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The Plastic Problem: Plastic Pollution in Bali

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SIT Study Abroad

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The Plastic Problem: Plastic Pollution in Bali

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Indonesia: Religion, Art and Social Change
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Abstract

With the fourth highest population and an ever-growing rate of plastic consumption, Indonesia is the second largest plastic polluter in the world (McCarthy, 2018). The country, which has only had plastic since the latter half of the 20th century, has staggeringly high rates of plastic waste which becomes pollution due to various factors. This paper examines the factors that go into why the rates of plastic pollution are so high, what people know about it and what is being done to help combat the problem. The four main topics explored are: laws, disposal methods, education and tourism. The study uses interviews, firsthand observation and secondary literary sources to collect information. The findings reveal that laws do exist to regulate plastic pollution, but are not enforced; disposal is mainly burning, burying and dumping; most people are not educated on the topic of plastic pollution in schools and otherwise; and tourism does not affect the rates of plastic pollution much. It is also revealed that changes in all areas of study are imminent due to new regulations and laws that are currently being developed and implemented. Further study is suggested on these new laws in order to determine the future of Indonesia's plastic problem.

Introduction

It is an undeniable truth that in the present day, the world has a bit of a plastic problem. Plastic production is higher than ever before; it is polluting the oceans, and even once broken down it wreaks havoc as microplastic. Most of the world is dependent on plastic for their way of life and without it, none of the modern advents of the past 70 years would have come to fruition. So why is plastic pollution such a big deal? Plastic is made from synthetic polymers, which are long chains of repeating molecules, and are entirely made in a lab. Elements like carbon and compounds such as ethylene are extracted from petroleum and other natural gases and combined to create molecules. These molecules are strung together to make polymers and those polymers make up what we know as plastic (Science History Institute, 2016). Some types of plastic begin leaching or growing bacteria after a period of time, which is toxic to humans and animals. Some particularly dangerous strains of plastic even contain carcinogens which can cause cancer with prolonged exposure.

Plastic is very durable, so it does not easily break down and a plastic water bottle will take about a thousand years to decompose. During those thousand years, chemicals from the plastic will leach, and it will break down into pieces too small to see, called microplastics. Then when plastic eventually decomposes fully, the compounds extracted from natural gases are still toxic, harmful and present. When the first synthetic polymer was created in 1869 and later the first piece of plastic came to be in 1907, people had no idea how harmful the substance could be. It was made for a good reason, to stop people from hunting elephants for ivory, and it replaced many scarce or expensive materials (Science History Institute, 2016). Economically, it is cheap to produce, safe to handle and a very durable substance which has helped build the modern

world. But the modern world also produces plastic too fast with no solution as to how to dispose of it safely, leading to mass plastic pollution all across the world.

With the fourth highest population in the world, Indonesia ranks second for highest rates of plastic pollution due mainly to its large population and lack of safe disposal (McCarthy, 2018). Between 1.15 and 2.41 million tons of plastic waste are expelled from Indonesia every year and the majority end up sitting in landfills or floating in the ocean (Adebayo, 2018). Plastic was not introduced to Indonesia until the latter half of the 20th century, but the pollution is much greater than most other countries in the world. This project was designed to focus on the reasons why there is so much plastic pollution in Indonesia, what the public knows about it and what is being done to combat the problem. My research questions focused on four distinct categories: laws, disposal, education and tourism to help gather information from a variety of sources. My research questions that guided the project are:

1. How is plastic commonly disposed of and what problems does this disposal cause?
2. What is being done on government and corporate levels to combat plastic pollution?
3. What is being done to educate people about the plastic pollution problem in Indonesia?
4. What is the effect of tourism on plastic pollution in Bali?

Field Methods

The methods employed for gathering information in this project were a mix of information gained from literary sources, observation and interviews. Some information was almost entirely gained from literary sources and other categories have very little literature, so were more dependent on the word of interviewees. It is in no way an accurate representation of the sentiment of all of Bali regarding plastic pollution, but more of an overview of a thriving problem and the large-scale changes that are imminent.

Interviews were all conducted in person with a set list of about 20 questions prepared beforehand. The conversation often wandered beyond the questions as well. The same questions were used for people multiple people, but different questions were formulated for specific topics as well. I took notes for all interviews on a notepad and recorded the full conversation for reference when writing. I interviewed people of different genders, ages, locations and careers to collect a wide range of data. Several people interviewed are referenced in multiple sections due to our conversations ranging over multiple topics. Most interviews took place with random people that I came upon in my studies. One interview with Ema from the Green School was scheduled.

Laws and Governance

In the past several years Indonesia has come under heat from other countries for its lack of laws and regulations regarding plastic pollution. Large international organizations, including the United Nations (UN) and G20 have begun looking for action in Indonesia to clean up the oceans and crack down on pollution. At a UN conference in February 2017, Indonesia's President Widodo joined the Clean Seas Campaign and, "pledged to cut plastic waste in 25 coastal cities and reduce marine litter by a massive 70 per cent in just eight years" ("Indonesia joins UN", 2017). Pledges to the United Nations are not legally binding, but it was a still a statement heard and recognized by the world. The UN Clean Seas Campaign is an unprecedented campaign that focuses on reducing marine waste from microbeads in cosmetics and single-use plastics. It has pledges from 54 countries, several major companies, and individuals who are personally helping turn the tide of plastic pollution. With the world watching, Indonesia is beginning to make good on this pledge.

