Ca' Foscari University of Venice

MA ENVIRONMENTAL HUMANITIES FINAL THESIS

THIS THESIS IS TRASH

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FINAL THESIS

MASTER OF ARTS IN ENVIRONMENTAL HUMANITIES

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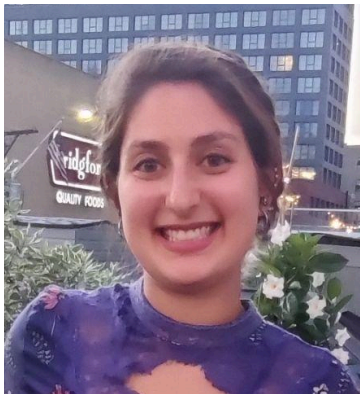

SCUBA diver, conservation activist, beginner herbalist, painter, photographer, English teacher, and yogi.

Graduated Cum Laude from the University of Wisconsin Whitewater in the United States with a BS in marine biology, and minors in Spanish and French where I was president of the Terrestrial & Aquatic Ecology Club, language ambassador for French language, French Honors Society member, and webmaster for the International Students Association.

I did field work in Gansbaai, South Africa working with Bronze-whaler and shy shark species, research on primary productivity, submerged vegetation, and social science in Laguna Bacalar, Mexico. And for my internship I also worked with a conservation organization in the Gili Islands, Indonesia collecting data for shark, turtle, and coral conservation.

I have work experience as a summer camp intern for a non-profit organization, librarian, bartender/waitress, and Spanish teacher.

For this master's degree in Environmental Humanities I wanted to combine my background knowledge in science and ecology with a more humanistic side of culture and ethnography. With my passions for sustainability and experiencing new cultures, I aim to contribute to the growing progress towards achieving the United Nations sustainable development goals and to pursue a life of initiating change for a greener earth and conscious living.

INTRODUCTION:

I had the privilege in the summer of 2023 to visit the Gili Islands, a trio of islands consisting of Gili Trawangan, Gili Meno, and Gili Air as a part of my internship for the Environmental Humanities masters program here at the University of Ca'Foscari. I worked primarily with and through the Gili Shark Conservation, a non-government organization that uses western scientific methods and fieldwork to collect and analyze data related to the health of the surrounding niches and ecosystems. I also worked alongside Oceans 5 dive shop and resort, which is the dive shop in partnership with the Gili Shark Conservation, due to the fact that most of the data collected requires volunteers and divemasters to physically be in the water with SCUBA gear. It was with them that we were able to rent our dive gear, store our equipment, and gather other volunteers for several project dives. Although my primary purpose for the internship was to get some experience in scientific diving, conservation work, and add some more dives to my logbook, I also knew that I wanted to explore more ethnographical studies and the field of anthropology. In the beginning, I wanted to explore the relationship between trash, particularly plastic waste, and biodiversity in the area. My ideas have since grown and I have shifted my focus to, if it isn't obvious from the title of this paper, trash. I am interested in trash and how much of an impact humans are having on this planet. Like many things in life, this title also has a double meaning. In the English speaking world, "this is trash" is a slang phrase to mean that something is bad or ridiculous in a negative way. I think that the reality of trash and over-consumerism are huge issues that we are facing in this day and age, and it is a bit ridiculous. This is why I chose this clever title to encompass my work.

I will go into literature reviews on the history, background, and current actions being taken on this massive global issue. I will also present my ethnographic research that I conducted while living and working on Gili Air. I collected both qualitative and quantitative data, where western science and my best attempt at anti-colonial ethnography collided. After outlining the key points, previous research, and current progress, I will then propose my own idea for a course of action. It consists of utilizing upcycled plastic waste and other trash as art and a tool for environmental education. This action plan is just an idea for the future, and it is uncertain whether or not it can actually be implemented. But I hope one day it can be, if not in the Gili Islands, then some other location that faces similar challenges.

HISTORY & BACKGROUND

The Gili Islands are nestled between the larger islands of Lombok and Bali in southern Indonesia. Originally, these tiny islands with an average diameter of just five kilometers acted as pit stops, trade islands, and resting points for ships passing by. It wasn't until the 1960s that permanent settlements were established by local Indonesians and western expats alike. And it didn't begin to attract tourists until around the 1980s. So the history of these islands is quite brief, with most of it being centered around tourism and the tourism industry.

Nowadays it is a fairly popular tourist destination with sandy beaches and previously large sea turtle, coral, manta ray, and shark populations, many reefs still remain healthy today, but the biodiversity index is nowhere near as high as it once was. These features attract divers from all over the world. Even though it's part of a marine protected area (MPA) called Gili Mantra Park(GiliSharkConservation, 2023), overfishing, shark killings, and waste pollution that decrease biodiversity are common in this area. And like many other coastal ecosystems, the Gili Islands are under threat(GiliEcoTrust, 2020). A major cause of this loss of biodiversity which is intrinsically and economically valuable to the community, visitors and tourists produce up to ten tons of waste every day, with most ending up in a temporary 22,000 square meter dump site on the island of Gili Trawangan(Nugraha, 2018). Waste from the other islands of Meno and Air, if it doesn't get burned on site releasing countless toxins and aerosols into the air, gets shipped to a landfill in the neighboring island of Lombok. There is also a recycling plant on Lombok, however, resources and funds are extremely limited and they simply cannot keep up with and process everything with the amount of waste coming in on a daily basis. There is also a significant amount of overflow from the Lombok recycling plant that gets shipped to the next closest facility which is on the main island of Java. Another struggle that has become a reality in this area is the fact that currents and tides are constantly changing, and storms often blow through this area. This means that the ferries that shuttle tourists, locals, supplies, equipment, and trash do not always run everyday or on time like they are supposed to. This results in an even bigger backlog of waste piling up, a lot of which then ends up on the beaches, in the ocean, or getting burned on the smaller islands. Due to the low sea level and the nature of the geography of the islands, floods are also fairly common. The landfills will flood, carrying tons of waste out to sea, a lot of which ends up deposited on the beaches and harbor of Gili Air. Indonesia is already the second largest contributor of plastic waste after China, with 85 million kilograms of plastic

being deposited into the environment every year(Invest Islands, 2021). Many peer reviewed studies have estimated that over 15 million tons of plastic end up in our oceans every year. To put this into perspective, this is the same as about two garbage trucks being dumped per minute(Oceana, 2023). These shocking numbers prove that trash and plastic pollution is not only a local challenge, but a massive global issue that must be faced soon before the negative impacts become too much for the world to recover from. There is also the danger of biomagnification and bioaccumulation of plastics in marine life that can be transferred to land. This is when for example, something at the bottom of the food web such as zooplankton ingests plastic, then a small fish comes and eats the zooplankton. Now let's say that the same small fish eats a very large amount of zooplankton, then the plastic will be transferred to the bloodstream of that fish in greater and greater amounts based on how much zooplankton it eats. Then, when a larger fish comes and eats several smaller fish, the amount of plastic will become even greater in concentration than before. And now finally large land predators such as bears and humans eat the larger fish. Now there will be plastic flowing in the blood of animals on land as well, even if it is just trace amounts. Because as we know, plastic and microplastics are persistent in the body. Even though some harmful chemicals from plastic such as BPA can be excreted from the body fairly easily, they are so common that new ones will always appear to replace the old ones. Although it is a global issue, it must be tackled by using a bottom-up approach and beginning with local communities doing their parts in reducing and banning plastics when needed.

The entire nation of Indonesia itself consists of thousands of islands, 87 percent of them being smaller than one square kilometer(Kurniawan et al., 2016). These small islands are especially vulnerable to impacts of natural disasters and anthropogenic activities. It is essential that more attention be paid to these grossly overlooked tiny islands because the majority of them usually have very high marine biodiversity and bustling coastlines. According to an article published in 2016, the Indonesian government has indeed considered stepping in to jump start the efforts to protect coastal and marine resources. However, an even bigger priority for them has been to further develop these small islands as "conservation" areas that serve the ecotourism industry, rather than protecting it with the intention of conserving its intrinsic value and integrity. Victims of this development scheme include the Gili Islands, and the islands of Bali and Lombok which are neighbors to the Gilis. Not only in Indonesia is this becoming a reality, the ecotourism industry is a worldwide phenomena that many tropical, coastal areas are becoming subject to, as

it is a proven method to boost micro and macro economies. The trend for the preference for smaller islands can be attributed to their beauty, remoteness, habitat diversity, warm weather, and clear water. Furthermore, when compared with other forms of tourism, the marine ecotourism sector has grown tremendously to become one of the largest industries in the world(Kurniawan et al., 2016). Whatever the original intention, many significant benefits for not only the economy, but also for marine conservation have come from this massive increase in popularity. Indonesia and the Gili Islands are no exception to this. On the other hand, this rise in ecotourism development is also responsible for many cases of environmental depletion from coastal construction to recreational activities. All of these new respective developments were carried out with no regard for other factors such as the lack of drinking water on these micro islands, and the low level of ecosystem resilience that these islands have against massive changes like the ones that are being made and have already been made in many areas. High vulnerability has a direct negative relationship with resilience, as proposed by the authors. Factors that make small islands, including the Gili Islands, particularly vulnerable can be their remote location leading to high transportation costs and difficulties, high reliance on imported goods, and the fact that natural disasters are simply more likely to cause higher levels of damage in smaller island communities(Kurniawan et al., 2016). Even without the crushing pressures of the growing tourism industry, the current and pressing climate crisis and population influx are already putting enough strain on these tiny island communities.

A large part of a socio-scientific research study was to do a vulnerability assessment of micro islands in order to prevent unwanted changes in stress, to preserve the current elements of the system, and to put an emphasis on sustainable economic activities that support ecosystem resilience. Specifically, this study focuses on the Gili Matra Islands in North Lombok and how the biophysical spatial changes from tourism contribute to the islands' vulnerability(Kurniawan et al., 2016). As previously mentioned, this group of islands is considered officially an MPA, partially protected by Lombok to the east, and inflows coming in from the Indian Ocean. These islands are categorized as being rich in marine fauna and having a relatively stable sea floor to support the large populations of coral. These coral reef ecosystems are what contributes almost single handedly to the ecological stability of the area, as it protects the beaches from heavy currents and waves(Kurniawan et al., 2016). This describes the main function of fringing reefs which can also lead to an increase in sedimentation and creation of new reefs areas from all the

wave activity. These islands are also surrounded by limestones, which is another effective protection element against wave and storm erosion. As of 2014, the tourism industry in Lombok is accountable for 16 percent of overall revenue, which in turn has led to a local population increase of almost 32 percent from the years 2000 to 2014. And from 2009 to 2013, both domestic and foreign tourists have continued to grow in numbers from 54,957 to 437,074(Kurniawan et al., 2016). The quality of the coastal reef ecosystems have faced the brunt of the consequences as a result of this rapid and seemingly uncontrollable growth. In this same time frame of thirteen years, live coral coverage went from 25.13 percent to 16.50 percent, Gili Trawangan being the only island to see a small increase in coral coverage.

Three main steps were implemented for the methodology of this research to measure Gili Matra's (the collective name for all three Gili islands) vulnerability as small islands. The first step was scoping, which entailed literature review to define potential vulnerability indicators. It also outlined how many and which of those indicators would be used, and finally, set up a baseline of indicators that could be applied to this tiny region. Part two of this step was to determine the control data for the area. The authors fabricated their by referencing years worth of various satellite images. And also by conducting ground surveys using tow equipment and measuring the live coral distribution. The second step was to define the indicator selection criteria. This involves doing a spatial analysis of the biogeophysical changes to the sample region, in other words, mapping the substrate and benthic zones of the areas off the coast of the islands and comparing them with old maps of similar studies to get a sense of how much it has shifted, or if it has shifted. This step proved to be more difficult due to Indonesia having an absence of a vulnerability standard, or a way to measure how susceptible a place is to outside influential factors, so the authors had to practically build one from scratch. The third and last step followed in this research was to evaluate the indicator data and select a final set small island vulnerability indicator. To achieve this, trends from previous Geographic Information Systems (GIS) experiments were superimposed on a map of the study area. The vulnerability level of the indicators together with the weight that each indicator holds were compared. The final calculation was then determined based on the unique characteristics and impacts on them(Kurniawan et al., 2016).

Further analysis of the data showed that the main indicators for vulnerability can be described as coastline changes, development area, coral reef area changes, and live coral area

changes. Natural coastline changes can be attributed to strong wave patterns or sporadic current changes, but in this case, it is suspected that all of the developmental changes to the coastline such as resort building, restaurants, and frequent boat traffic are responsible for the majority of the changes that have been observed. Further expanding on the development situation, these resorts, hotels, and restaurants are significant contributors to water pollution and solid waste deposits, with islands with higher populations at greater risk for these factors. However, some human made adaptations have been put in place that have proven effective such as artificial reefs and breakwater protection measures(Kurniawan et al., 2016). The coral reef composition was included here due to the significant role it plays in supporting small island stability and wave protection, which depends greatly on depth and projection of currents and waves which are elements out of anyone's control. They also are the center of many ecosystem functions such as maintaining fauna diversity, and encouraging fresh coral spawning and growth. It was concluded that the changes to the coastline and coral reefs occurred because of sand mining and coral exploitation for touristic development purposes. Significant changes were documented on each of the three islands, but Gili Air saw the most. The live coral cover around Gili Air decreased by almost 30 hectares which was the highest among the Gili Matra islands(Kurniawan et al., 2016). Much of this degradation can be traced back to the sheer amount of recreation activities in the area such as swimming, diving, and snorkeling. Efforts to conserve the reefs and nurture new coral beds have proven to be effective since its debut by the Gili Eco Trust in 2004. By using the previous methods of extensive analysis, it was determined based on the historical data of the area in comparison with data from similar regional studies, that Gili Meno and Gili Trawangan have a low vulnerability status, while Gili Air has a moderate level status(Kurniawan et al., 2016). This status is undoubtedly expected to increase to more critical levels in the future if something isn't done about the dangerous population and development growth. Other consequences of the development projects include sea water and aquifer contamination, and groundwater depletion. The islands have to therefore rely on bottled potable water imported from Lombok by boat, which only exacerbates the issue of plastic waste on the islands.

One of the key conclusions from this study was that risk and adaptation measures must be strategized and carried out, both internally and externally, in order to decrease the vulnerability index. In order for these strategies to work, partnerships must be formed between institutions and government officials, due to the costs and resources that it would take. Another main takeaway is

that intensive tourism activities is a prominent actor in driving up the vulnerability level index, which the Gili Matras--especially Gili Air--are at a serious risk for if certain preventative measures to increase resilience are not put in place urgently(Kurniawan et al., 2016). Influences other than ecological and scientific must be considered also if this were to actually be put into practice, such as social and political. The results of this research was simply to create a baseline reference point for future conservationists to refer back to in order to make decisions on what to do next, and also to monitor the state and health of the coasts and surrounding coral reefs.

Measures have been taken by the Indonesian government in the form of enacting an Integrated Coastal Management Law (ICM) in 2014. This is a well planned, well organized system for the development of the small islands; specifically those with high tourist demand and potential, and those with high vulnerability as defined in the previous study(Kurniawan et al., 2016(1)). In order for any tourism sector to be successful, it is essential that solid infrastructures must be put in place, such as hotels, modes of transportation, and safe restaurants. Unfortunately, this often comes with the downfall, degradation, and increased vulnerability of many elements of the surrounding environment. Because of this, spatial planning plays an important role in resource use and development planning when attempting to build sustainable communities that meet social, ecological, and economic demands. A similar follow up study done by the same authors as the previously mentioned research was done with the main objective of investigating landscape change patterns in the Gili Matra Islands and surrounding marine park conservation area that covers about 2,954 hectares(Kurniawan et al., 2016(1)).

To properly understand the changes in the landscape, reliable satellite images were used from 2010 and 2014. From these, the islands were classified using the system developed by the Land Cover Classification system and National Standard of Indonesia.

LU/LC classifications	Islands in 2010						Islands in 2014					
	Gili Ayer (Ha)	Percent (%)	Gili Meno (Ha)	Percent (%)	Gili Trawangan (Ha)	Percent (%)	Gili Ayer (Ha)	Percent (%)	Gili Meno (Ha)	Percent (%)	Gili Trawangan (Ha)	Percent (%)
Shoal beach	6.66	3.75	7.94	4.32	8.59	2.47	6.43	3.62	7.82	4.25	8.16	2.34
Sand beach	3.58	2.02	6.03	3.28	10.98	3.15	2.81	1.58	5.43	2.95	8.49	2.44
Salty lake	0.00	0.00	6.70	3.65	0.00	0.00	0.00	0.00	6.70	3.65	0.00	0.00
Mangrove area	0.00	0.00	2.76	1.50	0.00	0.00	0.00	0.00	2.74	1.49	0.00	0.00
Mixed forest	0.48	0.27	37.21	20.24	14.11	4.05	0.48	0.27	36.76	20.00	12.84	3.69
Plantation	63.78	35.90	44.19	24.04	109.15	31.33	54.75	30.82	43.40	23.61	102.62	29.46
Bare areas	76.05	42.81	56.81	30.91	131.92	37.87	62.56	35.21	46.29	25.18	116.92	33.56
Non built-up areas	9.44	5.31	7.47	4.06	27.61	7.93	15.28	8.60	12.23	6.65	19.19	5.51
Settlements area	7.54	4.24	2.61	1.42	13.77	3.95	12.59	7.09	3.92	2.13	21.58	6.91
Tourism accommodation areas	10.13	5.70	12.08	6.57	32.25	9.26	22.77	12.82	18.52	10.08	58.58	16.81
Total	177.66	100	183.80	100	348.38	100	177.66	100	183.81	100	348.38	100

Tabel 3. Landscape changes in GIli Matra Islands from year 2010 to 2014.

