economics*, *65*(1). https://doi.org/10.1016/j.jacceco.2017.11.009

Chua, T. E. (1992). Coastal aquaculture development and the environment: the role of coastal area management. *Marine Pollution Bulletin, 25*(1-4), 98-103.

Church, J. A., Godfrey, J. S., Jackett, D. R., & McDougall, T. J. (1991). A model of sea level rise caused by ocean thermal expansion. *Journal of Climate, 4*(4), 438-456.

Cicin-Sain, B., & Belfiore, S. (2005). Linking marine protected areas to integrated coastal and ocean management: A review of theory and practice. *Ocean & Coastal Management, 48*(11-12), 847-868.

Dundas, S. J. (2017). Benefits and ancillary costs of natural infrastructure: Evidence from the New Jersey coast. *Journal of Environmental Economics and Management, 85*, 62-80.

Curtin, R., & Prellezo, R. (2010). Understanding marine ecosystem based management: a literature review. *Marine policy, 34*(5), 821-830.

Daskalov, G. M., Grishin, A. N., Rodionov, S., & Mihneva, V. (2007). Trophic cascades triggered by overfishing reveal possible mechanisms of ecosystem regime shifts. *Proceedings of the National Academy of Sciences, 104*(25), 10518-10523.

Depledge, M. H., Lovell, R., Wheeler, B. W., Morrissey, K. M., White, M., & Fleming, L. E. (2017). *Future of the sea: health and wellbeing of coastal communities*. Retrieved from https://ore.exeter.ac.uk/repository/handle/10871/31606

Dolan, A. H., & Walker, I. J. (2006). Understanding vulnerability of coastal communities to climate change related risks. *Journal of Coastal research*, 1316-1323.

Dumas, P., Hallegatte, S., Quintana-Seguí, P., & Martin, E. (2013). The influence of climate change on flood risks in France–first estimates and uncertainty analysis. *Natural Hazards and Earth System Sciences, 13*(3), 809-821.

Edwin, L. (2020). Sustainable fishing practices. ICAR-Central Institute of Fisheries Technology.

ElAlfy, A., Palaschuk, N., El-Bassiouny, D., Wilson, J., & Weber, O. (2020). Scoping the Evolution of Corporate Social Responsibility (CSR) Research in the Sustainable Development Goals (SDGs) Era. *Sustainability, 12*(14). https://doi.org/10.3390/su12145544

Ellison, A. M. (2000). Mangrove restoration: do we know enough?. *Restoration ecology, 8*(3), 219-229.

Frankic, A., & Hershner, C. (2003). Sustainable aquaculture: developing the promise of aquaculture. *Aquaculture international, 11*, 517-530.

Graymore, M. L., Sipe, N. G., & Rickson, R. E. (2010). Sustaining human carrying capacity: A tool for regional sustainability assessment. *Ecological Economics, 69*(3), 459-468.

Gilek, M., Armoskaite, A., Gee, K., Saunders, F., Tafon, R., & Zaucha, J. (2021). In search of social sustainability in marine spatial planning: a review of scientific literature published 2005–2020. *Ocean & Coastal Management, 208*, 105618.

Holl, K. D., Studies, E., & Cruz, S. (2020). *Asian mangroves: community involvement in mangrove restoration provides coastal hazard reduction and enhances human livelihoods. Indonesia and Sri Lanka*. Retrieved from https://blue-forests.org/wp-content/uploads/2020/05/Holl-K-2020-Asian-Mangrove-Case-Study.pdf

Hossain, M. S., Gain, A. K., & Rogers, K. G. (2020). Sustainable coastal social-ecological systems: how do we define "coastal"?. *International journal of sustainable development & world ecology, 27*(7), 577-582.

Islam, M. S., & Tanaka, M. (2004). Impacts of pollution on coastal and marine ecosystems including coastal and marine fisheries and approach for management: a review and synthesis. *Marine pollution bulletin, 48*(7-8), 624-649.

Jackson, J. B., Kirby, M. X., Berger, W. H., Bjorndal, K. A., Botsford, L. W., Bourque, B. J., ... & Warner, R. R. (2001). Historical overfishing and the recent collapse of coastal ecosystems. *Science, 293*(5530), 629-637.

Jones, C. M., & Kammen, D. M. (2011). Quantifying carbon footprint reduction opportunities for US households and communities. *Environmental science & technology, 45*(9), 4088-4095.

Sutton-Grier, A. E., Wowk, K., & Bamford, H. (2015). Future of our coasts: The potential for natural and hybrid infrastructure to enhance the resilience of our coastal communities, economies and ecosystems. *Environmental Science & Policy, 51*, 137-148.

Schwenkenbecher, A. (2014). Is there an obligation to reduce one's individual carbon footprint?. *Critical review of international social and political philosophy, 17*(2), 168-188.

Tzanatos, E., Somarakis, S., Tserpes, G & Koutsikopoulos, C. (2007). Discarding practices in a Mediterranean small-scale fishing fleet (Patraikos Gulf, Greece). *Fisheries Management and Ecology, 14*(4), 277-285.

Toimil, A., Losada, I. J., Nicholls, R. J., Dalrymple, R. A., & Stive, M. J. (2020). Addressing the challenges of climate change risks and adaptation in coastal areas: A review. *Coastal Engineering, 156*, 103611.

