석사학위논문

Environment and Ecology for Savvy Teens

(환경과 생태 쫌 아는 10대, 번역논문)

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Environment and Ecology for Savvy Teens

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Chapter 1 Instant Cup Noodles and Plantation

The world is what you eat

There’s nothing like an instant cup-noodle to help kick your cravings

Growing youngsters like you are always hungry, aren’t you? What is the first snack item that comes to your mind? Is it instant noodles? Especially the instant cup noodles. Isn't it the best choice since you can eat it wherever, whenever you want to do so? All you need is boiling water. There is nothing to worry about food not suiting your palate if you are traveling with instant cup noodles with you. I want to talk about the delicious, easy go-to instant cup noodles. I am sure many of you will be blown away once you find out how closely and massively a single instant cup noodle is connected to its ecological problem.

How often do you eat instant noodles? Once a day? That's a bit much! Then again, people from all over the world eat an enormous number of instant noodles per year. According to the World Instant Noodles Association (WINA), over ten million instant noodles were consumed in 2017 alone. Then which country was found to consume the most instant noodles? China and Hong Kong, which ate 39 billion instant noodles in 2017, ranked number one; followed by Indonesia, Japan, India, Vietnam, the United States, the Philippines, and South Korea. However, by the percentage of the population, South Korea's annual per capita consumption of instant noodles exceeded 73, becoming the unchallenged number one in ranking. This means one person eats at least one instant noodle per week. There is nothing like instant noodles when

you are hungry but busy. Besides, what is better than a nice spicy soup at a reasonable price?

Instant noodles are fried in oil and then dried. This process helps you to store the instant noodles longer and dissolve them more quickly in hot water. What do you think is the key element here? Yes, the frying. This explains the bulks of oil required in instant noodles factories.

Now, shall we take a look at the ingredient labels printed on the instant cup noodles? All goods produced in factories must be labeled with the ingredients used to make the goods, the countries of origin, the content, etc. Most of the flour used in instant noodles is imported from Australia or the United States. What's written next? That's correct, oil to fry the noodles. Not just any oil, but palm oil is written on the label. Which country is the palm oil from? All the instant noodles in my house say it is from Malaysia. Meaning, noodles made of flour from Australia are fried in palm oil from Malaysia.

Palm oil is what comes from pressing the fruit of palm trees. And palm trees are mainly grown in Malaysia and Indonesia. You can tell by looking at the number of instant noodles consumed per year that one would need a lot of palm oil to fry a great number of noodles. Palm oil is a crucial raw material not only for instant noodles but also for foods like sweets and ice cream, as well as cosmetics such as lipstick. But out of all the different types of oils, why palm oil? This is because, unlike other

vegetable oils, palm oil-fried noodles become crunchier and odorless even after a long time. A farmer can get palm oil for 25 years after the third year of planting and growing a palm tree. And yet, since the demand is so high, palm plantations are spreading. That means more acres of land.

Then, of all regions, why Indonesia or Malaysia? The reason is that there's a vast of land called a primeval forest. A primeval forest is a place that hasn’t been significantly disturbed or logged; however, companies that need palm oil have been recklessly cutting down the trees in these forests to plant palm trees. When capitalists with money and skills hire local laborers to build a large-scale monocropping system, it is called a plantation.

Plantation sweeping primeval forests

The plantation began after the 15th century when Europeans were exploring new routes. There are several reasons behind this action; to strengthen powers, spread religion, and experiment with geographical and scientific developments. But, most of all, spices. At the time, demands for spices were high since many were fascinated by them. So it was considered valuable due to its low quantity. Whoever got in the hold of spices could make a fortune. Spain, Portugal, and the Netherlands started occupying and colonizing countries located in Central and South America. After the Industrial Revolution in the 18th century, great powers like Britain and France colonized Southeast Asia and even Africa. Plantation agriculture began when world powers’ capitals and

technologies for spices and tobacco met the colonies' cheap labor force and tropical climate.

But here is a point to consider. Is it okay for people to deforest and repurpose them however they like?