LU/LC classifications	Landscape changes from year 2010 to 2014					
	Gili Ayer (Ha)	Percent (%)	Gili Meno (Ha)	Percent (%)	Gili Trawangan (Ha)	Percent (%)
Shoal beach	-0.23	-0.13	-0.12	-0.07	-0.43	-0.12
Sand beach	-0.77	-0.43	-0.60	-0.33	-2.49	-0.71
Salty lake	0.00	0.00	0.00	0.00	0.00	0.00
Mangrove area	0.00	0.00	-0.02	-0.01	0.00	0.00
Mixed forest	0.00	0.00	-0.45	-0.24	-1.27	-0.36
Plantation	-9.03	-5.08	-0.79	-0.43	-6.53	-1.87
Bare areas	-13.49	-7.60	-10.52	-5.72	-15.00	-4.31
Non built-up areas	5.84	3.29	4.76	2.59	-8.42	-2.42
Settlements area	5.05	2.84	1.31	0.71	7.81	2.24
Tourism accommodation areas	12.64	7.11	6.44	3.50	26.33	7.56

Figure 1: *Sample of the spatial data for the landscape changes collected using the described methods of satellite imaging overlaid with GIS maps. Column on the left shows habitat location. Right columns show percent coverage in the area from 2010 to 2014(Kurniawan et al., 2016(1)).*

The tables clearly show a decrease in almost every category on all three islands from 2010 to 2014, and either a negative or no change in the number of hectares on all three islands as well. While the mean values in this data don't seem like too large of a decrease, when looking back at the data from decades past, a larger decrease in numbers can be observed in direct relation with the positive growth in development in the tourism industry. The results show that the land use patterns ie. accommodation, settlement areas, have changed by 17.62 percent which

is the equivalent of a loss of 39 hectares. The population has also grown in concurrence with this land and resource loss from 2,813 people (permanent settlers) in 2000 to 3,706 in 2014(Kurniawan et al., 2016(1)). Trends in the data indicate that certain patterns of the landscape changes are based on proximity to paths, ports, and coastline. It is emphasized once again that uncontrolled, rapid growth and development will contribute to the environmental conditions and increase in small island vulnerability, as these new developments contribute largely to water pollution, seawater intrusion on fresh groundwater supply, and brackish water issues in the Matra island area. It was determined based on these results that small islands should be limited to 50 percent development, and 30 percent development for very small islands(Kurniawan et al., 2016(1)). I can already say with confidence that these guidelines have not been followed in the Gili Islands. Nearly 100 percent of Gili Air is developed in some way, only a small area and some beach fronts remain untouched. Better restrictions and monitoring for sustainable development must be enforced in the Gili Islands before the situation gets even more out of hand. While the last two research studies have little to do with the theme of plastic waste, it is important to establish baseline knowledge and to gather background information on the situation in the Gilis in order to have a better understanding of how future conservation and sustainability efforts can move forward.

According to the Gili Eco Trust, current waste management practices in the area consist of a small recycling station on the largest island of Gili Trawangan, a larger recycling station on the island of Lombok, and a large dump on Lombok as well for all non-recyclable waste(2020). On Gili Trawangan, recyclables (plastic bottles, glass, and cans) are collected from all three of the Gili Islands to be crushed into blocks before being shipped to the larger recycling facility on Lombok to be fully processed. Gili Trawangan ships around 10-15 tons of waste off of the island every fortnight(Gili Eco Trust, 2020) which is an incomprehensible amount of waste for the size of these islands. Some of the blocks remain on the Gili Islands to be used to build houses, as these types of bricks are more stable in the event of a storm or earthquake. Once the other compressed blocks reach Lombok however, they don't always end up getting processed. As of 2015, only about seven percent of the total waste gets properly recycled(Invest Islands, 2021). One of the main problems faced in attempting to remove waste from the beaches and shores is that under the strong ultraviolet rays of the sun, plastics and other waste materials begin to break down easier. They become fragile and break into smaller and smaller pieces that become

scattered all along the coast lines, making it extremely difficult to remove every little bit. This may sound like a hopeless situation, but there are many local organizations that are joining forces to increase this number. Due to the increasing popularity of ecotourism in these islands, it is in the best interests of everyone to help clean up the islands and restore the lost biodiversity. Due to the tragic earthquake event in 2018, many low income citizens were left with even less than before. And the 2020 COVID-19 pandemic did not help the economic situation at all because most of the income in this area is attributed to tourism. People had to take desperate measures in order to feed their families. For example, weighted net fishing, an unsustainable and environmentally unfriendly fishing practice that has been banned for many years, was unbanned briefly during the pandemic lockdown because people had no other way to get food. Since the travel bans and social distancing rules have been lifted, weighted net fishing was once again banned, but it still did significant damage to the reefs in that short period.

One of the only primarily marine conservation based organizations currently located on Gili Air is Gili Shark Conservation, a non-profit aimed at protecting marine life and raising community awareness about the importance of conservation strategies through SCUBA diving and community outreach and engagement programs. They employ both expert scientists and local divemasters as a part of their team that works on a variety of projects, such as coral reef preservation, megafauna protection, and ocean trash(GiliSharkConservation, 2023). They also run a program called Coral Watch, which trains Indonesian women in various environmental education strategies and gives them hands on training with identifying corals and monitoring their health in the reefs as well as in the coral nurseries. The women then take this training to the classrooms of local elementary students in order to encourage young minds to participate in conservation efforts and to build an appreciation for nature. As a volunteer and a foreigner, I was not able to participate in this program because Gili Shark likes to leave the environmental education aspect to local Indonesians that the children can relate to and understand their language. I think this is a great strategy because it is likely to be more effective and have more of a lasting impact on the children as they grow up. It also helps to avoid the “white savior complex” of foreigners coming in and seemingly telling them how to live and what to do. I had the privilege of meeting some of the women divemasters involved in the Coral Watch program

and they are amazing at what they do. Although I didn't get to meet the children, I was able to participate in the identification and health index monitoring of the coral species in the area.

Gili Shark's current ocean trash initiative consists of regular beach clean ups every Thursday, and the weighing of all the waste collected from Gili Air shores(GiliSharkConservation, 2023). This is an important issue because not only does plastic pollution negatively impact the local ecosystems' biodiversity, but it becomes a global issue when the trash washing up on shore and in the harbors isn't from the area at all, but from completely different parts of Indonesia, and even different parts of the the world that are connected by the ever flowing ocean currents and storm surges.

In Marco Armiero's novel *Wasteocene*, he articulates a new method for naming the current geological epoch commonly known as the Anthropocene. The author proposes the word "Wasteocene" instead to describe this new era, and it has multiple meanings. Part of it is physical and material waste produced by humans, but also wasted people and wasted places. Such people and places are described, according to Armiero, as marginalized communities seen as "the other" where waste is more easily dumped due to those communities not being seen of equal value as others. The topic of waste is largely socio-ecological, and it has become a serious issue concerning environmental justice in said marginalized communities. Some problems that the author has with the term "Anthropocene" is that it implies that all humans somehow hold accountability as a homogenous community. However, this is certainly not the case, as accountability for the current climate crisis is held by some groups of people more than others, and some areas hold a bit less responsibility. The term anthropocene fails to acknowledge the social, historical, gender, and racial differences among the greater population(Armiero, 2021). The author goes on to mention many case studies of how poor conditions of waste treatment workers are causing cancers and death in many communities not given enough importance by their surrounding local communities or governments. The reason for this could partially stem from the viewpoint that in the Wasteocene, it's every person out for themselves. Furthermore, part of the socio-ecological implications that are discussed is that by using the term "Wasteocene" in place of the current term, it allows a shift in focus to what is seen as disposable, and the act of wasting rather than the waste itself. To me this was very profound, because although I knew that there had to be a shift in the way people think about waste, I wasn't entirely

sure which direction would yield the most desired results. I wanted to take into account this proposal and start thinking about the act of wasting in addition to how we can change the way we look at waste itself as well.

The book *Friction: An Ethnography of Global Connection* by Anna Tsing, provides some useful perspectives and background information on the topic of global ethnography analyzed through various lenses such as social and environmental. Tsing claims that ethnographies in the past have been focused on cultural specificity rather than the history of the universal. In other words, previous studies have placed more emphasis on smaller communities and truths within specific or even niche cultures. And they have not paid much attention to how those unique details and characteristics of the smaller cultures can be applied to bigger picture ideas and more universal truths. Tsing then proposes the notion of friction, meaning any kind of global connections or interactions, whether it be cultural or universal. This friction can either spark motion and be fuel for progress, or they can slow things down and cause conflict. It is proposed that friction can morph global knowledge, including traveling knowledge. But on the other hand, it can also create gaps in knowledge and cultural understanding. The definition that is given for universals in this case is a bit ambiguous. The idea of universal themes exists, however, they can be time and place specific, and the historical cultural significance should not be ignored. Tsing explains that some things such as rights are universal, but the contexts are very much cultural. In the 1980s and 1990s, the emerging democratic movement led to peak amounts of deforestation, which in turn caused the destruction of peoples' livelihoods that counted on it, and many Indonesian forests were exploited for foreign consumption. Not to mention all of the illegal mining and logging, the making of fake permits, and other unfavorable socioeconomic conditions. Despite all this corruption, there are many citizens that have been and that are involved in various aspects of environmental and social activism. They are broken down into four "generations": first, second, third, and forth. The first being charity organizations, the second being development focus organizations, the third is issue oriented activism, and the fourth is democratic agitation. But, the reality is that many locals are left powerless as the country, like many others, is largely ruled by greed(Tsing, 2004).

Development is many times synonymous with crisis, because developing any area further involves some kind of exploitation, and one party will always benefit at the expense of another. There is also friction to be found in the commodity chain, and in order to minimize negative

impacts, commodities must emerge untouched by friction. This is nearly impossible in the case of the Gili Islands because it is too easy for things like capitalism and international influence to take over such a tourist destination in high demand, while things such as waste disposal get overlooked. Another point that is mentioned in this book is the idea that Nature operates in a friction filled world by making generalizations. It is Nature, and not nature that is being spoken about here. Nature is a much more abstract concept and embodiment of not just things deemed as "natural," but the energy and sentience of the non-human. Whereas nature simply refers to things in the surrounding environment being seen as objects at human's disposal instead of regarded as having their own agency. One of the culprits for this generalization is colonization, largely Eurocentric colonial thinking. For example when encountering new plants, instead of learning about them through the eyes of the locals that know them best, assumptions are made and many species are lumped together even though they may be quite different. There is a long history of the refusal to acknowledge the global sharing of knowledge and using learning strategies such as collaboration and observation. After all, the only way to truly know Nature is through experience. To add to this hypocrisy, countries in the global north often blame countries in the global south as significant contributors to overall pollution and greenhouse gas emissions, when in reality the global north actually gives off the highest numbers of harmful greenhouse gasses. When the global south tries to implement infrastructures similar to those of the global north, they are criticized for not being sustainable, but global north countries are not providing better suggestions for alternatives. These points are relevant to my research because many of the main problems the Gili Island area is facing are caused, whether it's intentionally or unintentionally, by actors of the global north. Especially when looking at the tourist industry. The romance of nature is largely appreciated among Indonesian culture, and in an attempt to promote this, international tourism was largely encouraged. Unfortunately, it worked too well and the international tourist industry ended up taking over. This region has also seen a shift from nature appreciation activities, to adventure and high risk activities fit for the adrenaline junkie. As a consequence of this, less of an emphasis has been placed on the importance of biodiversity, and the intrinsic value of the non-human has become controversial(Tsing, 2004).

It doesn't take an expert to recognize that some major gaps exist between development policy and environmental activists. However, the question must be raised as to whether in an attempt to close these gaps, can more be created? Usually the answer is yes, as sustainable

development and economic growth is a puzzling double bind. Unfortunately, one notion that is not universal is the meaning of the term "environmentalism." Tsing highlights that this term does not have the same value everywhere around the world. For some it does not include the protection of wilderness and endangered species, but rather the first priority is to eliminate threats to human existence and quality of life. While Indonesia had the best of intentions in the 1980s and 1990s when it came to environmentalism by emphasizing that protecting the nation is synonymous with protecting the environment, the courageous activist groups could not work independently of the state. As a result, many laws were made, but not always enforced, and many informal regulations were created with local organizations being the main drivers and enforcers. Moving forward, a growth in popularity of commodity based conservation can be seen in Indonesia and in other regions around the world. Many believe that this is the most successful and creative form of collaborative production of both natural and social goods. On the other hand, skeptics say that it's too contradictory and can be confusing in the eyes of producers and consumers(Tsing, 2004). I would have to agree with the skeptics in this case, the words "commodity" and "conservation" don't seem like they belong in the same sentence. I do think there could be hope for collaborations in order to market more sustainable products and make them more mainstream. However, at the end of the day social marketing and consumerism will always be underlying factors, which have the potential to become dangerous, even if the original intentions are amicable. Although, I don't see any hope of this type of situation becoming a reality in the Gili Islands any time soon.

Anna Tsing concludes this novel with a few fruits for thought. The first is whether looking to the past can hold answers for building a better future, or if we must simply acknowledge the past, but have everything from now on be completely made new. The next thought the readers are left with is, that we all know and use nature through engaged universals, and that ideas and feelings about the environment spread mostly through friction. And finally, the author proposes that anthropology, specifically the field of environmental anthropology should be focusing on the intersection between global forces and local responses, in order to most effectively address this dichotomy(Tsing, 2004). This is the area that I wanted to focus my personal research on in Indonesia. I wanted to tackle the very much global issue of ocean trash, single-use plastic production, and the contributions of tourism in this case. Of course looking at the issue as a whole seems impossible and overwhelming to overcome, which is why I began

small and started with building relationships in the local community on Gili Air and to hopefully plant a seed that can spread to reach wider audiences and regions.

PREVIOUS STUDIES

In order to get a full and proper picture of what the general attitudes and dynamics in the community are towards issues of conservation, we must first look at studies dedicated to the relationships among the community, and between the community and marine conservation efforts. An article published in 2021 was written based on a study of the local community in Lombok. The specific area of focus was on the Jor Bay area, which is not a simple system, and plays an important role, both economically and socio-ecologically due to its direct link between land and ocean. There is a large degree of biodiversity, high thresholds of nutrient concentration, water quality, and productivity attributed greatly to the intersection of human and ecological systems. The authors point out that this particular situation emphasizes that the interactions between humans and non-human resources is hugely important for the welfare of these coastal communities. It is proposed that by recognizing this, a new way of thinking about the basis of resource economics doesn't come from capital, the resources themselves, or labor, but it comes from knowledge(Al Amin, et. al, 2021). By normalizing the knowledge of marine and coastal resources and resource management will lead to the practice of more effective and sustainable management of resources. Such local knowledge is vital in developing the social economy in local settings. However, local environmental knowledge alone does not always automatically include an outline for resource management practices, nevermind sustainable resource management practices(Al Amin, et. al, 2021). Many studies have gathered that attitudes towards this subject tend to be inconsistent.

The conditions in Jor Bay are worsening due to the aquaculture activities which has a very limited carrying capacity and is quite sensitive to new changes. It is proposed in this article that better tools and ecosystem models should be implemented in order to promote more sustainable aquaculture practices and healthier interactions with aquaculture and the environment(Al Amin, et. al, 2021). The Jor Bay community has agreed to establish a bay management regulation that is binding through a Communique Letter for the Jerowaru Village Head and a Joint Agreement Letter by both Village Head of Jerowaru and Pare Mas Village(Al Amin, et. al, 2021). The government has ratified and recognized this community regulation

which now has become a locally enforced regulation called *Awiq-Awiq*. It is implemented and enforced by the *Lembaga Pemangku Awiq-awiq Teluk Jor (LPATJ)* which is Jor Bay's Management Institute(Al Amin, et. al, 2021). The baseline for this new regulation came from local knowledge built with the help of the community dynamics. Shared knowledge and attitudes towards a common resource definitely influences the behavior and practices which determine the effectiveness of the proposed more sustainable resource management systems. The more dynamic relationships a system has, the more complex it naturally becomes, that is, in human systems. Such dynamics between the environment and society have unfortunately not been adequately studied in depth. That is why current observations focus on local knowledge of changes in the complex system dynamics. The authors explain that local practices must also be observed in order to understand how the system is able to direct and manage the conditions of new regulations. The goal of this particular study is to identify knowledge systems and community management practices in the conservation of marine resources, which could have a direct link to the effectiveness of these practices(Al Amin, et. al, 2021).

The area of study, Jor Bay, is a tiny bay characterized by its semi closed formation of water resources. Habitat types in the bay range from mangroves to coral reefs, and sea grass to coastal plains. Just two local villages are situated here: Jerowaru and Paremas villages(Al Amin, et. al, 2021). In total, 86 people, roughly half from each group, participated in this study. Most of the people fell into the categories of male, aged 40-45, fishermen, and senior high schoolers. The level of local environmental knowledge as a whole was found to be quite high (0.73-0.74)(Al Amin, et. al, 2021). While there is promise of local knowledge beginning to become adopted more and more, a large gap between the producers of this knowledge, and actual users of these practices still remains. The authors observed surprisingly low levels of practice compared to the level of actual knowledge. This low level of participation ultimately affects the quality, but no such evidence of this quality was discussed in the article(Al Amin, et. al, 2021). While I think this article is important to establish a baseline for what knowledge and practices already exist in the area in order more forward, I found it very anthropocentric, especially when talking about the socio-economics of the communities and referring to marine ecosystems as “marine resources" and they must be protected because of their importance to humans alone; while obviously marine and coastal systems are there for more than just exploitation by humans. I also wish that the study went into a bit more depth on the specific interactions and dynamics within the

communities. But I can make an inference that most of those that hold any sort of local environmental knowledge are older generations wanting, but apparently not succeeding, to transfer this knowledge onto the younger generations. This is relevant to the topic of my research because ultimately, it is the local community dynamics, knowledge, and agency that need to be the ones at the forefront of the anti-plastic and pro-conservation movements if it's going to have any amount of impact in the Gili Island area.