On October 23rd, 2018 President Widodo announced Presidential Regulation no. 97/2017 which states that Indonesia is going to reduce waste from the waste source generation by 30% and to process and manage at least 70% of the country's waste in order to prevent it from going to a landfill (Bahraini, 2018). The regulation states that this is all expected to occur by 2025. A Presidential Regulation in Indonesia is a formal order from the president that must be obeyed and fulfilled by every region, but each region must come up with their own model for how to accomplish it. The government will be monitoring the plans and evaluating them periodically but planning and enforcement are regional responsibilities. This regulation is moving towards the goal entitled 2025 Clean-From-Waste Indonesia (Bahraini, 2018).

The new Presidential Regulation is exciting, but luckily not unprecedented in Indonesia. There is one major law regarding waste that was released in 2008 that forms the basis for most other regulations. It had various sections on rights to be informed, incentives and waste disposal centers. Article 11 of Waste Management Act no. 18/2008 states:

Everyone has right to:

- a. have good and environmentally sound services in waste management from the government, local government, and/or other responsible entity.
- b. participate in the process of decision making, implementation, and monitoring in waste management.
- c. get accurate, correct and prompt information on the implementation of waste management.
- d. get protection and compensation derived from negative impact caused by the activity of final waste processing site; and
- e. get monitoring in order to implement good and environmentally sound waste management.

This law says that all Indonesian citizens have certain rights as to being kept informed of and having a voice in the decisions made about waste disposal. It is also the first law in Indonesia that makes dumping and burning waste illegal activities. Prior to 2008 there were a few other programs and laws that covered pollution from businesses, but this was the first that encompassed all people of Indonesia and gave a clear layout of the legalities of waste disposal for every person. Article 20 of Waste Management Act no.18/2008 states:

The government and regional government oblige to carry out activities as mentioned in paragraph

(1) as follow:

- a. determine the waste reduction target gradually within the limitation of time;
- b. facilitate the application of environmental sound technology;
- c. facilitate the labeling of environmental sound products;
- d. facilitate the activities of re-using and recycling; and

e. facilitate the market of recycled products.

This section of the law specifically says that the government is obligated to facilitate recycling among other waste reduction tactics. Recycling will be covered in the following section entitled “Disposal,” but it is worth noting that it is the legal responsibility of the government to handle recycling. It is also later noted in the law that the government is responsible for compensating any people that suffer negative impacts of waste handling activities at final waste sites (Act of the Republic of Indonesia, 2008).

Learning about Presidential Regulation no.97/2017 and Waste Management Act no.18/2008 led me to investigate about what people thought about the legal actions and how communities reacted to the current laws in place and the idea of new ones coming in. My first interview was with Annisa, a 18-year-old girl from a remote village in the middle of Bali. She lives with her parents, who were present, but she was the sole contributor to our conversation. I asked her about many different things, but when I asked her what laws exist in Indonesia about the environment, she did not know of any. I dug a little further and asked what the government says about plastic pollution, if anything. She replied that the government tells people not to dump plastic in the rivers, but otherwise does not do much. When we later touched on burning plastic I asked if burning plastic was illegal and Annisa replied that it is not. Finally, I asked if Annisa knew anything about the UN Clean Seas Campaign or Indonesia’s pledge to reduce waste and she had not (Anissa, personal interview, October 23, 2018).

Another interview was with Sari, an 18-year-old girl from Tabanan who is a tourism major at IHDN in Denpasar, Bali. When asked about laws in Indonesia about the environment, Sari responded that it was illegal to dump waste in rivers and forests. She did not know of any others. About plastic pollution, she did not know any laws that existed, but recalled that there are bins at IHDN for non-organic waste, though she could not say what happened to the waste after

it went into the bin. Sari sees plastic being burned around Bali but was not sure if it was legal or not, though she does know it is bad. Sari also had not heard of the UN Clean Seas Campaign or Indonesia's pledge to reduce waste (Sari, personal interview, October 22, 2018).

My third interview was with Kadek, a 28-year-old man from Jakarta who moved to Bali four years ago and works in a hostel in Nusa Dua. When asked about laws, he said that there were strict laws in Indonesia regarding logging and trees, but no laws around household waste disposal or burning waste. Regarding the government he said that the Ministry of Environment sometimes puts out public service announcements and commercials on television telling people not to dump trash into rivers and in the street. The Ministry of Environment also tells people to reuse plastic when they can, like reusing shopping bags and putting plastic into non-organic waste bins when possible. I next asked specifically about President Widodo's pledge to the UN Clean Seas Campaign and Presidential Regulation no.97/2017 to see if Kadek knew about them. He had not heard about either, but after I summarized both seemed very excited about the prospect of Indonesia reducing waste so drastically (Kadek, personal interview, November 14, 2018).