Forests are also home to many living forms. There used to live many orangutans, one of the great apes most closely to humans, on the Indonesian island of Borneo in Southeast Asia. The name orangutan comes from the Malay expression, "oran hutan," meaning "forest person." It could also mean that orangutans are one of the closest human relatives from an evolutionary perspective. However, over the past 20 years, research shows that one hundred thousand orangutans in Borneo disappeared. One hundred thousand is about half of the total number of orangutans living on the island. The main reason for the decline in orangutan populations is the deforestation from reckless palm plantations and paper mill cultivations. The orangutans lost their homes when the forests disappeared. And the number of orangutans decreased in proportion to the rate at which the forest disappeared.

Deforestation due to massive logging or illegal fires for large-scale palm oil factories has continued until this day in the Papua Islands of eastern Indonesia and the Maluku Islands of north Indonesia. Papua Islands, especially, have the largest distribution of natural rainforests. A wide variety of living forms live, including endangered and rare plants

and tree kangaroos. It means that all of these living forms are at risk of survival.

Then what does my life have to do with the disappearance of plants and animals? To answer this question, we have to first find out what would happen when forests disappear.

Side-effects of forest disappearance

National Arbor Day falls on April 5th. It's a national holiday to plant trees. This day was first celebrated in 1949. Why? It is because Japanese people logged many trees and destroyed forests in Korea during the Japanese colonial era. There were often floods and droughts ever since because there were no forests to hold onto the water and release when in need. That is why we should conserve forests and water because our topography has steep mountains and comparatively short rivers. Just a few years after the Japanese colonial era, the Korean War broke out. Forests burned out due to the war and the refugees went into the mountains to plow slash-and-burn fields. Mountains suffered once again. After the war, they turned into barren hills. The treeless mountains worried people who experienced droughts and floods. The government forbade cutting down trees in the mountains for firewood. With such effort, the landscape of mountains and rivers recovered their beautiful blue-green color after about 30 years. But why both mountains and rivers? why not only mountains? It is because mountains and rivers are very closely connected to each other. Dense forests bring flowing rivers.

Then I have one question. Where do woods come from to make furniture and build houses while trees grow? We imported cheap logs from Borneo Island in Indonesia, Malaysia, and the Philippines while we protect forests in our country. As a result, we succeeded in returning the blue-green colors of our rivers and mountains. But damaged rainforests in Southeast Asia instead. Does that mean we shouldn't cut down trees at all? That is not what I meant. Proper use of wood at the level to sustain the already existing forests has been part of our lives for a very long time. However, destroying forests to meet the excessive consumption need can be problematic.

Most of the forests in Southeast Asia disappeared to produce wood. Now the remaining forests are disappearing to generate palm oil for instant noodles, sweets, beauty products, etc. As the forests have disappeared, animals that live in these forests have lost their homes. As in Korea, if forests disappear, people will suffer.

Many of you might already know how serious the climate issue is as we have all been through heat waves and cold snaps. The climate issue is due to the increase in greenhouse gases. Experts forecast the world population to be between 9 and 9.5 billion by 2050. When the population increases steadily, consumption and greenhouse gas emissions rise because all consumption costs energy. So the earth’s temperature rise is inevitable. Forests and oceans are carbon sinks that account for

the largest share of greenhouse gasses. If the forests continue to disappear, we can't slow down the global temperature rise. Look at the palm oil. Imagine how much energy it needs to pick palm fruits, extract oil, export them to countries that need palm oil, and transport them to factories to fry instant noodles, make sweets, and produce beauty products. And what about the greenhouse gas emissions throughout the process?

We can escape this toxic cycle if we sustain forests where orangutans can live. We do not have to suffer again from heat waves and cold snaps due to unstable climates if we acknowledge the existence of orangutans and do not invade their habitat.

Now, do you see the relationship between our lives and the survival of orangutans? What do you think of instant noodles now?

Having fun choosing discomfort

Let us think about the wooden chopsticks that we use for 10 minutes to eat a bowl of instant noodles. From the wooden chopsticks' point of view, they worked hard for 20 years to grow up as a tree. Just to become wooden chopsticks for us to eat instant noodles for a minute and to throw away in the trash can. Trees are not the only problem. You need fuel to go to forests for trees, to cut down trees, to transport logged trees, and to cut the transported trees. You also need chemicals for disinfection, paper for packaging, and boxes for transportation. The list

goes on to write down all the processes and ingredients required to make a single wooden chopstick. Wooden chopsticks that went through all these processes quickly become a source of environmental pollution. Only in less than 10 minutes! The same goes for instant noodles containers and leftover soup. Resources are wasted in the process of throwing them away.