Another aspect that must be properly understood as part of the context of the situation in Indonesia and the Gili Islands is the earthquake that devastated the country in 2018. People are still recovering from this earthquake today, and the COVID19 pandemic in 2020 greatly slowed the earthquake recovery progress as well. Due to the geographical location of Indonesia sandwiched between two oceans and hyper tectonic plate activity, it is a high risk area and disaster prone. In addition, it's included in the Pacific Ring of Fire of volcanoes where volcanic activity often triggers earthquakes and vice versa. During the period of 2005 to 2015, more than 78 percent (11,648) of catastrophic events were hydrometeorological disasters and only about 22 percent (3,810) were geological disasters(Febriani et. al, 2021). In the summer of 2018, the area was hit with two earthquakes in two months, one with a magnitude of 6.4, and the other measuring 7.0(Febriani et. al, 2021). These back to back disasters took a huge toll on the economy, infrastructure, mental health, and environment of the country. Previous studies have determined that Lombok is a hot spot for seismic activity due to it being a connection point for the Indo-Australian, Eurasian, and Pacific continental plates, however, north versus south Lombok have different levels of vulnerability, the north being slightly higher(Febriani et. al, 2021). The Lombok area has a history of earthquakes higher than magnitudes of 6 going back hundreds of years. After the 2018 earthquake events, reported damages estimated losses of 73,843 homes, 671 education facilities, 6 bridges, 52 damaged health facilities, 128 workshops, 25 office buildings, 515 people died, and 7,145 more were injured. The aftermath of the disaster also produced 431,416 displaced people and refugees(Febriani et. al, 2021). So naturally, there is a push for better solutions and ways to combat the damages of these earthquakes that are more than likely to happen again and again in the future. That is, people are looking for ways to educate themselves on disaster preparedness, mitigation, and awareness, as well as better, more sturdy infrastructure that is able to withstand high magnitude earthquakes. Assuming success of such programs when they are launched, it will increase the resilience of the communities,

decrease the number of victims, and reduce the risk factors. In order for these programs to be successful however, initiatives must come both from the inside ie. local governments, and outside partners such as strengthening the education system and expanding knowledge on disaster mitigation. Another article published in 2021 is composed of two parts focusing on both literature and empirical research. In the literature section, researchers spent most of their time in libraries collecting historical earthquake data and history of the geography of the area in general. While in the empirical research side, researchers used a more qualitative approach by divulging information directly from the field using in-depth interview methods with reliable victims of the earthquakes in 2018(Febriani et. al, 2021), similar to the methods that I used in my ethnography interviews.

Furthermore, the subjects of these interviews were quite diverse. They explored post disaster impact, what future risks they could face, and brainstorming possible solutions or mitigation strategies that could be implemented in the future for rehabilitation and reconstruction. It was also discovered that serious mental trauma in children was also a huge consequence of the disasters, which exceeds the physical effects(Febriani et. al, 2021). Many children lost their parents, means of education, and the ability to have fun in their own environment, all of which strongly affect the children in Lombok and the Gili Islands to this day. It is so important that in order to recover from both the physical and psychological damages, it will take continuous effort from within the community to begin to heal itself. There is hope for this in Lombok and the Gilis because both islands are predominantly Muslim, and the Islamic community in the area remains strong and dedicated to the recovery of both humans and environmental damages. Results showed 85.2 percent of victims experienced neurosis symptoms, 25.9 percent experienced psychotic symptoms, and 64.7 percent post traumatic stress symptoms(Febriani et. al, 2021). Risk assessment results also found that facilities and infrastructures are seriously impeded, ground transportation is limited, and medical hospitals were overwhelmed. Much more extensive research was conducted with partner universities on the seismic activity in relation with the volcanic activity of the island, as well as the likelihood that each new earthquake will be coupled with the tsunami, luckily that was not the case in 2018. There was also damage caused by landslides in the aftermath of the earthquakes that was to be assessed. Fear still exists among Lombok residents that the next earthquake will come with a tsunami which will destroy any current progress made in recovery, and will be an even greater

challenge to bounce back both physically and mentally. Some people still recall the tsunami event that occurred in 1979 in the southern Lunyuk Sumbawa area, so this subject is a large trigger for concern among the local community(Febriani et. al, 2021). Because of this growing fear, the authors emphasize that more widespread socialization and education can help stifle some of the concerns that are still present in the mind of the local people. It is proposed that by having a better understanding of the core issues being faced, and by introducing possible plans of action, it will put the community more at ease and help them to gain more stability.

The authors in this case aim to continue studying the constraints and limitations in the region as far as existing human resources and current budget. The role of local governments and schools are arguably the most important factors, especially when it comes to disaster risk reduction efforts and improving childrens' resilience to disasters as well, since the children are the ones that will eventually take over to educate later generations. Some progress has been made up to date of this article in building institutional frameworks, disaster risk assessment and determining warnings, and building strong and safe foundations in the culture of risk assessment amongst the community(Febriani et. al, 2021). Yet work remains to be done in establishing partnerships between government and non-governmental agencies to reach this common goal. As remains a common issue, not only in the realm of disaster relief and prevention, but in other sectors as well. These mitigation projects create guidelines for future development planning, heightening people's knowledge on how to reduce tragic impacts so that people are able to live and work safely and sustainably, but also support cultural development in areas such as natural resource management. Other researchers have also studied this area and these types of community dynamics before, however, this is the first study of its kind to also look at physical changes in the geology in order to predict when new seismic activity and events will happen(Febriani et. al, 2021). These developed strategies are broken into three steps: before an earthquake, during, and after the earthquake. In order to adequately prepare the communities and to increase their resilience against negative emotions, physical, and societal harm, all three steps must be thoroughly addressed, which is still a work in progress as of 2021. As a positive side effect of this project's progress is an increase in optimism and sense of stability among community members. Similar to the Maslow Hierarchy of Needs where things like self-actualization and relationships can only be attained if basic human needs are met first, these new strategies could lead to the people worrying less about their basic needs such as a home,

education and safety. They will be able to pay more attention to the cultural practices and taking care of the environment. In my experience, it's not that locals don't want to protect the environment or switch to more sustainable practices, but it is simply not feasible for some who are constantly worried about weather or not they will always have a home to go back to, or when they don't know where their next meal is coming from. The study also points out that the responses and resilience of the communities of North Lombok are slightly different than those of communities in other disaster prone areas. Despite being pelted with high category earthquakes for decades now, the people of North Lombok are actually quite optimistic that they will be able to afford and overcome this adversity. This has been evidenced by strength of good self-efficacy, empathy for other survivors, and motivation and dedication to advance to further stages of reconstruction(Febriani et. al, 2021). It still remains that individual factors, family, and community factors hold the most dominant influence in the Lombok area. These factors manifest in the self-esteem and social competence of individuals in the community, the support and care for other victims, and lastly, the ability of the community as a whole to provide moral and material support in order for everyone in the community to make progress towards the creation of a better whole(Febriani et. al, 2021). It has been found that many parties are taking part in the push for resilience and disaster relief in North Lombok such as religious leaders, municipal governments, local stakeholders, and non-governmental organizations.

While I agree with most of what this article explains and that I think that the scientific study on predicting the seismic activity frequency and magnitude is incredible, I am a bit weary of how much outside involvement and interference of western science is being introduced here. The response from the locals on this matter seems to be positive and well received so far, and even though the study emphasizes local participation and building up foundations from within, I think it is in the interest of justice that this claim should be taken with a grain of salt and caution should be exercised when reporting on studies such as these from the outside. It is also pertinent to mention that strategies such as this may not work the same way in other parts of Indonesia, as the country is very geographically and ethnically diverse. This is only the case for Lombok and can be applied to its surrounding islands such as the three Gili islands and Bali. There is also a lack of previous research and studies done on the Gili Islands due to their relatively recent commercialization. So much of these previous studies were conducted on the neighboring island

of Lombok to the east, which faces very similar environmental, social, and economic challenges as those of the Gilis.

As part of a research initiative completed by Oceana and their team of scientists, it was found that more than 900 species have ingested or become entangled in plastic throughout the entire food web, from zooplankton to seabirds. Scientists found that 52 percent of all sea turtle species studied have ingested plastic. It is too easy for sea turtles and other animals to mistake plastic bags for jellyfish or algae which are their typical food sources. I can attest to this because I once confused a piece of floating plastic for a jellyfish when I was diving myself. Other studies showed that sea turtles can even mistake the smell of plastic for food(Oceana, 2023). Recently, Oceana found evidence of nearly 1,800 animals belonging to 40 different species swallowing or becoming entangled in plastic since 2009 in the United States. Of those animals, 88 percent were classified as endangered or threatened species under the Endangered Species Act. A research paper published in 2018 assessed the influence of plastic waste on disease risk in 124,000 reef building corals from 159 reefs in the Asia Pacific region. The authors found that the likelihood of disease increases from 4 percent to 89 percent when corals are in contact with plastic(Oceana, 2023). Scientists estimated that 11.1 billion plastic items are entangled on coral reefs across the Asia Pacific region. Seventeen percent of the coral species observed to be affected by marine plastic debris are again listed as threatened or near threatened with extinction by the International Union for the Conservation of Nature(Oceana, 2023). While corals face many threats including increased sea surface temperatures and ocean acidification, which they are naturally more vulnerable to, plastics obviously play a significant role in reducing the health of corals and coral reef ecosystems.

Previous studies published in *Marine Policy* journal implemented similar methods of interviewing to the ones that I used, but their questions were more policy and government focused on the issue of sustainable tourism. Strong social networks of actors (not the government) are primarily responsible for sustainable practices and upkeep(Partelow & Nelson, 2020). It would be foolish to discuss the issue of trash, overconsumption, and overproduction in popular destinations such as Indonesia, without also acknowledging the tourism industry. This massive industry must be held accountable for the damage that it causes as far as plastic waste, continuous traffic, and overall interactions with the environment. This article analyzes the

collection of social networks and collective action in the Gili Islands that has worked in the past, as well as how these networks are being underlined as the foundation for the island's governance in present day(Partelow & Nelson, 2020). The authors also suggest that these self-created networks are a result of growth and changing social-ecological conditions(Partelow & Nelson, 2020), meaning tourism and the loss of biodiversity. In many cases, creating groups with the central task of environmental governance can be challenging, especially if the cooperating groups don't have precisely the same goals in mind. It involves a complicated network of actors that must take social, political, and cultural aspects into consideration when making decisions and taking action. In Indonesia, the population is incredibly spread out and diverse, so people that are coming to the Gili Islands looking for work may have many different backgrounds, therefore could have very different goals than others that have also settled in the Gilis. It is much easier, as the article points out, for smaller groups with similar interests to be motivated enough to take steps in a positive direction(Partelow & Nelson, 2020). However, another challenge still remains, and that is financing and enforcement. Smaller groups or organizations may not possess adequate funds or man power to actually take the actions necessary for such a local governance. They could partner up with larger organizations, but these usually have much broader interests. On the other hand, it could also be an opportunity for growth of these larger organizations with a new set of conditions and goals. One of these new conditions that the authors focus on is the environmental challenges faced by the Gili Island area. The situation outlined here is exactly what was ailing Gili Trawangan in the 1990s. Basically, hippie travelers from Europe saw that Bali was getting too overcrowded with tourists, saw an opportunity to develop a new diving destination, and decided to open a SCUBA dive shop on Gili Trawangan. This was the first dive shop to open on any of the three Gili islands in the early 1990s(Partelow & Nelson, 2020). Soon, many more dive shops followed suit. The primary small groups were quite like-minded in their goals about conserving the surrounding coral reefs from destructive fishing practices. Of course the principal reason for this push for conservation was so they could run successful dive shops for the ecotourism industry. Together, these groups agreed upon several rules and guidelines that would later be developed into non-governmental institutions for cooperation towards environmental governance. They took into consideration social island life norms, rules for economic, and environmental development, all of which are very important because of the size of the islands, the communities are fairly tight knit. These organizations have proved successful

for many years, however, continued and rapid growth has increased the pressure and demand of these groups to do more. Pressure for such groups to move from informal to formal government status is increasing, and these groups must be able to evolve along with the changing environment and demand. Local organizations can no longer keep up with the sheer volume of activity that is going on in the Gili Islands, and the Indonesian government has expressed interest in getting involved in these more prevalent sustainability challenges.

The authors examine and recognize the significance of the interdependent relationships between social and ecological features in a given system such as this through the environmental governance theory (EGT). The EGT provides a useful framework for environmental protections that combines aspects of institutional economics, social systems theory, path dependency, and evolutionary biology(Partelow & Nelson, 2020). It is especially useful for coastal systems because it aims to analyze interactions between various institutions, biophysical features, and use of resources in coastal areas. Current coastal governance is based on terrestrial ones, which really has no translation to coastal regions because they are radically different. As mentioned previously, many groups may have different preferences for how their local governance should be set up, and what their motivations will be. For example, there are business owners, local Indonesians, and tourists that all may have different opinions and relationships with coastal resources. Tourists may view them as a form of social capital and pleasure, and business owners view them as income and cultural identity. This article outlines and discusses the realities of Gili Trawangan. It is essentially up to local businesses and residents to uphold the island's economy, waste management system, the upkeep of beaches and reefs, and manage the increasing volume of tourists that visit per day. According to the authors, few incentives exist for local businesses to actually contribute to finding collective solutions(Partelow & Nelson, 2020). Through my field study, my findings were a little bit different from this, but I will articulate that later on. By using EGT, many social-political hierarchies that exist between the local and state governments about who should be responsible for development and receivers of benefits on the island. There are also many foreign business owners and new investors that would like a piece of the action. This puts strain on the community and hinders it from taking real action, yet another reason for the slow progress. Theories such as the EGT can expose structures and different relationship dynamics, explain the social and ecological connections among all actors and their influence on political neworks. Research has found that ecological variables such as system boundaries,

system size, and the predictability of regenerative resources and ecosystem dynamics have proven to be influential in this process. Many of these variables, and other similar ones are found to have a strong influence on the social networks and governance in Gili Trawangan, which is easily influenced due to its small size and distinct elements.

Small island communities largely evolve around local natural resources and rely heavily on imported goods, which can become more and more marginalized in the competitive market as they face economic growth and sustainable development challenges. The case of Gili Trawangan is no different, and many islands in the area are being confronted with similar circumstances due to the sheer volume of activity and competition among each island as well. The Gili Islands are an excellent example of the importance and practicality of local socio-ecological governance because it's a tropical area, isolated, and have strongly impacted coastal areas from anthropogenic stressors. The waters surrounding the Gili Islands are particularly interesting because of high current flow, and the mixing of the Pacific and Indian Oceans, which both create a breeding ground for biodiversity(Partelow & Nelson, 2020). Unfortunately, this also means that pollution is prevalent and more easily spreadable in this high trafficked area. SCUBA diving is the backbone for tourism on Gili Trawangan, with more than thirty dive shops on the tiny six square kilometer island, and more are expected to open in the future. Its neighboring islands, Gili Air and Gili Meno, have just about the same number of dive shops and are still growing as well. In order to stay competitive, dive shops must keep adapting to consumers' demands, which mostly involve expanding services offered, promoting ideologies, and producing more goods. All of this is contributing to the trash pollution issue on these islands. There are also many popular dive sites that receive a lot of traffic, and raises concerns about how all this activity will affect the health of coral reefs and dive safety due to overcrowding and stirring up sediment which reduces visibility. Not to mention the internal tension between dive shops, all of which would like to enjoy the same dive spots. Partelow and Nelson conducted their study in 2017, they conducted more than 50 semi-structured interviews. The aim was to have an open ended interview style with owners and members of local dive shops, managers of non-governmental organizations, and local government officials on the island. The authors wanted to collect data on political, socio-economic, and environmental topics(Partelow & Nelson, 2020). Another goal was to map out the evolution of dive shops and organizations, to see how much original ones have expanded, or have branched off to form their own. Gili Trawangan is a classic example of a

place that had to rapidly adapt and adjust to environmental conditions that have gone from untouched to critically threatened in a very short time, in order to keep their businesses and livelihoods afloat. Each business chooses the actions that best suit them, without necessarily considering the larger picture. This is to no fault of their own, and nobody can blame them for keeping their own best interests, however, it does make solving the issues of plastic pollution and declining biodiversity that much more difficult. The authors analyzed how the role of social networks and the collective action by various dive shops have initiated the formation of more official systems of governance to address marine conservation and waste management despite the booming ecotourism industry. Examples of this will be discussed in depth later in this paper.

A study on the island of Lombok focused on microplastics washed up on beaches as well as embedded in coral reefs. Before I go deeper into this it is important to define what exactly defines a piece of plastic as microplastic. There are various definitions depending on the scientists doing the research. Some define them as any shard of plastic that is one centimeter or less in length, and anything greater than one centimeter would be a macroplastic, which would be visible to the naked eye. However, in this particular study, the authors describe microplastics as 5 millimeters or less in length, so not visible to the naked eye. This category of plastics is even more dangerous than macroplastics because they are not readily visible, but they can still deposit in coral reefs, wash up on beaches to get mixed in with sand, and be ingested by various marine species. It is also possible for these plastics to leech other harmful chemicals into the water through its very slow process of decomposition, which could take hundreds of years. The effects and true reach of the microplastic infestation is relatively unknown because it is seldom studied in depth. The consumption and production of plastic is so high that existing recycling facilities simply cannot keep up. It is thought that 14 percent of plastic packaging is collected for recycling, 40 percent of that will go to a landfill, 32 percent leaks to the environment including marine ecosystems, and the other 14 percent of plastic waste is incinerated or used for energy recovery. Past studies also estimate that plastic debris in the world's oceans sits between 7,000 and 250,000 metric tons(Cordova et al., 2018). The location of Lombok island, which is in the south next to the Gili Islands and Bali, makes it a part of the coral triangle region of Indonesia characterized by its high outflows and shipping activity(Cordova et al., 2018). The author's research aims to explore the occurrence, distribution, and features of microplastics in the coral

reef sediment off the island of Lombok. This research was carried out in December of 2015, which is during the monsoon season, where reef sediment samples were collected by divers at ten different sites spread out around the bay of Sekotong. Through a series of laboratory manipulations, they were able to isolate and identify the solids from the samples as microplastics and sort them using a microscope(Cordova et al., 2018). A summary of the results are shown in Figure 2.