Annisa, Sari and Kadek were all unaware of most environmental laws in Indonesia, particularly the Waste Management Act no.18/2008 that is the supposed legal base for waste management in Indonesia. In addition to never having heard of the law, they have never heard of any of the stipulations that it provides. None of them knew that burning trash is illegal or that the government is responsible for recycling. They are not aware of any of the government's responsibilities regarding waste disposal. Annisa and Sari were interviewed before the Presidential Regulation was announced on October 23, 2018, but neither of them had heard of the UN Clean Seas Campaign or Indonesia's pledge and Kadek had not heard of the Presidential

Regulation set forth to reduce waste either. It can be concluded from this that despite there being laws and regulations in place, they are not enforced, and people are not aware of their existence. The new Presidential Regulation has a lot of ground to cover if people are not aware of existing laws regarding waste and plastic pollution.

An earlier attempt at reducing plastic occurred in 2016 when Indonesia introduced a tax on plastic bags of US\$0.02. It was criticized by the world press for being too low an amount, though it did not matter as Indonesia's retailer's association stop applying the tax only a few months later, stating that there were no legal grounds for it (Ariffin, 2018). This is yet another example of laws not being enforced and therefore having no impact on the state of plastic pollution. The laws that are in place and the lack of awareness regarding them act as a base for the continuation of this paper and can also be considered background information.

Disposal

One of the single greatest contributors to Indonesia's plastic problem lies in the way the plastic is disposed of. First, all waste that is accumulated in a business or home is the owner's responsibility to deal with. There is no country-wide trash pickup; it only exists in some larger areas, and even then it is at high cost to the customer. Waste is normally taken to an area in a town or village to accumulate until the government comes to pick up some of it and it is taken to a larger landfill that usually services multiple regions across an island. Landfills are created on top of bare ground, with no barrier between earth and trash, which creates leaching from the waste into the ground and then becomes runoff into the ocean. Landfills are the most common way that most of the world disposes of waste, but in Indonesia it is a bad situation in every possible way.

In my interviews with Annisa, Sari and Kadek, I also asked about waste disposal. When asked what people normally did with plastic waste, Annisa replied that most people in her village dump their waste into the forest. I asked if she knew of any ways to reduce plastic pollution and she replied that people can collect plastic bags and reuse them for other purposes. Finally, I asked what she knew about recycling and Annisa said that recycling is taking trash and making it into something else useful. She said that she recycles some plastic things when she can. She also told me that she helps the environment by burning plastic waste because once it is burned, it is gone (Annisa, personal interview, October 23, 2018).

Next, I spoke to Sari and she said that people normally put trash into trash bins and then burn it or have it taken away. When asked about reducing plastic she replied similarly to Annisa that people can collect plastic bags and bottles and reuse them, telling me about how her grandmother always reuses plastic things. Lastly, I asked about recycling and she said that

recycling is taking things and making them something different, like taking a plastic water bottle, cutting the top off and planting flowers in it, which she does when she can (Sari, personal interview, October 22, 2018).

Kadek said that most people throw plastic into the streets or dump it in rivers and forests. Then I later asked about burning plastic he said that it was not illegal, and people do it often because there is nowhere else to put the plastic, since landfills are filling up. When I asked about other ways to reduce plastic pollution, Kadek said that the best way to reduce the pollution is to simply stop using plastic. He cited examples such as using a reusable water bottle and bringing reusable bags to the store. He said that recycling was taking plastic and processing it so that it can become something else. He continued in saying that recycling was not very big in Bali, but that he has seen many places that do upcycling, which is taking plastic items and using them to create art or crafts. Finally, I asked if he recycles and he replied that he does not, but he does make a conscious effort to not use plastic when possible (Kadek, personal interview, November 14, 2018).

My final interview on this topic was conducted with a woman named Ibu Indah, who is 73 years old and lives in the middle of Denpasar, in the same neighborhood I stayed in during my ISP period. When I asked about common disposal methods of plastic waste, Ibu Indah talked about how when she was growing up, there were no plastic in things and everything was thrown into the forest in her village. Nowadays, she said that most people burn their plastic and some dump it or bury it in more rural communities. Regarding reducing plastic, she said that some people have stopped using plastic bags, but that people need plastic to survive, so they do not reduce much. I last asked about recycling and she described it as plastic being shipped away to a facility to be reused there. She also said that there was not much recycling in Bali, but she had

seen the trucks a few times in other cities in Bali (Ibu Indah, personal interview, November 15, 2018).

Four interviews concluded that people generally dispose of plastic waste themselves, many do not know what recycling is and although some people care about reducing plastic, it is not a major concern for most people. My interviews were stratified across age groups to get a more accurate view of the common behaviors of each group and I found young adults to be the most informed from these four interviews. There are other factors at work though, as Kadek is from Jakarta which has a huge plastic problem, but also a major landfill and a recycling facility, so maybe people in that area know more about the major plastic problem.