Karim, M. S., & Hoque, R. (2009). Integrated coastal zone management and sustainable development of coastal area: A short overview of international legal framework. In Moksness, E., Dahl, E., Støttrup, J. (Eds). *Integrated coastal zone management*, 170-177. https://doi.org/10.1002/9781444316285.ch13

Kumar, N., Poonia, V., Gupta, B. B., & Goyal, M. K. (2021). A novel framework for risk assessment and resilience of critical infrastructure towards climate change. *Technological Forecasting and Social Change, 165*, 120532.

Kummu, M., De Moel, H., Salvucci, G., Viviroli, D., Ward, P. J., & Varis, O. (2016). Over the hills and further away from coast: Global geospatial patterns of human and environment over the 20th–21st centuries. *Environmental Research Letters, 11*(3), 034010.

Lascelles, B. G., Langham, G. M., Ronconi, R. A., & Reid, J. B. (2012). From hotspots to site protection: Identifying Marine Protected Areas for seabirds around the globe. *Biological Conservation, 156*, 5-14.

Lewis III, R. R. (2000). Ecologically based goal setting in mangrove forest and tidal marsh restoration. *Ecological Engineering, 15*(3-4), 191-198.

Loch, T. K., & Riechers, M. (2021). Integrating indigenous and local knowledge in management and research on coastal ecosystems in the Global South: A literature review. *Ocean & Coastal Management, 212*, 105821.

Loizou, E., Chatzitheodoridis, F., Polymeros, K., Michailidis, A., & Mattas, K. (2014). Sustainable development of rural coastal areas: Impacts of a new fisheries policy. *Land use policy, 38*, 41-47.

Mbanyele, W., Huang, H., Li, Y., Muchenje, L. T., & Wang, F. (2022). Corporate social responsibility and green innovation: Evidence from mandatory CSR disclosure laws. *Economics Letters, 212*, 110322. https://doi.org/10.1016/j.econlet.2022.110322

Mirza, M. M. Q. (2003). Climate change and extreme weather events: Can developing countries adapt?. *Climate Policy*, *3*(3), 233-248.

Mitra, A. (2020). Ecosystem Services of Mangroves: An Overview. In: *Mangrove Forests in India*. Springer, Cham. https://doi.org/10.1007/978-3-030-20595-9_1

Nicholls, R. J., & Klein, R. J. (2005). Climate change and coastal management on Europe's coast. In *Managing European Coasts: Past, Present and Future* (pp. 199-226). Berlin, Heidelberg: Springer Berlin Heidelberg.

Payne, M. R., Kudahl, M., Engelhard, G. H., Peck, M. A., & Pinnegar, J. K. (2021). Climate risk to European fisheries and coastal communities. *Proceedings of the National Academy of Sciences, 118*(40), e2018086118.

Powell, E. J., Tyrrell, M. C., Milliken, A., Tirpak, J., & Staudinger, M. (2019). A review of coastal management approaches to support the integration of ecological and human community planning for climate change. *Journal of Coastal Conservation*, *23*, 1–18. https://doi.org/10.1007/s11852-018-0632-y

Rabbani, M. G., Rahman, A. A., Islam, N., Michel, D., & Pandya, A. (2010). Climate change and sea level rise: Issues and challenges for coastal communities in the Indian Ocean region. In Coastal Zones and Climate Change, 17-29. The Henry L. Stimson Center.

Strauss, B. H., Ziemlinski, R., Weiss, J. L., & Overpeck, J. T. (2012). Tidally adjusted estimates of topographic vulnerability to sea level rise and flooding for the contiguous United States. *Environmental Research Letters*, *7*(1), 014033.

Suchanek, T. H. (1994). Temperate coastal marine communities: Biodiversity and threats. *American Zoologist*, *34*(1), 100-114.

Sustainable Development Commission. (n.d.). *What is sustainable development*. Retrieved from https://www.sd-commission.org.uk/pages/what-is-sustainable-development.html

Sustainable Development Goals. (2022). *Oceans & Seas*. Retrieved from https://sustainabledevelopment.un.org/topics/oceanandseas

The Guardian. (2017). *Just 100 companies responsible for 71% of global emissions, study says*. Retrieved from https://www.theguardian.com/sustainable-business/2017/jul/10/100-fossil-fuel-companies-investors-responsible-71-global-emissions-cdp-study-climate-change

United Nations. (2023a). *Transforming our world: The 2030 Agenda for Sustainable Development*. Retrieved from https://sdgs.un.org/2030agenda

United Nations. (2023b). *The 17 goals*. Retrieved from https://sdgs.un.org/goals

United Nations. (2023c). *Conserve and sustainably use the oceans, seas and marine resources for sustainable development*. Retrieved from https://sdgs.un.org/goals/goal14

Vikas, M., & Dwarakish, G. S. (2015). Coastal pollution: a review. *Aquatic Procedia*, *4*, 381-388.

Welford, R., & Ytterhus, B. (1998). Conditions for the transformation of eco-tourism into sustainable tourism. *European Environment*, *8*(6), 193-201.

Yadlapalli, A., Rahman, S., & Gunasekaran, A. (2020). Corporate social responsibility definitions in supply chain research: An ontological analysis. *Journal of Cleaner Production*, *277*, 123265.