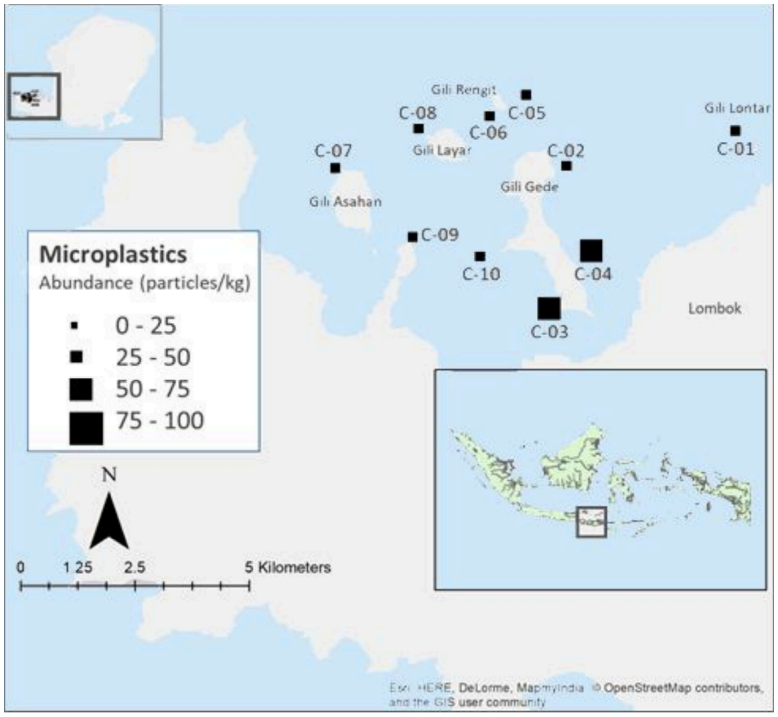

Figure 2: *Map of the sampling location and microplastic abundance found (Cordova et al., 2018)*

It is presumed that all particles found were sourced from the tourism and fishery industries, since those are the top two bureaus that essentially run Lombok island and the surrounding smaller islands. Shipping containers are also suspected to be a source of many of the plastic packaging that litters the shores and harbors in the area. About 3,900 ships pass through this archipelago, so there is a low chance that this shipping activity has no impact on these numbers(Cordova et al., 2018). It was interesting however, that the researchers found less microplastics in the sediment in the coral reefs compared to the coastal area and shoreline. This is likely due to activities on land by residents and tourists. Other sources are from styrofoam blocks that fishermen use to float their nets, and plastic bags discarded on recreational beaches. It

is also possible that some deposits are coming from local rivers that bring in fresh plastics from sources further inland. The top three forms of plastic (polystyrene) that were found are styrofoam, packaging, and fibers. The original suspect products include food and beverage containers, cutlery, fishing gear, lids, and protective packaging. These types of plastics have hugely complicated chemical compositions, which means they have high resistance to the elements and are highly persistent in the environment(Cordova et al., 2018). In the end, the authors suggest that more research be done, both on the concentrations of microplastics in coral reefs versus coasts and shorelines, but also on the implications and effects on wildlife and the ecosystem.

A more recent study was done in 2021, also on microplastics but the expedition was conducted in the waters of Nusa Tenggara, Indonesia, which is further east than Lombok and the Gili Islands. Figure 3 below shows the sampling area:

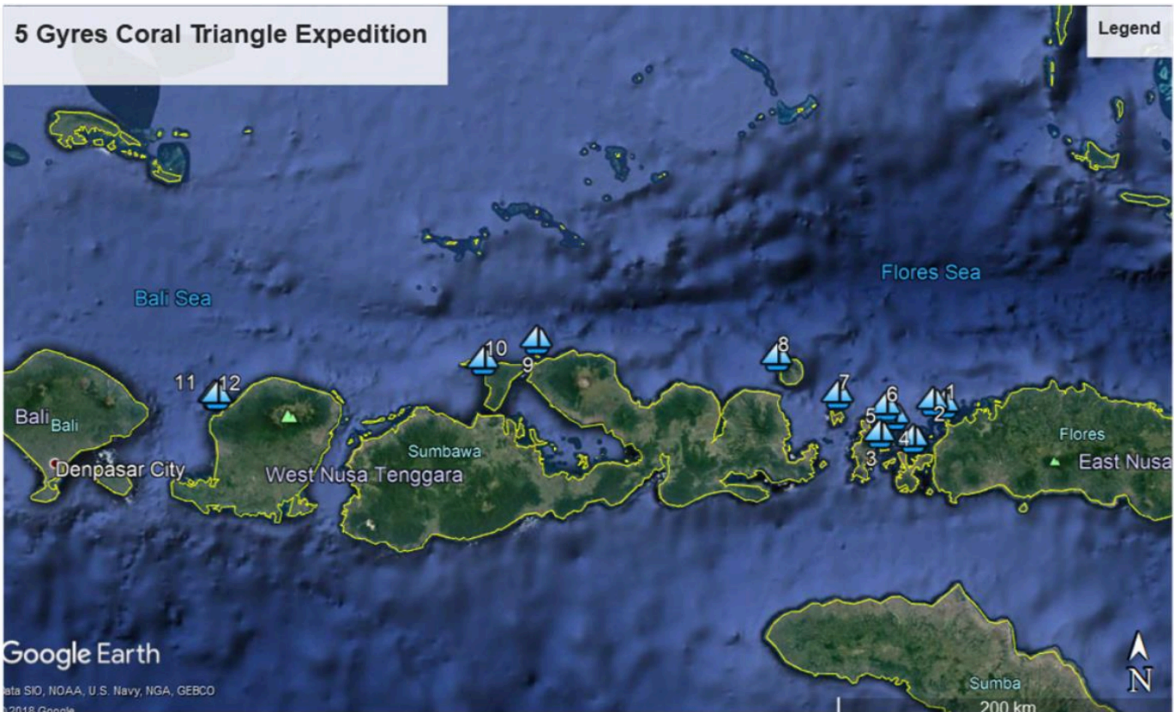

Figure 3: *Markers 11 & 12 is the approximate location of the Gili Island chain. Numbers are chronological from the start of the expedition to the finish of where different water samples were taken(Kisnarti et al., 2021)*

The method of research used in this case involved something called Hamburg Shelf Ocean Model (HAMSOM) hydrodynamics. This type of model is used to measure the characteristics of the waters such as current, temperature, density, salinity, and other functions. Other relevant data such as bathymetrics and atmospheric conditions were also measured and recorded for reference. In order to take the samples, one liter of surface water had to be collected horizontally, and be filtered with a plankton net. This was done at each given site, for a total of twelve sites. The second method used for collecting adequate samples was pulling a manta trawler, a special type of net for collecting surface water, for ten minutes at sea level at a speed of just two knots. All materials pulled up in these nets were removed and tightly sealed into a sample bottle(Kisnarti et al., 2021). It is important for all samples to remain cool because any heat or sun damage could have the potential to further degrade the unanalyzed samples and skew the data. Once they reached the lab, the samples were chemically separated into plankton, metals, and microplastics. Microplastics can easily be spotted using a microscope and counted, which is what the authors did in this case. Abundance of microplastics could then be calculated in relation to the total volume of water. Among the results discovered is the trend that waters north of this archipelago are relatively warmer than waters south of the island chain by a matter of 2-4 degrees Celsius respectively. And as far as salinity and density, they seem to have remained fairly unified throughout all locations sampled(Kisnarti et al., 2021). Currents tend to move from east to west and south to north at a slow but steady pace of around 0.5 meters per second. The current speed, direction, water temperature, and density are extremely relevant to microplastic presence and deposits because the higher the temperatures, the more degradation will occur, and therefore more microplastics created. The density determines whether said plastic particles will be able to float and remain at the high impact zone surface, or if they will settle at the bottom amongst other sediments. And the currents certainly impact the distribution of these particles and can determine where they end up. It just so happens that Gili Air sits in a zone where the current is weak but consistent, and receives many deposits from the upward flows.

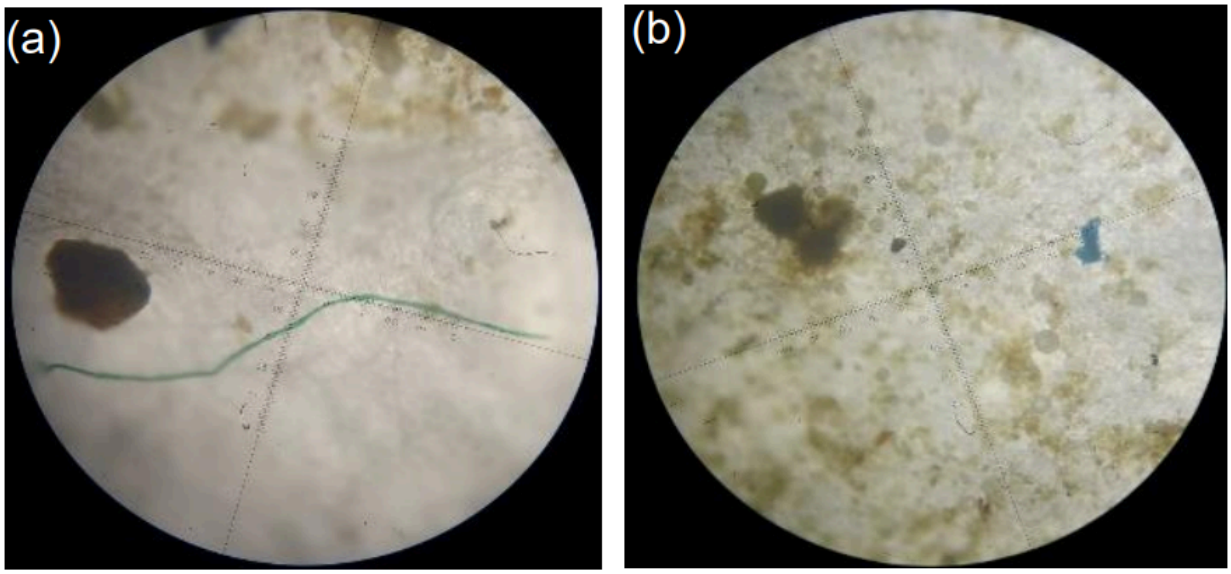

Figure 4: *(a) example of a green microplastic fiber collected and analyzed. (b) example of a microplastic fragment in blue(Kisnarti et al., 2021)*

Results from the lab showed two main types of microplastic present: fibers and fragments. Fiber was the most popular, as it was found at every site, but fragments were still found at over half of the site locations. They did not find any pellets or films since there are no plastic production factories anywhere in the area. The authors were able to determine from the microplastic pieces analyzed that they came from areas with high tourism and fishing activities. It is speculated that other sources for the fibers and fragments could be from loading and unloading port zones and food packaging, whether it is disposed of intentionally or was lost unintentionally(Kisnarti et al., 2021). Other trends found in the data such as higher fragment concentration in certain sites seem to correspond with the other atmospheric data, showing that areas at the downstream end of current flow had more microplastic particles.

While we already know that the main sources of income in this area are tourism and fishing, there are different sectors of the tourism industry introduced by the authors that have not been discussed up to this point. It is divided into port tourism, sea tourism, lake tourism, and national park tourism, none of which are immune to the negative impacts of the widespread microplastic phenomena. The conclusion of this study was that many coastal areas are largely affected by microplastic pollution, and that proper facilities to manage plastic waste in the surrounding Nusa Tenggara areas is essential to prevent more plastic leakage into the oceans. I

found this research incredibly helpful for gauging just exactly how large of a scale this issue has reached. However, my natural thought was that the production of these plastic products should be stopped and more sustainable alternatives should be introduced. While helping to filter out existing pollution does make a difference, it will become a never ending game of catch up if it isn't stopped from the original source.

The next study was done on waste management on Gili Trawangan that used quite similar methods to the one that I conducted. For some context, in 2017, the northern part of Lombok experienced an unfortunate waste crisis. They were hugely overloaded with waste and simply could not even take on the constant inflow of deliveries from the other islands. So much so that the streets of Gili Trawangan were overwhelmed with rotting, smelly trash in the streets. This crisis was caused largely by an operation in West Nusa Tenggara Province against the government of Gili Trawangan. It was allowed to happen due to waste management practices and the system for collecting fees was not enforced by formal regulations(Anugrah, 2021). Because of this discrepancy, the operating license of the waste management facility was temporarily revoked. The authors criticize previous studies on waste in Indonesia, saying that while many are already out there, most focus on environmental management and how there is a lack of innovation and limiting technologies. And other studies focus on aspects of capacity and the humanity components of managing waste looking at formal regulations. The author also points out that previous studies neglect to analyze the current sociopolitical dynamics within a local context(Anugrah, 2021). Other types of research, while helpful in some areas, are not so relevant when applied to the context of the small, very much not urbanized Gili Islands. The conclusions drawn from this crisis was that it was not due to any of the typical issues mentioned above, but rather because of problems at the institutional level. Another point brought up by the author is that issues concerning waste management cannot be separated from greater social hierarchies in governments and societies. Not to mention various actors having conflicts of interests in the governance of waste. Therefore, tackling waste management is not solely an environmental issue, but it's also the responsibility of the multilateral governance system and political relations. Such social and political processes are usually left for the levels of the local community to manifest and realize. Since this topic is so complex and relatively unexplored, this research aims to examine the socio-political dynamics of waste management in Indonesian society, combined

with the socio-economic implications of tourism in Gili Trawangan. As part of this case, the authors apply the Sociological Field Theory which is an actor oriented framework that centers around conflict, power, and strategy to explain change and stability in a particular social system. This theory highlights the perspective of actors with agency that take advantage of their social networks in order to bring change(Anugrah, 2021). In other words, this field theory involves the participation of a series of actors in a community with a common goal in mind that come together to enact positive changes in their respective society. There are two groups, usually the dominating and less dominant, or "challenging" position that is in competition with the dominant group. Examples can include administration, enforcement, or information regulation. They can also collaborate on the maintenance and editing of existing rules and regulations. Additionally, this field theory also acknowledges the existence and necessity of broader fields such as the environment, because the system can act autonomously. This being said, it is important for the actors to seek and engage in collaborations with others in order to carry out action plans. The action plan focuses on social skills, the ability to mobilize the members, create cooperation, or competition with other actors in the same field. A common goal that these groups strive for is to control governing units to strengthen and stand behind the ultimate positions of the acting members(Anugrah, 2021). What this theory seems to lack is a framework for how these relationships and interconnections can be built. Gili Trawangan is regarded as one social field in this case study, in which the following questions are addressed: What was the structure of the waste management field in Gili Trawangan prior to the crisis? To what extent did the crisis bring about change and continuity in the field(Anugrah, 2021)?

While my findings are both qualitative and quantitative, this research follows only a qualitative method case study approach. It applies the field theory as its framework because waste management in Gili Trawangan is characterized as a social field. The data was obtained through direct observation and semi-structured interviews. The interviewees consisted of several current and former members of waste management organizations, non-governmental organizations such as the Gili Eco Trust, and the Local Government of North Lombok(Anugrah, 2021). The author also made use of secondary sources including previous reports in order to see the situation from a more macro level. A simple technique of network analysis was used in order to determine who the key influential actors were in the networks determined by apparent connectedness of actor relationships. The analysis in this case began with looking at waste

management on Gili Trawangan before the crisis. Prior to 2017, the waste management system was intertwined with the sub-village government, which had an implemented “one gate system.” This system was originally created by several stakeholders such as the local business owner network, Gili Eco Trust, and environmental waste organizations to help facilitate the collection of environmental management fees, including the waste, security, and education sectors(Anugrah, 2021). Unfortunately, it was largely ineffective due to the sub-village placing it under low priority and assigning no formal regulations to make it “official.” Therefore, the only waste management establishment at that time was the Environmentally Concerned Community Front (FMPL), which works in conjunction with Gili Eco Trust, was also informal because it was not operating under any legal restrictions at the time. Local businesses on Gili Trawangan became the primary heads of this establishment due to their strong influence in the economy due to the tourism industry. Although, Gili Eco Trust plays the primary role in making sure that the FMPL is implementing adequate and environmentally safe waste management practices. In this situation, the Gili Eco Trust organization acts as a challenger for FMPL. The issue with this situation is that many things such as deciding on operational costs, service rates, and employee salaries remained in the hands of the FMPL instead of the sub-village government which merely handled the cash inflows and outflows. By keeping these institutions separate and informal, people were less incentivized to use these services for a fee, when they could just dispose of their waste outside or burn it in the backyard. Part of what contributed to the 2017 crisis was accusations of corruption within the two systems since the heads of both institutions were brothers. This in addition to the ongoing price wars between competing waste management organizations led to various legal actions being taken and facilities temporarily shut down(Anugrah, 2021).

Post 2017 when the two establishments became more collaborative, the situation improved significantly since the involvement of the sub-village legitimized the projects more. Three main points of the waste management system were also addressed at this time: the mechanization of waste equipment, regulation of operational permits and fee collection, and organizational reconstruction. To expand on the first point, for example, motorbikes were donated to the island of Gili Trawangan to make the transporting of waste easier. And these are the only types of motorized vehicles allowed on the island. Second, supervision, control, and authority of the overall waste management system is in the hands of the district government of

North Lombok, and has become more formalized. The sub-village government was replaced by the local state as well, which has the authority to collect taxes from waste organizations. And third, formal businesses stepped in when the informal local ones failed due to instability. Local businesses on Gili Trawangan are still the dominant actor in this system, but more informally, NGOs are the dominant force when it comes to social relations. In summary, the instability and lack of official regulations and involvement are what led to the waste management facility shut down and the crisis of 2017. By reworking the system and integrating more official and established stakeholders, the waste management crisis was able to be improved(Anugrah, 2021). The author ultimately concluded that local businesses and established social networks are the real driving force behind the island's waste management system. It is also inferred that the current system cannot keep up with the increasing tourism demands and the waste production as a result. The article offers recommendations for policymakers and suggests even more involvement of government officials on this matter(Anugrah, 2021). Unfortunately, little progress has been made over the years.

METHODS

The primary methods for my research and data collection were both qualitative and quantitative. For my qualitative research, I conducted a series of interviews, in English, of the staff members of Gili Shark Conservation and members of the community that have been living and working on Gili Air for many years. Before the start of my internship and research there, I had a few questions in mind that I wanted to center this thesis around. These big questions were: What is the current situation regarding waste management and conservation really like in this area? What is already being done to address this issue? And, how can we do more? I believe that my experience in the Gili Islands and through this research, that these questions will become answered. For my qualitative research, I interviewed four local divemasters, Aris, Katon, Gilang, and Chakra, my two supervisors that are in charge of the Gili Shark organization, Rose and Maisy, and the owner of our partner dive shop Oceans 5, as well as spoke to a few other dive shop owners and employees on the island of Gili Air.