No one *wants* to or *intentionally* destroy the environment. We need to eat because we are hungry. An instant noodle is an easy option, and wooden chopsticks just happen to be there. But the amount of tremendous environmental pollution from a single cup of instant noodles is beyond imagination. We even unknowingly took away the homes of orangutans in a forest in Indonesia. There are many other examples of when we unconsciously cause things, and it might be too late when we have figured things all out. So what should we do about it?

Let us explore on the things we can do today. How about we start simple? Besides, a journey of a thousand miles begins with a single step. I believe we can go far and make a difference if we take a single step every day. Who knows whether we can make a big change by building a tiny habit and sticking to it?

How does this sound? How about reducing the number of times you eat instant cup noodles? There is also an option of not using wooden chopsticks. Now the schools provide hot lunches for students. But

students used to carry lunch boxes with metal chopsticks to school. Let's bring back the metal chopsticks instead of wooden chopsticks. If it is too heavy for you, I recommend very lightweight silver grass chopsticks. Wooden chopsticks require sterilization with chemicals, but silver grass chopsticks are sterilized with boiling salt water and then dried under the sun. You also do not have to worry about harmful substances coming out of the silver grass chopsticks even after being dipped in a hot instant noodle soup. Since it decomposes after 45 days, there is no burden on nature. Why bother? True. It can be bothersome. However, not wanting to take small actions brought mountains of trash and environmental destruction. I want you to think a little about the pain your negligence can bring to others. This is something that can't be forced. If you think going through the hassle of taking tiny action is worth a shot, go for it!

There is a saying about fun *discomfort*. If we stretch our limits and become comfortable being uncomfortable, our world will become a better place to live. Our ecosystems will be less threatened, a single tree will live to the end of its life, and we will be able to coexist with the forest animals. Doesn't it make you happy just to think about it? Discomfort is uncomfortable. But there are ways to have fun in choosing the discomfort.

Finding Justice in Food

Individual actions are needed, but actions to change the system are also crucial. Plantation agriculture is predominantly carried out in

Latin America, Africa, and Southeast Asia even today. This means large corporations are still taking advantage of low-cost labor in these regions. The main crops grown in plantations are coffee, cacao, bananas, tobacco, sugar cane, palm trees, and cotton. Did I mention that one of the characteristics of plantation agriculture is that it cultivates a single crop in large quantities? So large corporations have no choice but to spray excessive pesticides to get rid of the pests. This ruins the soil, making the corporations plow new land. There will be less land for the local farmers to cultivate their land, forcing them to depend on the unreasonably low wages from large corporations.

Unjustly produced agricultural products are also related to us. It's not someone else's business as globalization removed trade barriers and lowered the costs of ingredients brought to our dining tables. Farming methods and energy required to transport crops from foreign countries are not the only problems. We also need to pay attention to the fact that domestic farmers are not receiving reasonable prices in return for what they've sold as cheap overseas crops replaced them.

Some people put their heads together to solve the problems listed above. One solution they came up with was fairtrade. Perhaps some of you have already heard of this term. It aims to buy goods at the appropriate price, rather than finding the cheapest goods, so people who have been exploited with unreasonably low wages can live more stable lives. One example is Muscovado. Muscovado is an unrefined sugar grown

in sugar cane plantations in the Philippines. It is a little more pricey than other sugars. But if we buy Muscovado at an appropriate price, we will be supporting organic farmers who are responsibly growing their crops and saving the farm's ecosystem. The goods, such as coffee, chocolate, and clothes which we can buy at fairtrade are becoming more diverse.

However, it is a little burdensome to have these goods shipped from abroad because a great amount of carbon is emitted during the distribution process. There are a large number of cargo ships floating on the ocean all year round. These ships are loaded with containers. To reduce these types of energy, Local Food was launched. Local Food started a movement to consume agricultural products that are produced within a short distance of where they are consumed. If we consume agricultural products grown from nearby farms we can reduce carbon emissions and support residents to live a more stable life. I will explain this later.

Nonetheless, even if such a system is there for you, it is useless if no one is using it. Even if it costs a little, we need to take an ecological attitude by taking an interest in fairly and ecologically produced goods.