According to my interviews and other sources, waste is disposed of in a number of ways in the home: collected by a garbage service; taken to a village landfill; burned; buried; or dumped into sewers, rivers and forests. Like Ibu Indah said, prior to the past few decades Bali was an island of organic materials that were used for everything. Food, utensils, plates, bowls, offerings, bags and packaging were all made with banana leaves, grass, flowers, coconuts, bamboo and other plants and animals. Everything used was easily biodegradable and entirely natural, so when one was finished with a snack, they could toss the banana leaf to the side of the road and it would decompose there, returning to the earth. Since plastic was introduced to Bali, the ability for the utensils, plates, bowls, bags and packaging to biodegrade quickly and safely has changed, but the habits of the people have not. People will still eat a little snack from the store and immediately crumple up the bag and toss it to the side of the road. This habit is amplified with the dumping of waste that would have biodegraded a few decades ago, but now serves only to pollute and harm the earth. More than 10% of Indonesia still disposes of their waste by dumping it in sewers, rivers and forests (Ministry of the Environment 2012, 168). That

means that the plastic waste of over 30 million people in Indonesia alone is sitting in nature, leaching into water sources, breaking down into harmful microplastics and washing out into the ocean where it is killing creatures.

Waste which is buried often causes the same effect as that which is dumped, but the leaching has easier access to permeating the soil and many harmful chemicals in plastic are released into the earth. Additionally, burying plastic creates the perfect conditions for said plastic to break down into microplastics, which are pieces of plastic smaller than 5 millimeters and invisible to the human eye. They are so small that they are often mistaken for plankton in the ocean and eaten by fish and can easily contaminate water drunk by humans and animals alike. Microplastics are dangerous because they are everywhere, and humans likely ingest them every day.

Burning plastic only has negative effects to the environment, yet it is the most common method of waste disposal in Indonesia. Over 52% of Indonesians burn their household waste (Ministry of the Environment 2012, 168). It is a fairly common sight throughout Bali to see little trails of smoke leading up from empty fields and concrete pits outside front doors which is quickly followed by rancid smell of burning plastic. There is a case being made in some countries in the world for burning plastic as a source of energy, but it is far safer for the environment to leave plastic in a landfill than burn it. Directly after burning coal, burning plastic is the top contributor to carbon dioxide emissions. In a world that is currently experiencing a crisis with climate change, adding to the levels of carbon dioxide in the atmosphere is a very poor idea. Not to mention, burning plastic also releases harmful chemicals from the plastic into the surrounding air, which people then breath in.

The final method of disposal is the landfill, which is far from perfect, but the safest option for both people and the environment. The largest landfill in Bali is *Tempat Pembuangan Akhir* (TPA) Suwung, which is located on the outskirts of Denpasar, near the ocean. TPA Suwung is a massive site about 30 hectares in land area that collects waste from Denpasar, Badung, Gianyar and Tabanan regencies of Bali (Arif, 2016). It is run by the Provincial Government of Bali under the Forest Service. The landfill had many flaws, the largest of which is that it is very much over capacity. The landfill is only equipped to deal with about 800 tons of waste per day and is now seeing over 1000 tons of waste incoming every day (Arif, 2016). The piles of waste reach over 15 meters in some areas and now resemble small mountains. The landfill is built on top of bare ground and toxins have leached into the ground and become runoff into sewers and later, the ocean. Additionally, TPA Suwung occasionally catches fire due to a buildup of methane from organic waste being overheated in the sun. The fires spread quickly and catch on all materials nearby, including plastic which releases a plethora of dangerous chemicals into the air when burned. The last fire was reported at the end of September 2018.

TPA Suwung was built in and around a village outside of Denpasar that traditionally raised cattle. The village people still do raise cattle, but now have to run them through mountains of waste to do so. Over 100 families of this village and surrounding areas are employed at the landfill itself, sorting trash with their bare hands and barely earning enough to survive on (Suwung Community Center). Though legally, the government is bound to compensate the people of the village for the negative effects of the landfill upon their lives, the people have yet to see any compensation.

A place called the Suwung Community Center exists inside the landfill as well as a beacon of hope for the people living there. It is run by the Bali Life Foundation and provides

various services to the community who work in the landfill. Families do not make enough sorting waste to pay for their children's education at school, so the Suwung Community Center provides an informal education program, daycare, medical care and other support for the families and children (Suwung Community Center). The center is currently small, but expanding and hopes to eventually offer or fund a formal education for elementary through high school for every child. The center is a positive in the midst of many negatives, but it does not solve the underlying problems at work in the landfill.

There is one organization in Bali that deals with disposal in a more environmentally friendly way: EcoBali. EcoBali's primary functions are to provide recycling pickup and education about plastic pollution. The center is located in Canggu and currently only serves the surrounding areas, but it already does a lot of good. The small staff picks up and sorts plastic waste to be sent to the nearest recycling facility, which is on Java, and sends out people to do lectures in schools and have stands at community events. They also have partnerships with other huge businesses, such as TetraPak, which is a Swedish company that produces only recyclable plastic packaging. They are also partnered with Balinese born NGO's, like Bye Bye Plastic Bag, which is a youth driven organization that provides alternatives to plastic bags (Pak Ketut Merta Adi, 2018).