The principal driving questions for the interviews are as follows:

1. Have you noticed a difference in biodiversity in the area from when you first arrived until now?
2. How is the single-use plastic on these islands? When did they switch to more sustainable materials?
3. Can you tell whether the trash picked up originated in Indonesia or another place?
4. In your opinion, what is the general attitude of locals towards conservation and waste reduction? Does the concern stem from the rising ecotourism industry? Have these attitudes evolved over the years?
5. What do you do with the trash collected on the weekly beach cleans and DAD?
6. What does the waste/recycling treatment process look like in this area?
7. Has Gili Shark Conservation ever thought about doing upcycling projects with the trash collected? Could it be feasible to launch a program like this in the area? Would people be interested?
8. Are the local people concerned at all with the amount of plastic waste, microplastic, and waste management problems?

My quantitative research consisted of data collection and data recording of trash that was removed from the beaches and harbors of Gili Air by Gili Shark Conservation staff and volunteers. There were even other members of the community, other dive shop members, and tourist volunteers that joined the beach clean ups as well. Every Thursday the trash collection team, consisting of four or more Gili Shark staff members, five to ten Gili Shark volunteers, and occasionally two or three other members not associated with Gili Shark. We would carry several bags with us to collect the trash we picked up from walking along the beach. The location of the clean ups was slightly different every week, but always on Gili Air. The team would continue to walk along stretches of beach and pick up anything that doesn't belong there for about one hour. After the hour was finished, the bags would be weighed in kilograms before being sorted into mixed recyclables and regular trash. The recyclables were sent off to Gili Trawangan for pre-treatment, or directly to the Lombok recycling center, the same goes for the regular trash as well. The results of each clean up were recorded on Gili Shark's database, along with any relevant observations. There was also a second method of trash collection as a part of the dive against debris (DAD) movement. These excursions involve experienced as well as new divers

whose mission is to make the reefs, harbors, and waterways free of waste. Some of the divers involved include volunteers and staff from the Gili Shark Conservation, divemasters from Oceans 5 or other shops on Gili Air, and other volunteers in collaboration with the respective dive shops. Much like the beach clean ups, for DAD, divers brought gloves and bags with them on their dive so they could safely remove and collect any trash from the reefs and harbors. It's a bit tricky because some of the trash found underwater may have some creatures living in or on it, and these types of trash obviously cannot be removed. So divers have to make sure each piece of trash they pick up can be removed without further damaging other organisms around it. Usually the dives last from forty five minutes to an hour. After that, the bags are dried, weighed, sorted, counted, and recorded in the Gili Shark database, as well as the respective dive shop's database. The sorted bags are then sent off to Lombok island once again to be treated.

DATA RESULTS

Answers to the qualitative interview questions of course varied from person to person, however there were many commonalities in the answers I received. Most of the people that I talked to had not been living in the Gili Islands for very long, but still, all of the divemasters expressed a noticeable difference in not only the amount of species present, but the number of individuals as well. There are some regulations against plastic, but not enough. There are also incentives for local businesses to not use plastic. For example, business owners can earn extra money from the municipality if they use paper or compostable straws and take out containers instead of plastic or styrofoam. I also observed while I was there, that business owners would get up early to clean and wash the streets in front of their businesses, so the few paved roads that existed were relatively clean. But again, we aren't sure how much of that trash was getting disposed of properly or getting burned on the island, which is a common practice. There are also several refill stations on the islands to fill up reusable water bottles. You could also take your own water bottles to restaurants and they usually have potable water to fill up the bottles with. As for the third question, it is difficult to tell whether the trash is all from Indonesia or from other places. As most of the trash collected already has the label rubbed off, or is broken into too small of pieces to tell what the original object was, let alone where it came from. Due to the way the currents flow, many predicted that it does all come from Indonesia.

One of the divemasters with the most experience expressed that any conservation movements in the local community are likely to be financially motivated due to ecotourism being the main, and in some cases only source of income for the people permanently settled in the Gili Islands. A lot of people do care and recognize the intrinsic value of their unique ecosystem, however, there is no centralized education system, let alone an accepted curriculum for environmental education, according to local Indonesian divemaster. The older generations tend to have a stronger connection with the local flora and fauna, but these days those ties are becoming weaker. The weekly beach cleans are sorted, weighted, recorded, and sent either directly to Lombok, or to Gili Trawangan to be pre-treated. I also had the opportunity to join the Dive Against Debris (DAD) movement during my time there. For this we conducted a dive with several other women volunteers to remove waste from the harbor outside the Oceans 5 dive shop. Every so often the women divers working for Oceans 5, as well as volunteers like me will conduct these DAD surveys. In this case, the waste is dried as much as possible, weighted, then sorted, recorded, and sent off to one of the respective waste treatment centers. Most people were unsure of the actual processes behind the waste treatment plants, but I will leave that up to my research. They were able to tell me that there was no centralized waste treatment system, it is very much up to the municipalities which are not always effective. The federal government has little role in the funding, building, or operation of these facilities. Gili Shark Conservation has thought about launching certain upcycling projects, however that has not been their main focus thus far. They are simply understaffed and lack the resources to do this kind of thing. But, the members of the organization did express interest in this. Maisy expressed an idea to have the women of Coral Watch and their environmental education students participate in this project, but more on this will be discussed later on in this paper.

Due to the lack of a centralized education system in Indonesia, especially environmental education programs, many locals are not aware of the plague of microplastic, and if they are, they are most likely to be fishermen, those that work in the dive industry, or scientists with some sort of higher education. Most other professions on the Gili Islands are either tourism, small business, or transportation related. This includes restaurant and shop owners, hotel workers, horse buggy drivers, and boat captains. There is one school that doubles as a day care facility for children on the islands of Gili Air and Gili Meno, but it is quite small and only a few women are employed there as teachers and caregivers. Gili Trawangan has an elementary school, but only

for children aged 3 to 9, and in order to receive higher education, they would have to leave to a neighboring island like Lombok or Bali. Many people that work in the Gili Islands, don't in fact live there at all. Many of them commute from Lombok island each day, simply because there is not enough room on the Gili Islands, or if there is space available, it's too expensive. For this reason, there are not many children living on the islands at all. However, as of 2019, the Bali Children Foundation is working on projects to build better, more stable elementary schools on all three Gili islands, as well as junior and senior high schools on Gili Trawangan and Lombok. Frequent earthquake activity in this region makes it difficult for children to have stable, permanent schools to attend, since they largely get torn down by the phenomena, especially in 2019 and 2020(Jakarta Post, 2019). After many schools were destroyed, they were left conducting classes in bamboo huts without enough space for all the students, or proper desks and supplies. The Bali Children Foundations also provides scholarships to 80 students living in remote Indonesia so they are able to attend school(Jakarta Post, 2019).

Besides microplastics, the locals are very aware of the plastic waste and waste treatment issues. It stares them in the face everyday when they walk outside and they have to sweep and clean hundreds of pieces of trash from their yards and the road ways. Many burn their trash in their backyards because it is so over flowing, and it cannot always get transported to a neighbor island in a regular or efficient manner. It also costs a certain amount of money to ship waste from island to island that many simply cannot afford. They are aware that it is unsafe for human health and the environment, but they are left with few other choices. They are very much open to a change either in practices or in government involvement in the waste treatment and management situation. Based on my research and observations, locals and tourists alike are willing to do something about this, and they welcome organizations wanting to help as well. The thing is, it cannot be done alone because these tiny islands lack the resources and financial incentive to make certain changes on their own. It is necessary for the municipal and even federal government to become involved to give the community the final push and the means that it needs in order to do something as big as banning all single-use plastic and building more capable recycling facilities. However, this final push must be campaigned for by the local municipalities using a bottom-up approach.

Overall, according to the people I talked to, it is difficult to have a unified front when it comes to sustainability because the country of Indonesia itself is so spread out and diverse that

government resources are not enough and any attempts for unification at this moment would be spreading them too thin. Indonesia consists of thousands of individual islands and many are uninhabitable. Many of the islands that are inhabited cannot be self-sufficient, that is, they cannot produce all the basic resources they need to survive; so they rely largely on imports. As previously stated, boats in this part of the world are strongly dependent on the currents and tides, so imports are not very reliable. This makes resource access and availability in this region extremely limited, so there are many factors and challenges that act in this equation of sustainability and conservation in this area. And addressing these challenges will not be easy, however, there are already several organizations involved in this and steps are being made in the right direction. For example, I heard from the locals that there is some government involvement in the promotion of more sustainable tourism practices, like small subsidies for not using plastic take out containers or straws, and locals are able to earn money by collecting waste and turning in sorted recyclables. It is not much, but little things like this can add up, especially if it becomes a regular practice.

The results for the quantitative portion of this project were both surprising and unsurprising to me. The part that took me by surprise was the sheer amount of trash that was picked up after each clean up. It was not that shocking, however, to see what types of trash that was collected every week. The majority of the trash collected from the beaches was small, microplastics, food wrappers, old fishing gear, and single-use plastics items. Sometimes random items would wash up such as diapers and batteries. Similarly, the trash collected from the dive against debris dives mostly consisted of paper and plastic packaging, food wrappers, single-use plastic bottles, and fishing line. Since the items found underwater weren't as exposed to the sun and therefore prone to breakage, there were more larger items and less microplastics like the ones collected from the beaches. Some random items found on DAD dives were sunglasses, scissors, and glass bottles.

With permission from Gili Shark, I recorded and copied all of the trash clean up data from the first seven months of the year 2023 (until the end of July when I completed my internship). The results were as follows:

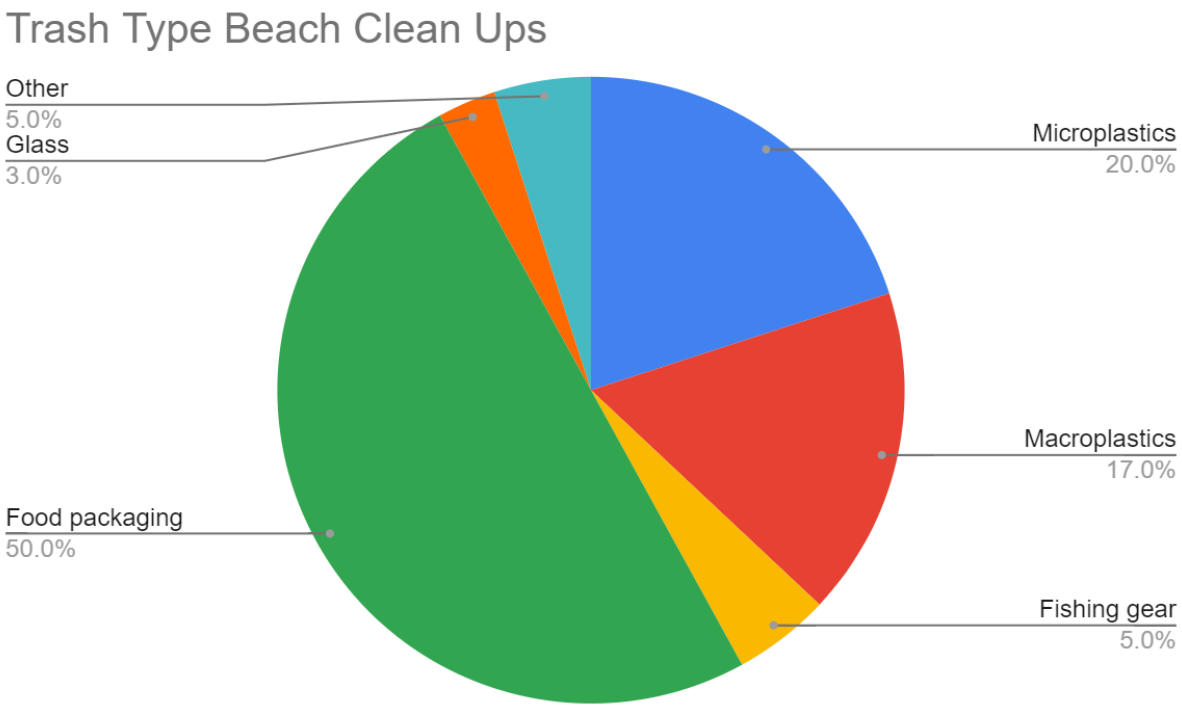

Figure 5: *With a range of 257 and 96 kilograms a month, the most common trash items collected on regular Thursday beach clean ups shown by percentage for January-July 2023*

More specifically, by food packaging, I mean plastic, single-use, non-recyclable food wrappers and packages. Examples of this included chip bags, candy wrappers, snack bags, and the plastic jackets from water bottles. Examples of fishing gear include fishing line, rope, and some torn nets. By macroplastics I mean broken pieces of plastic no smaller than ten centimeters in length, but not big enough to tell what product it originated from. On the contrary, microplastics are defined as any piece of plastic shorter than ten centimeters in length, and it cannot be determined what product it originally was. This does not include plastic bottle caps which we would consider macroplastic because we know the origin. The glass category usually has glass bottles only, beer bottles for example. The other category is for random things that don't fit into a larger category such as hygiene products, children's toys, and non-plastic scraps.

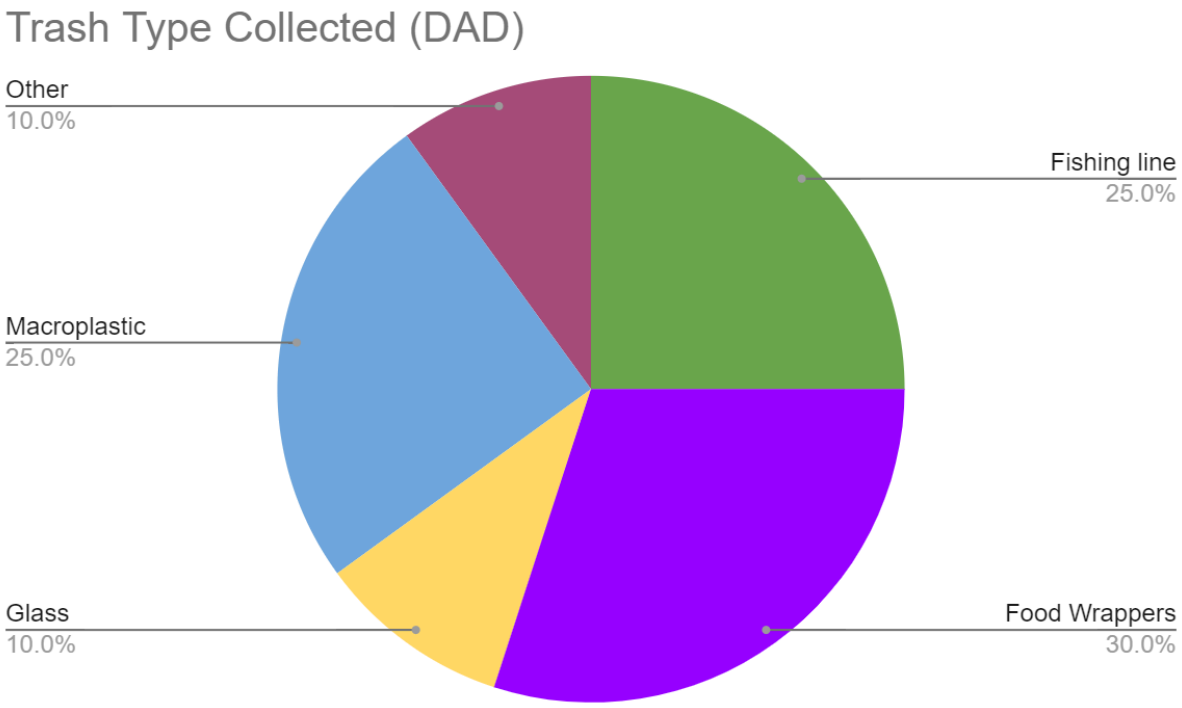

Figure 6: *Having a range of 3 and 0.5 kg per month, these are the most popular trash types pulled from the reefs on weekly Dive Against Debris dives from January-July 2023*

The categories are the same as in Fig. 5, except this "other" section includes things like zip ties, sunglasses, scissors, diapers, and batteries. As previously mentioned, there is less trash that collects on the reefs due to the strong currents and high diver traffic. If things are caught in the reef, they are usually larger items because smaller ones simply wouldn't have enough area to catch on corals or rocks.

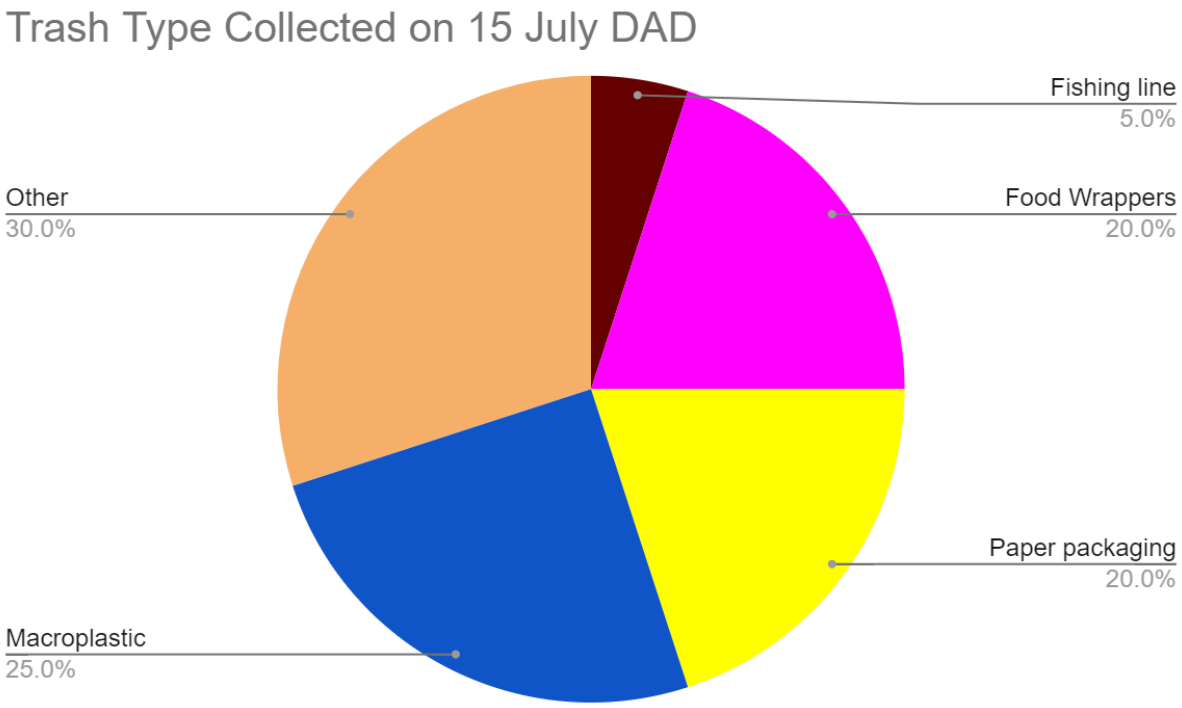

Figure 7: *Results of the trash types collected by myself and 5 other volunteers on July 15th, 2023. In one hour's time, 33 kilograms were collected*

These categories are the same as in Fig. 5 and 6. But in the graph, paper packaging refers to cardboard or other mail packaging made of paper. There was quite a substantial amount of paper packaging in the harbor when I went on the dive. Much of it was too large to be carried up by us in the bags that we brought, so we didn't manage to pull nearly as much of it up as we saw. Macroplastics in this case included many household hard plastics such as laundry soap bottles, cleaning bottles, etc. "Other" in this case includes things such as diapers, foam, and several cosmetic items.