Chapter 2 Banana and Biodiversity

Diversity makes our world a more beautiful place

Will bananas soon go extinct?

What is the most common fruit that comes to your mind? For me, it is bananas; the fruit you can eat all year round. Not only are they common, but they are also appetizing. It is an affordable fruit that doesn't need washing or cutting! They are truly the icing on the cake. But in the past, they were the pies in the sky. Or should I say, *bananas* in the sky? They became common only after 1991. In 1988, one bunch of bananas cost about 34000 won. If there were about 15 bananas per bunch, a single banana would cost more than 2000 won. You can guess how luxurious the banana was, at the time, when you consider the price of beef which cost about 6000 won per pound (600 grams). Bananas were considered a 'fancy fruit.' Nobody imagined that it would become such a common fruit as it is today. When I was a kid, I could only get a bite when a guest gifted us or when one of our siblings was ill.

The reason bananas were expensive is that they used to be enlisted on the negative list. The trade was not as developed as it does now and we were not a trade powerhouse. So we had no choice but to restrict the imported items to save foreign currency. Fewer numbers of bananas we could import meant higher prices. The price of bananas began to drop in 1991 when bananas were excluded from the import restrictions. Bananas ranked as the number one imported fruit in South Korea with 440,000 tons of bananas imported in 2017 alone.

Then, what types of bananas are we eating? According to the world's best institute for bananas improvement, the Laboratory of Tropical Crop Improvement of the Catholic University of Leuven (Belgium), there are a total of 172 types of bananas registered. Among them, humans selected only two species to cultivate. One is *Musa acuminata* which we eat as a plain fruit, and the other one is *Musa balbisiana*. *Acuminata* is a cultivar that has been improved to have a sweeter taste, and *balbisiana* is a hard and starchy plantain after being naturally crossbred to some extent. You can boil, grill, or fry plantains, and they are eaten as a staple food. I noticed every dish was served with bananas when I visited an African restaurant outside Paris a few years back. It was chewy and delicious, like a yam or a potato.

The bananas we eat today are either *Musa acuminata*, *Musa balbisiana*, or a hybrid of these two species. But there's a problem. Bananas are now at risk of becoming precious again or going extinct altogether. It is because an epidemic is spreading in the bananas we eat now.

Gros Michel is the name we used when we mentioned the first fruit we bred for commercial purposes. 95% of *Gros Michel* disappeared when the epidemic disease called Panama attacked the globe. After *Gros Michel*, *Cavendish* appeared. The bananas we eat today are mostly considered *Cavendish*. But even this *Cavendish* is stricken with an epidemic and it is now on the verge of extinction. How ironic. Makes me

wonder whether any bananas could go against these infectious diseases. Just because one peer in your class got a cold, doesn't mean the entire class is ill, right?

The answer is in bananas. One reason is that there are no seeds in bananas. Bananas stems are cut off after a year-end harvest. Did you know that bananas are perennials, and not trees? If you cut off the stems after a harvest, new shoots will grow from the underground stems next year. New shoots come up and bear fruit every year, meaning the same gene is inherited, not bred. It’s a replica. Since they are genetically identical, they are all equally vulnerable to the same diseases.

Reasons bananas are prone to diseases

Bananas couldn’t have been like this from the beginning because all living beings reproduce with the same species, leaving genetically different descendants. If bananas were in a natural state, we wouldn’t have been left with only one type of banana. This is due to the intentional improvements in breeds by mankind. Why did we do such a thing? Because people only wanted bananas that suited their palates. Or, same-tasting *products*, to be exact. Even if time goes by, generating genetically identical clones would only produce consistent bananas with the same size and taste. This is like printing the same product out of a factory. Besides, wouldn’t it be more challenging to do business with products that have irregular shapes and tastes? That is why farmers have improved bananas. And for the same reason, we have been able to enjoy

delicious bananas at an affordable price. Nevertheless, bananas are now on the verge of extinction because they were improved for our convenience.

If genes varied, there would have had both disease-susceptible and disease-resistant breeds. But because bananas are genetically homogeneous, they are all susceptible to the same disease. That is why bananas were not able to survive epidemics and why biodiversity is important.