Earlier in the semester I was lucky to have heard a lecture from Pak Ketut Merta Adi, one of the head employees at EcoBali. He described a lot about the organization in the beginning and the goal that they have always been reaching towards. EcoBali was founded in 2006 on the idea of moving Bali to go Zero Waste, which they define as recycling 100% of all plastic materials on the island. He talked about how the plastic problem is so bad because of a lack of infrastructure that allows for easy waste disposal for trash and recyclable materials. The plastic waste in Bali is

mostly from packaging, which is why EcoBali partnered with TetraPak. Pak Ketut Merta Adi also talked about smaller things that EcoBali does, like teaching people how to compost organic materials, beach clean ups, and running a store at their center which sells bags from Bye Bye Plastic Bag and other recycled things like drinking glasses and produce bags (Pak Ketut Merta Adi, 2018). Eco Bali is one of the only organizations on Bali that deal with plastic disposal other than landfills and though the area they cover is small, they are expanding and continuing to make an impact in the communities they touch.

Education

Education regarding the environment and more specifically plastic pollution is a difficult topic to cover because every answer is completely different. Indonesia has no standard for education and no curriculum that is followed across various islands or even within communities. Each school or school organization individually decides what the students are taught, and while some subjects are taught similarly across different schools, topics like the environment are very subjective. Research on this topic is minimal, so I relied heavily on interviews for this information.

I once again turned to Annisa, Sari, Kadek and Ibu Indah for information on the educations that they all received in school and beyond. When I spoke to Annisa about what she was learning in school about the environment, she said that they did have a unit on the environment. They learned about the oceans, volcanoes, earthquakes, water cycle and atmosphere. She could not recall specific information about these topics, but her descriptions sound more like the geophysical aspects of Bali and the world environment than information about pollution or climate change. I asked if kids were more motivated to help the environment after learning about it and she replied that they were a little bit, but not very much (Annisa, personal interview, October 23, 2018).

Next I spoke to Sari and she said that she learned very little about the environment in school. She learned a little bit in junior high biology class, but it was relegated to telling students not to dump plastic in rivers because it will stay there for a thousand years. Beyond that, she could not recall any other specific information. She also remembered being visited by a landfill at her school and being told the same information again: do not dump plastic in rivers, but bring it to the landfills. When asked if kids felt more motivated to help the environment after learning

about it, she said that some do and she bought a reusable water bottle after learning about plastic pollution (Sari, personal interview, October 22, 2018).

Kadek's information was slightly different because he went to school in Java at a *Pesantren*, an Islamic boarding school. He told me that he did not learn about the environment in school at all. He became conscious of environmental issues, particularly in Indonesia, because he researched it on the internet. He said that he reads articles in online publications and sees news from around the world about climate change and plastic pollution and reading about these things helped him make some changes in his life. Kadek does not use plastic when it is at all avoidable and he helps run the hostel that he works at to do the same. He said that not many people know about plastic pollution problems unless they seek out the information themselves, but that he wished kids were taught about it more because it is such a problem (Kadek, personal interview, November 14, 2018).

Ibu Indah did not know much about environmental problems when I asked her, but she said that what she did know was because of her grandchildren telling her. Her final remark was that she only worries about her family's safety and having food on the table, but beyond that she does not know much, so it does not concern her (Ibu Indah, personal interview, November 15, 2018).

Answers from my four interviewees was once again varied and showed how truly unequal educations in different schools are in Indonesia. Information about the environment could be put with any applicable subject or even removed altogether if it suits the purposes of the schools better. Also, kids who are taught about the environment are not taught in a way that inspires them to care or makes any changes. I only found one notable exception to this, from a private school in Ubud that proves the exception to every rule.

The Green School was founded in 2006 by John and Cynthia Hardy who were inspired by Alan Wagstaff's book "Three Springs" and Al Gore's 'Inconvenient Truth.' The first structure was finished in November 2006 and the school opened two years later with a class of 90 students. Now, ten years later the school has over 400 students and programs that extend into the local community. I sat down with Ema, an English teacher at the Green School, who talked to me about the purpose of the school and how it functions. She said that the Green School was founded for kids who didn't fit into other schools, but who still wanted a whole education that is based in sustainability. It is kindergarten through high school education, though the largest part is elementary. Physically, she described how the school is entirely wall-less and made of bamboo, so it is integrated into the jungle around it. They also have a recycling collection area at the school, which is picked up weekly by EcoBali.

The teachers are international and local, and students are the same, though most students are international. The majority of students from abroad only stay for a few years before their families move on, but there is an initiative to get at least 20% local Balinese students at the school on scholarships in order to grow the consistent group of students. Ema talked about the curriculum as created internally and kids learn all basic subjects, but everything is tied back to sustainability. The curriculum is project-based learning, taught in English.

Ema talked about another aspect of the Green School, which are the extension classes taught to kids in the area that teach English and Sustainability. It is run as a separate, sister program to the Green School and currently has about 300 kids enrolled. Students pay for a semester of classes by bringing five kilograms of plastic to the recycling collection area. Ema considers this program the best thing that the Green School does because it reaches the local community to motivate kids there and really teaches them things that they do not already know.

The Green School mainly draws interest from people who are already sustainably aware or interested, but by reaching the local community, there are entire new groups of people who are made sustainably aware. Ema says that these extension classes are continuing to expand and although the Green School is at capacity, there are initiatives to continue growing the extension classes (Ema, personal interview, November 18, 2018).