One part of these results that I was surprised by was the fishing line and fishing gear. Although we did collect a lot of this, I was somehow expecting there to be more, since fishing is a large part of the community around the Gili Islands. It is also concerning to me that we were still finding some plastic cutlery and foam take away food containers even though they are banned in Gili Air and many surrounding islands. This means they must've had to travel a pretty

substantial distance in order to reach the shores of Gili Air. Exactly how far did they travel? We may never have the answer to this question, as it is nearly impossible to track the origin of every single piece of trash that washes up on the beaches and gets stuck in the harbors. Let this be an example of how small habits such as using petroleum derived materials for take away food can have a large impact even in far away places. It was not so surprising for me to find some of the random items that were pulled from the reefs such as the sunglasses and beer bottles because of the amount of tourist traffic, both on boats and other SCUBA divers. Although, I was shocked at some of the items we pulled from the DAD dive on July 15th. There were far fewer things seemingly from tourists, and a lot more things that may have come from locals. There were many household items such as laundry soap bottles, brooms, and cleaning products. These are things that tourists are not likely to have deposited. I expected that most of the waste produced and deposited to be from tourists and the tourism industry, simply due to the sheer amount of tourist traffic that these islands get on a daily basis. Of course there are locals who call these islands home, most of which work in the tourism or fishing industries. Since the prominence of the tourism industry is so apparent, I forgot that there are also local people. And people still produce waste, whether it's considered "local" or not. All six of us that completed the women's dive against debris task on July 15th were also flabbergasted at the amount of trash we were able to pull out in just one hour underwater in the small harbor off the south coast of Gili Air. We could barely haul the 33 kilograms of trash bags out from the sea, because the bags don't have much weight when they are submerged underwater. There were still tons more trash items that were left behind because we simply could not carry it all back up. I had to use my dive knife several times to cut fishing line that was entangled with other trash and also with several sponge species that are found on the seafloor. DAD is more difficult than it seems. As a diver, there is more to it than simply picking up trash and putting it into a bag. There are other factors to be aware of and consider when you are down there. As previously explained, items can only be removed if they are free from the reef and there are no creatures living on or in it. And great care must be taken to remove fishing line, as to not cut something accidentally that shouldn't be cut, or destroying sponges that may be entangled in it. This is no easy task because it is quite common to find sponges growing around fishing lines, so it must be slid out horizontally as to not damage the organism.

CURRENT PROGRESS IN THE ANTI-WASTE MOVEMENT

Another South Asian country has adapted new methods to combat plastic and other types of waste in the environment. Bhopal, located in central India, generates roughly 480-500 tons (500,000 kilograms) of waste per day. The majority can be attributed to the city's rapid population growth and rising industrialization. The large dump site for this waste is sorted by over 2,000 waste pickers, 85 percent of which are women, and their working conditions are less than favorable(GEF, 2018). A local non-governmental organization called Sarthak, together with Global Environmental Facility (GEF), a program dedicated to giving small grants to communities in need, teamed up to allocate a portion of land so that a proper waste segregation center could be set up. It is much more than simply a waste collection and recycling facility. It is a place where waste pickers can have a sense of community support, access to services such as insurance, and they can receive fair wages. This is especially important for the women because they can now support their families, and afford to send their children to school to get them a decent education. The business model for these new waste facilities is to segregate the waste by type, into more manageable 100 kilogram bags by using a special compactor. Once completed, the bales are sold to several local cement manufacturers(GEF, 2018). The cement manufacturers use them to derive fuel for the cement kilns, which ends up saving on greenhouse gas emissions because they do not release any persistent organic pollutants (POPs) when burned. These methods and facilities were so successful that GEF was asked to build similar establishments in another city where they also provided waste management training along with community support. Extra shreds of polyethylene waste are also used to build and repair roads, and thanks to the strong partnerships involved in creating these centers, daily income has quadrupled for the waste pickers in the area. Sarthak and GEF plan on continuing their work and opening up more centers in 50 different cities spread throughout India(GEF, 2018).

This case, while only specific to India, is a great example of local NGOs partnering up with larger ones in order to build necessary waste sorting and treatment facilities. I think that similar methods can be deployed in Indonesia, as the conditions and circumstances are quite similar to those of India. Systems like the one in Bhopal could serve as a model to start other facilities around the world.

The initial group of dive shops on Gili Trawangan began a non-governmental organization called the Gili EcoTrust which was mentioned previously, in order to focus on coral reef restoration and other marine conservation actions. This organization gets their funds from the fees paid by each customer that comes and dives with one of the many participating dive shops on any of the Gili islands.

Through the interviews that I conducted with the locals and staff of Gili Shark, I was pointed in the direction of many other organizations and foundations that are dedicated to dealing with and hopefully eradicating plastic waste in the area. The first of which is Classroom of Hope, an organization founded in 2012 whose primary purpose is to address both the issues of access to education for children, and the plastic pollution issue in Indonesia. Based on the Island of Lombok, Classroom of Hope works with other partners as well to build schools in four different countries in Southeast Asia. According to their website, their principal objectives are: to allow children in remote areas access to basic education, to increase literacy rates and set foundations for a productive life, to reduce dropout rates, to increase continuation rates from primary to secondary school, and to encourage parents and community members to support their children in education. How do they do this? Ecobricks. They use blocks made from 100 percent recycled plastic (PP, PE, PET types) as the main material to construct these schools. These blocks are lighter, more resistant, and more flexible than typical bricks. They are affordable, non-toxic, persistent, easy to assemble, and they claim that the carbon footprint is near zero. Some other characteristics of these block schools are: that it only takes 5-8 hours to construct one classroom, they have concrete foundations, all wood furniture, steel rods and u-beams to reinforce structure, and glass windows. Due to frequent earthquakes in this area, it is essential to have structures that are sturdy and can resist bad weather conditions. These schools do just that, due to the eco bricks and strong internal structure. The founders and team members believe that basic education for all children is the foundation or “building blocks” for a healthy society, so this initiative has even more meaning.

I reached out to this organization via email to inquire on a few more points that I did not get from their website alone. I was able to get a response to the following questions:

1. Who makes the bricks and how?
2. Where does the plastic for the bricks come from? How is it collected?
3. Who teaches at these schools?

4. What does the curriculum include? Is there an emphasis on environmental education and building relationships with non-humans?
5. Are there any local partners you also work with? How many staff/administrators are Indonesian (non-foreigners) ?
6. How would you say your presence in these areas is received by the local community?

I chose these questions in part out of curiosity, but also to act as a follow up to my ethnographic study. I wanted to gather more inside information on the organization so I could get a better idea of the relationships created and maintained between the organization and the effectiveness of their presence in the community. After my studies of environmental anthropology and learning about ethnographic research, I became curious and more critical of these types of organizations. I realize that many non-governmental organizations are not founded by locals, but usually by western expats. While this doesn't automatically discredit them, it always makes me wonder if the work they are doing is truly effective and considerate of the local community and encourages participation by everyone. I did my best to ask what I wanted to know without appearing too judgemental or skeptical of the organization. The response I received from the Classroom of Hope was quite pleasant and informative.

1. The blocks they use are produced by Block Solutions Indonesia at a factory in Lombok. They use recycled plastic pellets and an injection moulding machine.
2. Block Solutions buys the pellets from a recycling facility in Surabaya, a city on Java island. This facility receives plastic materials from all over Indonesia, including Lombok, because there are so few facilities throughout the country. The CEO of Classroom of Hope, the person with whom I was in contact with, claimed that there is no such recycling facility on Lombok island at all.
3. The schools they build are government funded public schools, so the government is in charge of hiring teachers and maintenance after the buildings are finished.
4. Since they are government public schools, they teach the national Indonesian required curriculum.
5. Classroom of Hope works with their partner, Yayasan Happy Hearts Indonesia, which does employ mostly Indonesian staff.

6. The CEO claims that their school building program is welcomed. Once they got past the initial education phase of how to make the block buildings and addressing community concerns, they now have a fantastic relationship with the North Lombok community. The children are excited about learning in these types of buildings, because their old schools fell apart in the earthquake and they are scared of it happening again. But of course it won't in the new plastic brick buildings.

After reading these responses I had a few thoughts. I didn't realize that these schools would end up being public schools left up to the government, and out of the hands of the organization after being constructed. I was also elated to hear that the blocks are made inside Indonesia, using plastic waste being recycled throughout Indonesia, so everything is being kept local. However, some of the information from the CEO was in contradiction with what I had previously heard from the staff at Gili Shark, and with the research I had done for this thesis. Firstly, I was under the impression that there was a recycling facility in Lombok. And secondly, I was told by an Indonesian staff member that there wasn't really a centralized education system for all of Indonesia. This could've just been the staff member's opinion, or that was the impression that they had of the education system. Either way, I was inspired to do a bit more research on these two topics. After checking a number of sources, there are a few recycling facilities on Lombok. Some are relatively new, and they are almost all "unofficial," facilities independent from the government. This would explain why the Classroom of Hope representative claimed that there were no facilities there. This also explains why there is so much trash washed out to sea from Lombok, because these small, independent recycling operations have nowhere near the resources or power to process it all. This then raises the question of, why do the Gili Islands ship their waste to Lombok at all? Why don't they just take it directly to the nearest facility on Java? Answers to these inquiries unfortunately cannot be answered in the scope of this particular research, but are points to look into for future projects. As far as the concern about education, I was able to find that there is in fact a national education system for Indonesia, which is quite similar to other standards of education that can be found globally. There is however, a large degree of variability within the set standards, meaning that some schools require English education while others don't, and some focus more heavily on different

subjects such as religion, while others do not. What the Gili Shark staff member meant was in the field of environmental education, it is not a part of the baseline required subjects, and therefore, some schools may have better or more developed programs than others. This explains the discrepancy in the answers received and clears up the confusion that still lingered about this case. I also took the liberty into getting some information on Classroom of Hope's partner, Happy Hearts. They began in 2005, with a branch in Jakarta opening in 2006 after an earthquake destroyed many schools. They provide various education materials, sanitary facilities, and school furniture for many school rebuild projects(Impact Crew, 2024). Happy Hearts is dedicated to rebuilding schools across Southeast Asia, particularly after natural disasters. They also run several school reconstruction and training programs to teach others about rebuilding projects. So far they have rebuilt 340 schools, 25 libraries, and over 6,000 hours of volunteer work contributed(Impact Crew, 2024).

Another organization, this one based in Switzerland, is called Trash Hero. They have many branches all across Southeast Asia and Europe, the first of which was founded in 2013 in Thailand. They just opened the Indonesian chapter in 2022. There are many aspects to their mission, some of which include action and awareness, education, launching projects that promote sustainability, and to inspire others in the local and global communities. More specifically, volunteers pick up trash and similar times and locations each week and spread the message to encourage others to join. They also host multilingual education programs for kids in order for them to get hands on experience to connect with the environment and see the true impacts of plastic waste on our ecosystems. Trash Hero creates long term projects that help communities with better waste management practices, and helps to prevent waste in the future. This organization also aims to motivate and inspire others to eliminate the use of plastic in their daily lives. They spread positive messages and work to remove barriers and normalize the vision of a zero waste society. According to their website, they have five main principles that they live by. The first is to be the change, to take positive action and to lead by example. The second is to be credible, work honestly and earn trust. Third is to be selfless, working for the public benefit and not personal gain. In fact, Trash Hero does not accept any cash donations, but rather donations in the form of volunteer work or any supplies they may need for their various programs. The next principle is to be responsible, to be accountable for actions taken and to hold high standards for community support. Lastly, one of their principles, or rather a motto, is to

think global but act local. This means to understand the greater global issues and broader concepts, but to start taking action near where we live. Now, if they don't accept cash donations, then where do they receive funding from? They have agreements with a number of sponsors and grant making foundations that provide them with some funds annually. They also have self-generated income from the staff and board members. As of the end of 2023, Trash Hero has conducted over 19,534 cleanups, sold over 106,848 reusable water bottles, hosted over 490,138 volunteers, and collected over 2,388,746 kilograms of trash worldwide(Trash Hero, 2023).

Once again, I contacted Trash Hero through email in order to ask them to further elaborate on some things I encountered during my research. The questions I posed to them were:

1. Who teaches the students in your education programs? What does the curriculum look like?
2. Does it include environmental education or environmental appreciation learning activities?
3. What kinds of students join your programs? All students in an area, or only a select few?
4. What do you do with the trash you collect when you're finished?
5. Do you primarily work with communities to try and reduce plastic use, or with industries/companies as well?

In a similar fashion to the previous organization, I posed these questions out of curiosity and to fill in any missing information that couldn't be gotten directly from their website. I also chose these particular questions because I believe they are important for analyzing and getting a better understanding of the current efforts to combat plastic waste and promote the ever growing important subject of environmentalism. The responses to the questions were received as follows:

1. **Teachers:** The education for kids is under the "Kids and Education Program." It is done in both formal and informal ways. But in Indonesia, the usual methods are only in the informal way. For example, education at the cleanup (with the story books), or volunteers that visit the school to give education occasionally.
   In the formal setting, the teachers would get trained by Trash Hero, and get the permission to educate the kids using Trash Hero's name and books. This practice is done at the branch in Thailand, but not yet in Indonesia.

Curriculum: There is no set curriculum yet. On Gili Air, the volunteers create their own based on the books provided by Trash Hero.

2. All the children that work with Trash Hero are encouraged to log their own environmentally friendly actions in their personal books provided by the organization. Each log is one point, and once they reach 50 points they get a free t-shirt.
3. Any kid can join the cleanup as long as they have a chaperone. The organization also attends occasional events, it depends on which schools invite them. Usually they are invited to give a speech to all kids in the school. They typically split the age groups into grade 1-3 and grade 4-6, and different contents of presentations are given to each group appropriately.
4. It all depends on the chapter. For example in Canggu they use the EcoBali service to pick up the trash from cleanups. EcoBali will send the recyclables to the island of Java and send the rest to the landfill. In other chapters like Sanur, they collaborate with the Environment Agency to pick up the cleanup trash to send to a landfill. Every chapter has to make sure that the cleanup trash is picked up by another party and managed properly.
5. Yes they do but it depends on the chapter. Some chapters who have been doing the cleanup program for a few years now would be automatically respected by the communities, including small businesses, and they can integrate the Trash Hero missions into the community, such as having a zero waste local event. They are also frequently invited to give educational talks to the local communities (including the government), and use these opportunities to introduce the zero waste concepts. On the other hand, the other chapters are also encouraged to do brand audits to give pressure to companies to stop producing single-use plastics.

However, I was informed that there is an exception on Gili Air where they get the access to have a regular program with kids at the schools. Usually it isn't allowed for a chapter to only do the education programs run by volunteers without having a regular community cleanup. But as they have an extraordinary situation, the Gili Air branch is allowed to have a regular program in the elementary school. Since there is still no standard curriculum, in Gili Air the qualified

volunteers create it by themselves. They did create a book as well which is used by the volunteers to help with the education programs. A free download of a children's workbook is also available on the Trash Hero website. This is where kids can learn about the little things that they can do to reduce plastic use, tips on conscious consumption, and activities to complete in order to get a free Trash Hero t-shirt and other rewards to get them excited about fighting the plastic plague. As far as the collected trash, unfortunately there is no better solution for the cleanup trash other than to separate them, send what they can to recycling facilities on Java, and send the residual to the landfill at this time. Trash Hero is also a member of Break Free From Plastic, a global program whose primary goal is to advocate for the end of the single-use plastic production and develop a series of projects to create lasting solutions to the plastic pollution crisis. This organization is highly anticipated and accepted by the community which involves both expats and local volunteers. It doesn't surprise me that they don't have a set standardized curriculum for environmental education, because no such programs exist or are regulated under Indonesian government run public schools. As for the trash from the cleanups, they are looking for better solutions, more effective, and efficient ways to deal with this waste. I believe that this organization could benefit well from my proposed upcycling environmental education project, as they work directly with local children.

A similar organization to Trash Hero also operates out of Bali called Ocean Mimic. Founded in 2018, Ocean Mimic is run entirely by women. They began as an ocean clean up organization that also sold sustainable swimwear. Due to the challenges of Covid19, they had to close down for a while and their swimsuit brand was discontinued. Now they are back up and running, and only focusing on regular clean ups and promoting sustainable lifestyles. In the year 2023 they have collected 34,613 kilograms of trash worldwide, as there are many other branches besides the one in Bali(Ocean Mimic, 2020). On their website they have several tips and tricks for people wanting to conduct their own cleanups, tips on how to reduce the amount of plastic consumed by using other more sustainable products, and even information on how water sports and recreation can be a gateway for a cleaner ocean. They have stories about eco bricks, composting, and even news reports on the issues of overfishing and climate change. There is also a blog written by the staff members on various stories in Indonesia and around the world. There wasn't much information on their website, so I contacted them by email and on social media to ask more questions on their mission and strategies.

1. What did the recycling plant project in Bali May 2020 entail? What was the local response like?
2. Where do you take all of the trash that you collect from the clean ups?
3. What kinds of environmental education/activism projects do you run? Who teaches them?
4. What are the reactions of the local community to Ocean Mimic's presence in the Lombok/Bali area?
5. What kinds of volunteers participate in your clean ups?
6. How are you funded?

I posed these questions both out of curiosity and to get a more complete picture of the community involvement and feedback. Unfortunately, I did not receive a response in time. There is a possibility that I will cross paths with them in the future, but for now my inquiries will go unanswered.

Next, I researched Batubambu kids, a 100 percent non-profit organization based in Lombok. It originally began as an eco-guest house started by a German expat, but soon grew to become a much larger part of the local community. Every Sunday they have programs where children from the village come to receive English education, participate in trash clean ups, and are able to enjoy free time or have swim lessons(Batubambu, 2024). Their website was fairly vague, so I reached out to them through email and through various social media outlets with a few questions regarding their program. Specifically their plastic recycling and environmental education initiatives.

1. Are the Sunday programs available to all kids in the area? How many usually attend on average?
2. What do you do with the trash collected on the clean ups?
3. The website says you melt the recycled plastic down into molds of your choosing. Can you elaborate more on this? What happens to the final product?
4. Do people that stay in the guest houses help volunteer for these programs as well?
5. What are the responses of the local community about your environmental and English education programs?

It was still unclear to me what they did with the recycled plastic waste after their weekly clean ups. The website mentioned that they have conveyor belts that chop up the plastic and equipment to melt it down to be poured into molds of their choosing. I was left seeking more information on this process, naturally because plastic waste is the star of my research. Unfortunately again, I received no response from this organization through any of the platforms. However, if this organization employs any similar methods to the others I investigated, then I can infer that this organization receives much praise and appreciation from the community by involving both local community members and expat volunteers. I can also guess that they ship the trash from their collections to Java like the other NGOs, or they process it in their own facilities in order to turn it into newly transformed materials. This is part of the reason why I wanted to get in touch with them because they are implementing new alternative strategies to waste processing that I am interested in. Maybe in the future I will be able to get in touch with them properly.

Continuing, I investigated an organization called Plastic Kembali. They were founded in 2019 in Lombok, with the intention of combining Indonesia's greatest challenge, plastic waste, and one of their greatest strengths, traditional folk art. They source most of their materials (polypropylene or PP plastics) from a recycling center on the larger island of Java where the capital city of Jakarta is located. The organization also employs several local artisans, the majority of whom are women, to use the obtained plastic materials as a medium to create various works of art. They have a gallery located on the island of Bali showcasing many works made from shredded plastic materials and some other natural materials such as banana leaves, coconut husks, or rattan. In addition, they also offer do-it-yourself workshops that are available for anyone interested to teach them how to make their own plastic art projects.

I also contacted Plastic Kembali by email and then by phone to ask them for more details on their projects and missions.

1. What is the main demographic of the people that buy these art pieces?
2. Besides workshops, does your organization participate in any other environmental or sustainability education programs?
3. What are some of the reactions the local community has towards your organization's presence?
4. About how many kilograms of plastic are used for these projects in a day/month?

5. Can you clarify where the plastic comes from that gets used for these art pieces?
6. What are some goals for your organization in the future? What kind of impact are you hoping to have moving forward?

I always inquire about where the plastic is coming from or going, because to me, it seems arbitrary that the waste that managed to escape the treatment plants is being picked up, only to be sent back to the very same facilities that are not able to process that much. But Plastik Kembali seems to have recognized this predicament and has done something about it. They focus not on the recyclables but rather on the non-recyclables in order to keep them from landfills. Nevertheless, the responses received from Plastic Kembali were:

1. Plastik Kembali works directly with Seminyak art gallery which ships purchased art pieces internationally. They have many international clients as well as hospitality groups within Indonesia, such as the Marriott and Four Seasons.
2. They used to do home good workshops, which involved teaching people how to make upcycled household products. But they have not been doing those for a few years now due to being understaffed. They have switched their focus onto creating more large scale pieces using primarily tali which is a sturdy, woven rope made out of plastic bags. This organization also works closely with another non-profit called Selong Belanak Community Association (SBCA) which does run environmental education programs. Plastik Kembali contributes to the community in many ways, such as funding waste transfer stations and placing bins throughout the community. Recyclables go to the closest treatment plant on Java and the non recyclables are used as materials. One of Plastik Kembali's goals is to keep the non-recyclables from entering landfills or getting burned in homes or in common spaces.
3. Many local craftsmen are a part of the team at Plastik Kembali. The main team of five employees were picked up by the director at a local market in Lombok, because they had an ad looking to recruit people to learn how to use upcycled materials as a medium for artwork. They also employ two welders and eight traditional weavers. As far as the general public's feelings about the situation, they are glad that someone is stepping in and doing something to help the over

use of plastics while also finding new innovative solutions. From what I was told, the community seems to enjoy getting involved in the organization's processes and they love participating.

4. When I spoke with the director, she did not have exact data to give me, since they don't typically keep track of these things. But she was able to estimate that they have used thousands of kilometers of tali, and they just take whatever materials come their way and try to find some way to utilize it.
5. Plastik Kembali is not like other organizations that organize beach clean ups or anything like that in order to get materials. It is collected from the local businesses and community homes. They also take in some overflow from recycling plants, but mostly they work with non-recyclable materials.
6. The director wanted me to know that they are very much art focused and art centered and the sustainability part is a bonus. They want to further emphasize reducing and eliminating the production of plastic altogether; and to do this they hope to use art as a driver for social change, to get people to make more sustainable and conscious choices. They are also expanding their galleries in the near future to have showrooms in Australia.

Some more brief information about SBCA is that they were founded in 2018 and they focus on environmental sustainability, waste management, and community development(SBCA, 2019). They run many environmental education and community outreach programs for local children and community members. Part of this involves training locals and volunteers on how to properly dispose of waste and develop alternative approaches to an overall sustainable lifestyle. They have weekly beach clean ups and work with Plastik Kembali to provide trash and recycling bins throughout the islands for easier sorting and collection. Plastik Kembali does have a small incinerator so that they can safely dispose of waste that they cannot turn into art materials, and also as an option for the local community so they don't burn trash in their yards and emit harmful chemicals. Since it is too expensive to ship glass off to other islands, a donation has recently been made for a glass crusher. They can turn old glass bottles into tile or mosaic pieces, wall art, or even turn it back into sand. In an effort to boost the local economy and support artists, Plastik

Kembali purchases already made tali from locals, and then they use the tali to create their art pieces which they sell.

The next existing organization project is called OceanKita. Founded in 2018 with headquarters in Lombok, OceanKita addresses the issue of overflowing landfills and overworked recycling facilities that concerned me from the beginning. Typically, only PET, PP, and HDPE type plastics are able to be recycled in Indonesia. Plastics that fall into these categories only account for one third of the total plastic waste composition. The remaining two thirds is what ends up getting burned which releases toxic chemicals into the air, in landfills, or in the oceans where it never fully decomposes(OceanKita, 2021). This organization has their own state of the art, environmentally compatible, and industrial low cost machinery that allows them to divert that two thirds of plastics to their own recycling facilities. These facilities are called ReForm, and they have been able to spread to other locations all across Indonesia and Vietnam(OceanKita, 2021). They have helped put an end to illegal dumping and have joined the fight in keeping the landfills from overflowing and the oceans receiving more waste. Additionally, OceanKita does ocean clean ups, consultes with partners to help develop better waste management plans, and conducts marine debris and solid waste management studies.

The recycling process for these facilities first begins with sorting the plastics (including plastic bags, styrofoam, and multi-layered items). Then they are shredded, cleaned, and dried. They are then spread out and pressed into large molds to make boards of “new” plastic. These boards can be sold as is to be made into furniture or other products, or they can be cut down as needed, depending on what the buyers would like the final product to be(OceanKita, 2021). In 2022, the organization launched a sort of competition project. They sought out the top five organizations that are carrying out similar projects or have similar goals to OceanKita. These included organizations that help create steady jobs for local Indonesians, other companies that create recycled plastic furniture for homes, restaurants, and schools, and other facilities that sort single-use plastics. These top five groups were offered a chance to partner with OceanKita and their many partners, new education opportunities, resources, and funding. OceanKita itself is funded by its many sponsors and partners in the Southeast Asia region, and by their sales of their products. So by bringing other organizations in, it can only contribute to positive growth for the individual companies and for the cause of eliminating plastic waste from the environment. I admire this organization because instead of just picking up trash off of a beach (which still helps

the cause) and sending it off to a place where it will likely just end up right back in the ocean, they take it one step further and actually recycles the materials that the government facilities are not able to take care of. I think there needs to be more investments in private recycling facilities for many reasons. They are more impactful at a local and regional level than many of their government run equivalents, they inspire more community involvement, and people get to see the mutual benefits almost immediately. They create stable jobs for local people, and everyone from kids to adults can get involved in collecting materials and buying products. It is mutually beneficial because they are cleaning up their communities and getting high quality recycled products at an affordable price in exchange for profits. These types of recycled furniture are becoming more and more in demand, especially in earthquake prone areas such as Southeast Asia, for schools and booming tourist destinations. The issue still remains however, of new single-use plastic products being produced. If 100 percent of them could be recycled after use it would be less of an issue, but that is obviously not the case, and likely never will be. Therefore, in order to properly keep plastic waste out of the environment is to stop producing new plastics altogether. This is easier said than done and would involve the demand for new, single-use plastics to go down while the demand for recycled or upcycled products to go up. Now that there are companies out there that are investing in facilities that make such products that last longer and are more affordable, I think that a change in trend could be possible in the coming years. Furthermore, this bottom-up approach to tackling the plastic waste crisis is the way to go in my opinion, because it's faster, more personalized, and more inspiring. By starting at the base community level instead of the top government level to fight this issue yields better, quicker results because nothing has to go through a system of bureaucracy or people trying to slow progress. By starting at the community level, their personal needs are more likely to be met, considered, and accommodated for whenever new projects are introduced, which also makes it more likely to have high approval rates, participation, and less resistance. And finally, by taking a bottom-up approach, it is more likely to trickle up through the ranks and spread ideas out to other communities, and eventually the proper legislation will have to catch up with the new developments. If we relied on a top-down approach, it would lack everything I just talked about, and way more likely to have pushback or resistance from the people that may not fully trust the government or higher authorities. It puts the power back into the communities and allows a space

for real change to happen and action to be taken, not just a plan of action written on paper and signed by a select few high level people.

I also discovered during my research, a company founded a few years ago by two Indonesian women in Surabaya, Java called Robries. Robries uses recycled plastic waste to make products such as furniture, coasters, phone cases, recycling bins, and much more. The women got in contact with Precious Plastic, a company which makes and sells equipment needed for do-it-yourselfers and small companies to recycle their own plastic on a small scale. They were able to partner up to acquire several pieces of equipment such as ovens and shredders, and hire many skilled craftsmen in the area to create the upcycled products and officially launch Robries. So far, Robries has recycled over 64 tons of plastic waste, including more than 200 million plastic bottle caps, and they have made tens of thousands of high quality upcycled products(Robries, 2024). The first step in the making process is to collect, clean, and sort the plastic waste, usually by plastic type and by color. Then it is shredded into tiny pieces in order to make it easier to melt down. Once melted down, they are molded into shape and specific designs are made on them. Finally, the products are sanded, finished, and assembled into the final product to be sold(Robries, 2024). These products are highly durable, earthquake safe, long lasting, and weather proof. The demand for upcycled plastic products has grossly increased over the years and I believe it will continue to do so. Their client list includes many hotels, restaurants, and businesses in Java and in many other Indonesian islands. I think that this is a very creative and effective way to raise awareness about the issue of the overconsumption of single-use plastics. And many other companies, both existing and potential start ups in the future, can take notes from Robries and carry out a similar operation in many other parts of the world that have significant problems with plastic waste. While this initiative does not deter other companies from producing new plastic products, it can certainly decrease the demand for such products. Manipulating the supply and demand chain is one way to advocate for more sustainable practices, and hoping larger industries will follow suit and produce less and less new plastics as the demand and consumption decreases.

Figure 8: *Examples of original products made by Robries from recycled plastic scraps-chairs, bar stools, and tables(Robries, 2024)*

One organization that I was referred to was particularly interesting to me. They are called Oceana, a group of foundations founded back in 2001, who specialize in reducing impacts and marine pollution from the coastal hotel industry. According to their research where they surveyed several beaches and harbors in Cancun, Playa del Carmen, Copacabana, Ipanema, Mallorca, Valencia, and the Florida Keys, all areas were found to be polluted with plastic that was directly hindering the surrounding ecosystems and showed negative impacts on biodiversity, which is not a surprise. During the course of this research (as of June 2023), Oceana found a total of 1,653 waste items, with 70.8 percent of it being materials made from plastic. They were able to calculate a concentration of plastic items ranging from 324 to 852 pieces of plastic per square kilometer of seafloor that was surveyed. They recorded most of the plastic to be single-use, such as bags, food wrappers, packaging, cutlery, and drinking containers(Oceana, 2023) which are all items related to the tourism industry. Oceana claims that about 50 percent of tourism globally are forms of ecotourism, whether marine or coastal. So the growing amounts of coastal and marine

plastic trash pollution pose a serious threat to this massive industry. This organization has a large staff of scientists, administrators, and specialists that they employ in various locations throughout the globe. It is these scientists that run many of their research expeditions and publish blogs related to their findings. Oceana runs a number of programs, expeditions, and campaigns all over the world. Some of them include, activism for policies to better protect the world's coastlines, lobbying for new marine protected areas (MPAs), making sure boat owners are implementing marine conscious practices to minimize their impact on the water, promotion of aquaculture, Plastic Free Paradise, and many more. The Plastic Free Paradise initiative promotes the elimination of single-use plastics and encourages the use of reusable materials or more easily recyclable materials on both industrial and corporate levels. This is an area that I am particularly interested in because, while beach clean ups and plastic free lifestyles are great and do make a difference, if large amounts of plastic are still being produced, it is inevitable that the cycle will be never ending and the beaches and coasts will still never be clean. We have to stop it from being produced at the industrial level, a task that is easier said than done, but I think it can be feasible with more organizations like Oceana and projects like Plastic Free Paradise that make small but impactful steps towards this goal.

Yet another global organization called 10 Billion Strong, has had an impact in over 90 countries since its founding in 2019. They are a leadership and development organization dedicated to working towards environmental sustainability, because the CEO Patrick Arnold believes that it is unjust for only a certain amount or certain types of people to clean up the messes made in the environment when they aren't all responsible for it. The ultimate goal is to unite all people together on this issue and work towards a more sustainable future together rather than working separately or against each other. At the end of 2023, 10 Billion Strong was able to divert more than 12 tons of plastic, including keeping plastics from 505 Indonesian homes out of the oceans. They were able to train over 17,000 new team members, and impact more than 24,000 communities and their members(10BillionStrong, 2024). One of their programs based out of Lombok Island is called Harvest Plastic Lombok. This community based program offers ways to reimagine plastic waste in the local community using technology, education, community participation, and circular economy supply chains to end the cycle of single-use plastic and make sure that the plastic that has already been produced gets properly treated and doesn't end up in the oceans, watersheds, or being burned in the backyards. In one year, this program has

succeeded in helping over 300 households divert their plastic waste from the environment(10BillionStrong, 2024). The technology aspect of this project is mainly covered by the use of the app by the Ocean Recovery Alliance called Global Alert. This app allows people to report plastic hotspots that need to be addressed and prioritized by the community. The education aspect includes training people on how to use this app to track the plastic hotspots, and how to organize community engagement activities and clean ups for volunteers in the community to take action in these areas. The locals also use recycled rice bags to collect plastics from their homes as well as from out in the community to then bring to "plastic banks" in the area to hopefully be properly disposed of. They also host many fellowship programs in countries all around the globe to train university students in the ways of circular economy dynamics, eco-entrepreneurship, renewable energy, waste management, and wildlife conservation. The programs are only available to students in that region, and they are funded largely by the United States Embassies of that country. So far these fellowships have trained over 200 students in these fields in 2022 and 2023(10BillionStrong, 2024). They plan on continuing their work and reaching even more communities and making positive impacts by keeping plastic out of the environment in places where the waste management facilities are not able to keep up with the amount of plastic being consumed. Due to the large amount of community involvement and the fact that these education training programs are only offered to locals, and the educators are also majority locals from those communities, the reciprocation of the organization by each of the communities is generating a lot of positive feedback. By starting small and getting other local people excited about the possibilities when it comes to sustainability has a much more powerful impact when the inspiration and information comes from people from the community and can relate to the others' situations and perspectives.

The Gili Eco Trust, an NGO based in the Gili Islands as mentioned before, has also developed their own strategies to combat plastic pollution and promote sustainable tourism. The Gili Eco Trust Headquarters also doubles as an eco-friendly and plastic free gift shop. They sell beautifully handcrafted jewelry, ashtrays, and candle holders made from upcycled glass, as well as reusable tote bags that can be purchased in lieu of plastic bags. They also sell travel packs with cutlery and straws made from bamboo, shampoo bars, artisan soaps, and a book swap shop to trade in old books for new ones to read while traveling(GiliEcoTrust, 2021). This organization additionally hosts their own beach clean ups every Friday on Gili Trawangan. Small businesses,

divers and employees from local dive shops, and backpackers from around the world join in on these clean ups. They run various other eco-tourism events such as bike tours that take people around the island to sight see for a small donation that goes towards developing better waste management strategies, all while collecting trash from local businesses to be recycled by the Gili Eco Trust.

Shifting gears away from Indonesia, but still in the south Pacific region, a charity based in Australia called Take3 for the Sea is also making steady progress in the fight against plastic waste. They received multiple awards in 2023 such as Banksia Foundation Sustainability Award for sustainable tourism and the Energy Globe Award for their dedication to the conservation and preservation of the well-being of aquatic ecosystems. This organization has also picked up over 42 million pieces of trash from coastlines in 129 different countries, and with over 166,000 participants(Take3, 2023). The primary mission of this organization is to inspire people to take actions, even small ones, to reduce the negative impacts of plastic pollution on the natural environment. Take3 calls people to take action by picking up three pieces of trash every time they go to the beach or some other trash ridden outdoor space. This is where they got their name, Take3, from. They claim that small actions when carried out by many people can have a larger impact. I would agree with this statement because prominent global issues such as trash and plastic pollution can seem overwhelming and impossible to find a solution. But, when many small actions come together it can lead to a greater impact. Starting local as well can make these ambitious goals seem more achievable. This is a strategy and a mindset that I think could really work in other areas, especially places like Indonesia where they have such diverse populations that are scattered around a large geographical area.