Education also extends beyond a classroom, and there are some organizations, like EcoBali and Bye Bye Plastic Bag, who have education programs, but they are not very widespread and as a result do not affect many people. The government has no education about environmental problems either and so it seems that people must make individual efforts to seek out information in order to learn. Environmental organizations are gaining more ground in Indonesia, so education is more widespread than it has been before, especially with the advent of social media, but it has a long way yet to go.

Tourism

There is another group beyond the people of Bali that affect plastic pollution as well: tourists. At first glance, it is hard to figure out whether tourists have a positive or negative impact on plastic pollution in Bali. Large tourist areas, like Canggu, Kuta and Seminyak are often filled with eco-friendly stores, bins for organic and non-organic waste, and use bamboo or metal straws in restaurants to replace disposable plastic ones. There is evidence of plastic littering, but it is less than in areas where there is less tourism. The largest amount of plastic to be found in these areas is along the beaches because it is washed in with the tides. The plastic that washes in though is not from Bali, but areas all over Southeast Asia and even the rest of the world depending on what currents the plastic rode on. At first thought, tourism might be perceived as an automate negative for plastic pollution, but in Bali, it seems to be much the opposite.

My first source of information on the topic came from Kadek, who works at a hostel in a notoriously touristy area, Nusa Dua. When I asked about plastic pollution in tourist areas he said that the tourist areas are always kept cleaner than the rest of Bali because tourists want clean streets and beaches. Bali relies heavily on tourism as a industry, so people will go to great lengths to keep people coming back. In tourist areas there is more recycling, composting, plastic alternatives and general awareness about plastic pollution. Several times I have seen huge graffiti displays near the beaches about keeping the oceans plastic free. Kadek said that tourists usually bring ideas of sustainability with them from other countries and that is how they exist in those areas (Kadek, personal interview, November 14, 2018).

Recently in Western media there has been an uproar about single-use plastic straws. All over social media there is a video from 2015 showing a sea turtle having a plastic straw pulled out of its nose and with the video came outrage from people against plastic. It took a few years to

catch on, but there are companies, cities and entire countries banning single-use plastic straws. It is the beginning of a larger movement against single-use plastic. When Western tourists became involved in the no-straw movement, they brought those ideas with them on vacation and began refusing straws or asking for alternatives. It did not take long for businesses to catch on. Now the singular thing that sticks out in my mind about being in Canggu, Kuta and Seminyak is that I did not see a single plastic straw the whole time.

I interviewed several tourists in Canggu on the beach about plastic pollution and what they thought about what they saw. My first interview was with Natasha, a 26-year-old from Switzerland. When I asked what she thought the biggest environmental problems in Bali are, she immediately said plastic pollution. She said that she had travelled a bit around Bali and it was one of the first things that she noticed in every new place. It was always most evident in towns where there were less tourists, particularly when she was travelling from one place to another. She did not know anything about how bad Indonesia's plastic problem is statistically, but observationally it was really bad. She said that she tries not to use much plastic, but it is hard to avoid when you have to buy bottled water because the tap water is not safe to drink. I asked if she thinks that tourists are good or bad for the plastic problem in Bali and she replied both. People from countries that are more eco-conscious might think about it more, but people on vacation also tend to not worry about little things like plastic bags as much. Personally, she felt like she is more conscious of her plastic usage in Bali because unlike Switzerland, Bali is surrounded by ocean, which makes the problem very visible when it washes up on the beach. I last asked about what plastic pollution is like in Switzerland and Natasha did not know much about how Switzerland deals with plastic waste, but she did say that whatever happens to it, people do not see it around (Natasha, personal interview, November 18, 2018).

My next interview was with three girls, all 19 years old, from Finland: Lenna, Ansa and Milla. I approached them after I noticed all three of them picking up plastic waste from the beach and throwing it away. They were walking down the beach with plastic bags, filling them up, tossing them and continuing on. When asked what environmental problems they know of in Bali, one girl said plastic right away, looking at the plastic waste littered all around us. They said that it is most visible on the beaches, but also in towns when people are burning trash. I asked why they were picking up waste from the beach and they replied that a bit earlier they had seen a few guys doing the same and thought that is was a great idea. They were hoping that someone else would see their actions and be inspired to do some clean up later on as well. I next asked what they knew about plastic pollution in Indonesia and they replied that when they had been surfing earlier that morning in the plastic filled ocean, someone had told them that the plastic is from other islands that gets washed up with the tides. The Finnish girls agreed with Natasha that tourists are good and bad for the plastic pollution in equal measure because they bring good habits with them, but tend to forget when they are on vacation. Ansa knew that the Indonesian government was trying to create new legislation regarding the plastic pollution but did not know what since she had seen a report on the news. When asked about plastic pollution in Finland they replied that the Finnish government was stricter about littering than Indonesia and there was far more recycling. They also mirrored Natasha in saying that although there probably is a lot of plastic in Finland, it is not as visible to most people (Leena, Ansa & Milla, Personal interview, November 18, 2018).

The final person that I interviewed in Canggu was Pak Wayan, who is 43 years old and owns a small mini mart near the beach. I started by asking what he knew about plastic pollution in Bali and he replied that it was a huge problem in Bali because there is nowhere for the plastic

to go. We next talked about recycling and he said that there was recycling in the area by EcoBali, but most of Bali did not have any. I asked specifically about the tourists and what their effect was and Pak Wayan said that sometimes tourists bring good ideas from other place and can teach the Balinese people, like with recycling. Tourist areas are cleaner because of tourist's ideas and when I asked if there were any negatives to the tourists and plastic pollution he replied that there were not. He said that the plastic was so bad because the Balinese people did not dispose of plastic correctly, but that the tourists are okay (Pak Wayan, personal interview, November 18, 2018).

My interviews with Kadek and Pak Wayan showed that Indonesian people do not blame or look down on tourists for the plastic problems in any way. If anything, they are somewhat grateful to tourists for bringing new ideas about plastic, like recycling and upcycling. Tourists themselves have a harsher outlook on their own impacts. Tourists bring with them to Bali the knowledge of how another part of the world deals with plastic pollution and in knowing that, they judge everything according to that scale, including their own behaviors. Tourism may have a positive or negative impact on plastic pollution in people's' minds, and there are no statistics suggesting that they make it better or worse. Tourism is a complicated relationship in Bali, but at least plastic pollution is one less complication.

Looking Ahead

Currently, the plastic problem in Indonesia is not doing very well. However, that does not mean that there are not bright spots for the future. There are a number of people and organizations doing great work in educating people and providing resources to clean up plastic and creating new solutions to reduce in the future. Some of these organizations are mentioned in above sections, such as EcoBali, the Suwung Community Center, and the Green School. Some are organizations that do amazing work and simply don't fit into my research questions, though they deserve to be mentioned anyway.

Bye Bye Plastic Bags is an NGO that was started in 2013 by sisters Melati and Isabel Wijisen when they were 10 and 12 years old (Bye Bye Plastic Bags). Both were students at the Green School at the time and what started as a school project became an international movement. They were learning about significant people in history in school and the changes that those people were able to bring about. People like Nelson Mandela and Mahatma Gandhi did not wait for change to happen, they were the change. Their contributions to the world shaped and changed its future. Melati and Isabel were inspired by these teachings and attending the Green School, they knew how big of a problem that plastic waste is in Bali. So they decided to do something about and created their own organization. Bye Bye Plastic Bags, an entirely youth motivated non-profit that teaches and motivates people to care about reducing plastic pollution. It began with a few friends, but over the past five years has gained traction on the world stage and now has teams in 18 countries. Bye Bye Plastic Bags also has partners such as EcoBali, Jane Goodall's Roots and Shoots, Clean Seas, Make a Change World and the United Nations supporting them in their mission to continue growing worldwide. Melati and Isabel have gotten

to travel around the world speaking at conferences and doing a Ted Talk to get the message out to young people about the plastic problem in Indonesia and across the entire world.

In Indonesia, Bye Bye Plastic Bag works with other organizations to host and sponsor many different things. In February 2018 they helped organize the biggest Balinese beach clean up in history and in July they helped throw a large sponsored movie night at Potato Head Beach Club in Canggu, which screened an environmental film. They also sell reusable grocery bags through the store at EcoBali and use the proceeds to continue growing their international presence (Bye Bye Plastic Bags). Melati and Isabel are now 15 and 17 years old and continue to make Forbes Indonesia top 10 most influential women's lists and CNN world news for their unflagging dedication to their organization and their motivation to reduce plastic pollution.

International organizations are also making an impact, like EcoBricks. EcoBricks is a movement that began in 2010 when a man named Russell Maier was living in the Philippines and helping build a new structure for a school. They were using plastic bottles filled with sand for structure and support, which gave him the idea to use plastic. The EcoBrick is a plastic bottle packed with enough plastic to make it sturdy and useful for building. He pitched the idea to the school board and within a few months there were hundreds of schools using the idea. He continued to spread the idea and soon thousands of schools, homes and other organizations were using this idea. It is now in use in many different countries, but the Philippines and Indonesia are two of the biggest users (EcoBricks). It is a clever solution to the plastic problem that also helps in other ways too. This solution is not Balinese or Indonesian in any way, but it is helping reduce the plastic pollution in Indonesia by increments and that is where it all starts.

There are also smaller, more local movements and trials for reducing plastic pollution, like the plastic road at Udayana University. The government is beginning to make changes to

environmental policy and they are testing new methods of waste disposal in the process. In a plastic road, plastic waste is melted and shredded and then mixed in with tar to create a kind of plastic tar that is then laid as a road. The first trial of this was on July 29th, 2017 when a 700-meter road was laid at Udayana University (Suriyani, 2017). The road proved to be a success and increased stability by 40% while having no visible negative effects so far. More roads are in the process of being made with this new method as Indonesia looks to India for inspiration where there are already 21,000 miles of roads made in this style.

Conclusion

My overall conclusion of study is that Indonesia is a country with many contributing factors to its plastic pollution, but that there are efforts on every level trying to come up with solutions. There are laws and regulations that exist to guide waste disposal and help facilitate recycling and other methods to reduce plastic pollution, but they are not enforced and often looked over. Most people are not aware that these laws exist, so they become quite inconsequential. As a result of this lack of enforcement in the past and pressure from other countries, Indonesia is beginning to create plans to greatly reduce waste and plastic pollution by 2025. They are a part of several international efforts to clean up the oceans and increase recycling while cutting down on plastic usage. New regulations are being announced and implemented right now to see these goals come to fruition. The past legislature has failed in its job, but future laws and government involvement are now on the right track.