Take3 also runs a few elaborate education programs. They have early childhood education and primary school programs, both in person and online. There the children learn about ocean health, sustainability, and empathy through arts and crafts, as well as through hands-on exposure by going on field trips and participating in a number of conservation related activities. There are also a number of free online resources related to the topics of sustainability for anyone to access. These programs are supplementary to their regular academic education and programs run from one hour to half a day. Part of these programs is a final project for the kids to come up with their own action plans at the end, after gathering inspiration throughout the

teachings and activities from the program. These action plans include how themselves and their families can reduce plastic waste and increase sustainable practices in their own homes. In addition, Take3 also runs a number of community outreach programs, such as organizing beach clean ups and providing tools and resources that can enable other organizations to do the same thing. Although these community programs are mainly focused around involving local youth, adults are encouraged to participate as well.

Although this is a great movement and has proven to be fairly successful thus far, I do have a few concerns. Due to the fact that this program is only supplementary and therefore not required to take, it means that not everyone will have access to it. I think it's important for mindful sustainability and nature appreciation programs such as this to be integrated into the regular academic system as forms of environmental education. This way, there are more opportunities to go further in depth on certain topics, and for more young people to have the access and exposure to it. Furthermore, I think another point that should be emphasized is the role of consumers in the sustainability narrative. If people stop consuming products containing single-use plastics, and pressure is put on producers not to use excessive amounts of harmful plastics in their products and packaging etc., then the plastic waste issue would be able to decrease dramatically. This might very well be a part of the Take3 programs, but such specific information could not be discerned from my research.

MY PROPOSAL FOR THE FUTURE OF TRASH

It is a false presumption that simply recycling materials can be the only viable solution to a problem as vast as waste and plastic pollution. As of 2015, approximately 8.3 billion metric tons of plastic have been produced since the 1950s, and 6.3 billion metric tons have become waste. Of this amount, only a small fraction has been recycled, about nine percent. Twelve percent of it has been incinerated, and the remaining 79 percent has accumulated in landfills, on land, or in the ocean(Oceana, 2023). In order to properly find solutions to the marine plastic pollution problem, it is essential to reduce the production and consumption of plastic. We must replace useless single-use plastic items with reusable alternatives, and stop the flow of plastic from its source. If reusable items aren't feasible, plastic should be replaced with other, easily recyclable materials with a low impact on the environment. Such products could be plant plastics or bioplastics, which are hard "plastics" made from 100 percent organic materials such as

pineapple skins and avocado pits, and therefore they are biodegradable. This way we are killing two birds with one stone in reducing manufactured plastics and food waste at the same time. The same bioplastics can be used for packaging materials as well. Another possible alternative could be using metals, woods, glass, and other natural materials like beeswax cloths whenever possible. Natural materials such as these are mostly renewable, sustainable, long lasting, and relatively easy to harvest and process. While these new materials might seem more expensive upfront, they are actually more economical in the long run due to the reduced waste management fees and incentives from governments and businesses to encourage the use of more of these alternate materials(Packsize, 2023). Many companies around the world are already producing bioplastics such as BASF, Plantic, and Futamura. The future fight against conventional plastic largely depends on new innovations, more companies embracing plastic alternatives, and marketing them to consumers as a better, cheaper, and safer option.

Stopping the flow of plastic from its source should take priority over beach clean ups, otherwise the cleaned beaches will continue getting littered with new waste coming in, like being stuck on a global treadmill. However, that doesn't mean that they aren't still important. Instead of simply picking up beach trash and sending it off to the very facilities that expelled them into the ocean in the first place, I believe that something more can be done that has the potential to see much greater impacts and be highly effective. My proposed initiative is specific to the Gili Islands region, but it could also be applied to any other hot spot area for plastic pollution. I propose eco art or upcycled art as a form of environmental education and activism. While beach cleanups are immensely helpful, they keep macroplastics from turning into microplastics and releasing toxic chemicals in the oceans, that collected trash just gets sent off to the same treatment facilities that likely are the reason that trash was washed on the beach in the first place. Many of these facilities are overcrowded and not able to properly handle the amount of waste coming in. What if there was another way? My idea is to use the pieces of trash collected as materials to create eco art pieces. I see many advantages to this, the first being that these are free materials, collected by volunteers, for organizations that may have limited funds. And if it is used as a form of environmental education, it can inspire children, and adults too, to become excited about doing beach cleanups and activism to push for the normalized production of plastic alternatives. These final artworks can be placed on display to invoke tourists' thoughts and encourage them to be a more conscious traveler and refuse single-use plastics. Additionally the

works can be sold for personal profit of artists trying to make a living, or as a sort of fundraiser for NGOs working towards this common goal. Hopefully, these art pieces will invoke deeper feelings of sympathy for nature, bring more awareness to the plastic waste problem, and ultimately grab the attention of conventional plastic consumers and producers alike to push for making a change. Using upcycled materials also gives them a new life, instead of being discarded a second or even third time. And if one day in the future the production of conventional plastics is completely stopped, that doesn't mean that ones that have already been created will just go away. This is a more permanent and aesthetically pleasing solution to ridding the environment of chemical plastics, and removing them permanently. Unfortunately, these types of projects would only include macroplastics, as microplastics are impossible to see with the naked eye. The issue of microplastics must be addressed, but I don't think it is feasible to do so before the other more obvious issues are tackled first. Because as mentioned before, it is nearly impossible with today's technology to completely rid the oceans of microplastics. Hypothetically if there was, there still would be nothing stopping the production of new plastics or those macroplastics ending up in the oceans only to turn into microplastics later on. In summary, this issue should be tackled from the top-down. And in order for this to happen, action must be taken from the bottom-up. Let me explain further.

If I took any message away from my studies in Environmental Humanities, one of the most important ones is that change cannot always happen from the top-down. Not every part of the world has strong enough governments or law enforcements to make effective changes in favor of sustainability. And the ones that do, many times their citizens do not trust the government and will likely not comply with new laws just for the sake of rebellion. There is also the question of which approaches should be taken for which issues, as they all range from broad, to more specific, to entirely unique and niche. Proven effective changes towards sustainability usually always start from the bottom-up. Due to the capitalist nature of supply and demand, and the power and influence that groups of citizens hold, changes are more likely to be made at the top if people at the bottom start demanding them and accepting these new changes into normalized society.

I am not the very first person to think of such an idea. There are several other organizations and education programs out there that are using, or developing a curriculum for upcycled material creation as a supplement to environmental education. Included in this category

is technology development environmental impact assessments. Professors Rose and Flowers of a technology impacts course for high school aged and university students have built a program that challenges the students with the knowledge of not only the environmental impacts of technology, but also how to develop technologies to contribute to sustainability. This way, policy makers can make informed decisions in the future(Flowers et. al, 2018). Their primary goal is to create new ways to reduce emissions, decrease the consumption of natural resources, and consider the tradeoffs that come with these new innovations. These professors have created a course called "Green Prototyping and Upcycling," whose primary objective is to pique students' interest in prototyping technologies and to positively impact their attitudes concerning environmental sustainability(Flowers et. al, 2018), motivated by the fact that sustainability and environmental concerns were largely lacking from the previous curriculum. Before I explain any further, let's define the differences between recycling and upcycling. Recycling, as most people are familiar with, is the act of taking used materials and making them into new products of similar function and value. No new raw materials are needed for this process, but it typically requires specialized industrial equipment that the average person would not have access to. Upcycling refers to the creation or modification of any final product out of used materials in an attempt to generate a product of higher quality or value than the compositional elements(Flowers et. al, 2018). This can mean the final product is similar in function to the original, or it can be completely different. The key part about upcycling is that it can be done by anyone with access to the simple materials. Furthermore, unlike recycling which involves remanufacturing and manipulation, upcycling does not, so the quality of the original material is not compromised and does not degrade with each reuse. Professors Flowers and Wierzbicki wanted to give students the experience of hands on creation, manufacturing, consumer, and post consumer aspects of technological development.

The mention of consumer and post consumer concerns with technology is quite an interesting point to be brought up. In recent decades, convenience and getting products fast has been heavily pushed in the media and by marketers such as, fast food, fast fashion, fast delivery service, fast modes of transportation, just to name a few. So many companies market their products as "disposable" and that somehow translates to being convenient. When really, there is nothing convenient about it. More and more waste gets produced, more raw materials are being used unnecessarily, and the only ones that benefit are the producers because the consumers have

to keep buying more and more of their products after disposing of the first product after just one use. The culture also exists of not caring what happens after something is thrown away. People discard various items every single day, not knowing exactly what happens to them after, and not really caring. By instilling these ideas in young people early on, they will grow up to have better habits when it comes to consumption and waste generation, and also become more aware of the entire process involved in a product's lifespan, not just the part that directly impacts their lives.

Continuing on with the professors' new course, they additionally conducted an experimental study on the attitudes that the students had towards the environment before and after attending the course. The course consisted of a series of projects: use a 150 watt laser to transform used materials, use a vacuum former along with used materials collected by the students to upcycle into a new product, use a 3D printer to create a product that somehow promotes sustainability, and finally, find a way to recycle regular plastic into 3D printer filament(Flowers et. al, 2018). The students were asked to rank their feelings and/or value towards the following statements on a scale of 1-7: enjoyment of nature, support for interventionist conservation policies, environmental movement activism, conservation motivated by anthropocentric concern, confidence in science and technology, environmental fragility, altering nature, personal conservation behavior, human dominance over nature, human utilization of nature, ecocentric concern, and support for population growth policies(Flowers et. al, 2018). The surveys continued for three years in a row, and the results showed that each year the rankings given at the beginning and the end increased by more and more, however, it was not a significant enough increase to definitively say that correlation led to causation. Flowers et. al did report that there was no significant decrease in rankings in any of the three years(2018). The students were also able to leave comments, and most of them were recorded to be technical in nature rather than reflections on their relationships with the non-human environment. One student said the most significant take away was his perception of trash itself. While so many people discard items that seem useless to them, other people may look at the same product and see new potential to create something else. The student noted that they saw little difference between the product that they created using free materials, and ones that can be sold on the market for hundreds of dollars(Flowers et. al, 2018). Another student pointed out that it was difficult to find plastic products with the same chemical composition, as there is no standard for what that composition must be. If all conventional plastics were of the same chemical

composition, it would be much easier to recycle and would take less manual labor of separating them by type. This could very well be a contributing factor to the difficulty and rarity of commonly available recycled items. There was some bias in this study that the professors mentioned such as the fact that this was not a required course, so students that signed up likely already had an interest in sustainability concepts, so that could be why there was only a slight increase in rankings in the results(Flowers et. al, 2018).

There is another example of a success story where upcycled art was used as a tool for education. This is the case of Education for Sustainability (EfS) which is an organization and newsletter that works with middle school students and art teachers. They are interested in exploring whether or not the students will question their ecological footprint if they are able to utilize recycled materials in their own creative art projects(Girak et. al, 2019). Their hope is that the students will learn to appreciate the aesthetic potential of discarded materials. By developing such skills, the students will hopefully be able to re-examine, reflect, and transform their attitudes towards the environment, and then be able to make more consciously sustainable choices as they enter the adult world(Girak et. al, 2019). It is increasingly challenging to integrate any new educational program into schools due to the fact that public schools are government funded and have their own standards of education already in place. It would take a lot of campaigning in order to mend the system. There is also the question of the word "sustainability" itself. Definitions vary from culture to culture, and even between generations, leaving the introduction of the topic into the standard elementary or secondary curriculums ambiguous in many cases. The EfS does not think that should hinder schools from introducing something about the topic of sustainability. Part of their definition is finding a balance between development and protection(Girak et. al, 2019). The article also points out that there exists a distinction between education *about* sustainability and education *for* sustainability. Education *about* sustainability is described as teaching the theoretical side of sustainable practices, creating awareness, challenging the current narratives, and learning the basic principles behind sustainability. Many programs such as this are more common and are already present in a widespread number of establishments. Whereas education *for* sustainability is a practical tool to inspire, develop, and execute changes towards a higher level of sustainable solutions and practices(Girak et. al, 2019). EfS offers both types of programs, but elects to focus on education *for* sustainability. Hence the chosen name.

I believe my project can offer both aspects of education *about* and *for* sustainability. First in theory by showing what sustainability can look like in different cultural contexts. And also by inspiring others to think differently and shift their previous attitudes towards sustainability and trash to hopefully more positive ones. The project has a practical element as well because students get to actually create something with their own hands and see the final ending product. It is living proof that not all "trash" is trash, it also preserves and spreads a certain cultural history through art and adds to the aesthetic rather than adding to landfills.

Further research on this subject done by an Indonesian scholar, Centaury Harjani, talks about how artists must become more considerate of their carbon footprint. In order to produce low carbon emission artwork, they must make use of recycled or upcycled materials to do so. The author accurately claims that human relationships with the environment are constantly changing, especially in recent decades. Art should be able to change and adapt to reflect those new relationships as well. Harjani also criticizes other forms of eco-art such as using natural materials themselves to create various pieces. The claim is that these works simply invoke inspiration and awareness for climate change(Harjani, 2020), but even more could be done. Some scholars are using upcycled and eco-art to communicate scientific information on climate change, a concept that can be difficult for people without scientific backgrounds or knowledge to grasp. This method promotes new, unconventional modes of instruction that are more engaging and interesting to students learning about the importance of sustainability. The main driving questions for this research were: What are the roles of art and artists in responding to climate change? How can art communicate scientific information? Can art help people to perceive the effects of climate change and to comprehend its underlying physical processes? Is art an effective means of motivating political action or changing individual conduct? How should nature be imagined in a period when the global environment is undergoing a profound transformation as a consequence of human actions?(Harjani, 2020). Such questions are quite similar to what I would like to answer and explore through my research and project launch.

For this particular research, both literature review and practice based research were involved. According to the author, practice based research "produces more creative work through the research process," and involving upcycling and media art facilitates more creativity and opens the doors for more outside the box thinking when it comes to art(Harjani, 2020). The study also includes some preliminary research in the form of a questionnaire given out to artists,

academics, and regular citizens on their current views on environmental issues and environmental art. Part of the results from this questionnaire expressed a deep preference for upcycled art to be more practical and functional, such as transforming old materials into wearable pieces such as clothing or handbags. Or household items such as coasters, curtains, or kitchen heat pads(Harjani, 2020). Fast fashion is a large contributor to carbon emissions worldwide, and too many of them end up in landfills. While this project focuses on fabric materials rather than plastic, I think the same main principles and ideas are still relevant and can apply to my proposal as well. One of the main points that I also agree with from this article was that environmentally friendly art is different from environmental art. It is easy for art to be environmentally friendly, but it doesn't always have a deeper meaning. Environmental art should be thought provoking, educational, or inspiring on the subject of the current environmental conditions(Harjani, 2020). Therefore, upcycled art is both environmentally friendly *and* environmental art due to the low carbon footprint and rescuing of materials from the doom of the landfill. The literature review of this article included many upcycling techniques, mainly wrapping and scrapping with various fabric scraps as the main material, as done in many cultures including Japanese, Indonesian, and Pakistani(Harjani, 2020).

Figure 9: *These are some examples of what kinds of artwork that could be created from beach trash. (Left) a bust made from plastic bags and assorted microplastics. (Middle)*

another sculpture of the endangered sea turtle made from painted plastic bottles and bags. (Right) a 2D picture of a chicken using discarded metal materials. These images were obtained from private blogs on Pinterest posted by (TheArtyTeacher, 2024 and TrashImagination, 2024).

CONCLUSION

Waste is largely a socio-cultural construct, meaning what seems to be trash for someone could be treasure to someone else in a different context. Things only become waste when they lose their social position. Therefore, the best way to combat plastic waste is by cultivating healthy, positive relationships with the non-human environment, as well as becoming conscious of how much we are actually consuming, and adopting more sustainable alternatives to conventional practices. Sustainably conscious tourism, a system in the process of being developed in the Gili Islands and other parts of Indonesia, is only one rung on the latter needed to build up to stopping the production of single-use plastics. This movement is one that must be community driven by locals and NGOs to culturally adapt to the dire environmental crisis, but also to educate and inspire others to follow in their footsteps, especially young minds and future generations. Many people look at certain products and only see the beauty on the outside, without even thinking about the ugliness it has on the inside. From the exploitation of natural resources and habitats, the carbon emissions stemming from production, or the violation of human and workers rights. I invented this proposal with the hope of bringing these overlooked issues out from the shadows and bringing the importance of making positive changes for a better environment to light. Even if the production of single-use plastics is ceased, it will hardly be the end for many of the organizations mentioned above. There will still be millions of tons of plastics that undoubtedly will continue to wash up on the shores of the Gili Island region. The work of NGOs in the realm of beach and ocean clean ups will likely continue for some time. Not to mention all of the microplastics that will likely never exit the marine ecosystem in any of our lifetimes. Throughout this research, I have outlined the root causes of the single-use plastic problem in Indonesia, and the anthropogenic impacts on the marine ecosystem such as increased tourism and product consumption. In addition to analyzing previous scientific evidence, data collection, and ethnographies, I have conducted my own ethnographical and scientific research with hopes to shed some light on what it is like first hand in the fight against single-use plastics.

However, I was limited to only one small island out of thousands more in the country and region. It would be interesting to hear about other studies by anthropologists and scientists alike in this area because very limited information exists about this rapidly developed tourist destination. There have been many studies conducted to measure the true scale of the plastic problem, and many more organizations, in addition to the ones I've investigated, that are working to turn the current data around. While I am not the first to come up with the idea to integrate environmental art into the education and activism sectors, I may be the first one to propose using plastic from beach clean ups in such a way, especially in the Gili Island area. Many of the NGOs currently based in this region are largely run and welcomed by locals, with extensive participation of the community and tourist volunteers alike in their work. I believe that with proper funding and sufficient manpower, this project could be possible. Hopefully in the future, this proposal can be adopted not only by Indonesian education systems, but also in other environmental science and art programs all around the world.

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