Current methods of waste disposal leave much to be desired, but this is also a changing tide. Burning, burying and dumping trash will soon become strictly illegal under new laws and landfills will be reduced with higher rates of recycling. Disposal is largely affected by habits of culture and laws, and while habits of culture will take longer to change, laws in Indonesia will soon catch up to the current plastic problem. Organizations like EcoBali continue to grow even without government involvement and with that they teach more people and see more people recycling.

Education is varied across Indonesia and even across Bali and the standard for education is not likely to be among the changes coming soon. Most kids in school do not learn about the environment and if they do, it is brief and does not stick with the kids for long. There are notable exceptions to this, such as the Green School, but because there is no standard curriculum for

students across Indonesia, there is no way to standardize this. Learning about the environment in school remains subjective to each school, but hopefully with new regulations will come government sponsored education to the general population about the plastic problem and how to change it.

Tourism does affect plastic pollution in Bali, but rather than being in the perceived negative way, it is usually positive. Tourists bring with them the customs of their home countries, which often have better methods of plastic disposal than Indonesia. These customs are implemented in tourist areas and as a result, tourist areas often have more recycling and plastic alternatives than other parts of Bali. This is a combined effort between tourists bringing ideas and the Indonesians actively keeping tourist areas clean to encourage people to come back. This leads to the conclusion that tourists are not making the Bali plastic problem worse and might be marginally improving it by changing the habits of the Balinese in tourist areas.

In addition to answering the initial research questions, I also found evidence of many more organizations and movements fighting in different ways to reduce plastic pollution in Bali. Bye Bye Plastic Bag, EcoBricks and the plastic road and Udayana University are three examples that represent a much larger number of these efforts. The existence of these organizations alone shows that there are people in Bali and in the rest of Indonesia that do care about the plastic problem that is so evident. The first step in rectifying a problem such as plastic pollution is to make people care enough to want to help. There is still a ways to go with this in order to affect all of Indonesia, but for many people the drive is already there. Organizations such as the ones above bring hope that Indonesia's plastic problem is not beyond fixing.

Suggestions For Further Study

Plastic pollution continues to be a problem worldwide and especially Indonesia, and there are many other avenues that could be expanded upon in further research. Many of these avenues were not possible to pursue in this project due to time constraints, limited access and lack of development in new regulations. Further study would be advised to see the long term effects of laws that are currently being implemented. The Presidential Regulation that was announced October 23rd, 2018 is a huge step forward in Indonesian legislation and it has the support of huge international organizations such as the UN and G20. Additionally, exploring the differences between households, small businesses, and large corporations for plastic waste produced and regulations would be a good topic for further consideration. Plastic pollution in Indonesia may soon be changing and the effects of the changes will be numerous and affect many different levels of society. These changes will create many new areas of study.

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Appendix

Annisa- Annisa is a 15 year old girl from a remote village in the middle of Bali. She lives with her parents and sibling in the village and attends the local high school.

Ema- Ema is a 34 year old woman from England who currently lives in Canggu and teaches at the Green School in Ubud. She moved to Bali three years ago from Australia with her husband and they have both taught at the Green School for two and a half years. She is an English teacher at the school for primary school age children. She wants to continue working at the Green School for the foreseeable future and strongly believes in its purpose.

Ibu Indah- Ibu Indah is a 73 year old woman and lives in a neighborhood in the center of Denpasar, Bali. She lives with her oldest son and his wife, daughter and son. Her grandchildren are her main informants on topics of the environment.

Kadek- Kadek is a 28 year old man from Jakarta, Java who moved to Bali four years ago and found a job working at a hostel in Nusa Dua. He has continued working at that same hostel ever since and plans to continue working there for the foreseeable future. He has some knowledge of plastic pollution issues in Indonesia and the rest of the world due to having contact with travellers from other countries in the hostel.

Leena, Ansa and Milla- Leena, Ansa and Milla are all 19 year old girls from Finland who are taking a gap year from university and travelling around Southeast Asia. They are spending three weeks in Bali. They were picking up trash along the beach and are somewhat informed on the plastic pollution in problem in Bali, but do not know much about the problem in Finland.

Natasha- Natasha is a 26 year old woman from Switzerland who is currently travelling in Bali for an indeterminate amount of time. She has travelled to several locations in Bali and has noted the amount of plastic pollution, but does not know much about the problem in Bali or Switzerland.

Pak Wayan- Pak Wayan is a 43 year old man who lives in Canggu with his wife and children and owns a small mini mart near Batu Bolong Beach. He has a positive view of tourists in the plastic problem and was somewhat informed on the problem. He knew of EcoBali and the state of waste disposal around Bali.

Sari- Sari is an 18 year old girl from Tabanan, Bali who currently attends IHDN in Denpasar. She is a tourism major and wants to go into tourism hospitality after graduating.