Our ancestors might have eaten dozens of animals and plants when they were hunters and gatherers. It is a valid speculation since they did not settle in one place to farm, but obtained food by foraging in the wild. Naturally, if someone said what they had for dinner, others could assume when and where the person had the meal. This was possible because dietary depended on the culture, region, and season. But now, people in New York, Paris, and Seoul eat the same-looking and tasting burgers, spaghettis, and bananas. Diversity is no longer on our dining tables.

Crisis of a diversity loss

I mentioned earlier that there was a banana named *Gros Michel* that disappeared before we even got to taste it. Apparently, *Gros Michel* was bigger and sweeter than *Cavendish*. It was also good for distribution

as it did not soften easily. But it was all wiped out because of an infectious disease caused by a fungus. When infected with this fungus, a banana plant died as the fungal mycelium penetrated its stem. That is why it is called the *banana wilt disease*. The other name is the Panama disease as it was first discovered in Panama. The highly contagious fungus almost wiped *Gros Michel* when it was commercially mass-producing during the 1960s.

What does it mean to be highly contagious? The breed-like has identical genetic traits. So if a disease gets into one breed, it will likely spread across all the other breeds as well. If bananas were genetically modified with various breeds, a variety with strong resistance to diseases may have survived. Yet, everyone flocked to *Gros Michel* because of its delicious taste and easy distribution. That is why there was enormous damage when the disease spread. There were of course mutant bananas that survived the disease while all the others died. But, farmers had no choice but to get rid of even the good ones to prevent further disease spread. It would be easy to understand when you think about how the outbreak of the foot-and-mouth disease virus led farmers to cull pigs in an attempt to stop the virus from spreading. Mankind almost had to say goodbye to the bananas forever as the *Gros Michel* extinct. Then a miracle happened. An Irish medical doctor and amateur explorer, Charles Edward Telfair, collected plants from traveling around the world as a ship’s surgeon for the Royal Navy to plant them in his botanical garden. One of the plants was the *Cavendish* we eat today. Telfair brought this

banana breed from China and handed it over to Joseph Paxton. an English architect and gardener. Paxon worked at the greenhouse of Duke Cavendish, who devoted all of his fortunes to collecting new plants. When Paxton succeeded in cultivating disease-resistant bananas in Duke Cavendish's greenhouse, he named the banana *Cavendish*. That is how we ended up eating the banana we can find today. However, for the same reason, the banana is under another threat of extinction because of the evolved fungi that are attacking *Cavendish* bananas.

If you count the number of crops and livestock we eat today, you will realize how much we lack dietary diversity. It is said that twelve types of crops account for 80% of the grains human intake today. Even if we increase that percentage to 90%, humans will only be eating 15 types of crops. Crops' diversity lowered as agriculture developed. And as the world traded goods more freely, food became simpler and more similar regardless of region or culture. What is more shocking is that the area of cornfields currently being cultivated is larger than the area of wild grasslands.

Most of that corn is used for livestock feed. Does it have an alternative if an epidemic strikes and wipes all the corn out? It gives me the creeps just thinking about it. Low biodiversity is a huge threat to us who are living in an era of climate change. Can't you tell by learning how *Gros Michel* vanished without a hitch and how *Cavendish* is on the verge

of extinction in the same pattern? Lowering dietary diversity can very likely cause a food crisis.

Similar things have happened before. At the end of the 19th century, the British cleared the forests in its colony, Sri Lanka, for coffee plantations. All the hills and mountains, large and small, in sight, became coffee farms. Then they all collapsed overnight due to the *coffee leaf rust*. It was a huge burden on the farmers, as well as the ecosystem, as it cut down all coffee trees to start over the coffee plantation.

Why are we making the same mistakes over and over again? We are supposed to be the lord of all creations and the *wise men*, as we named ourselves *Homo sapiens*. The problem is the human attitude. Humans do not see bananas or coffee as plants, or as members of the ecosystem, but only as a means to make money. The irreversible environmental scar is marked by simply scattering chemicals when disease outbreaks and conveniently relocating to cultivate another land when the previous one is of no use. When will we truly understand that protecting the ecosystem equals sustaining our lives?

Banana Republican Tragedy

Have you ever heard of the word *banana republic*? It sounds fancy but it is actually a very gloomy term. It is a derogatory expression to describe a politically unstable country with an economy dependent upon

the export of one or two natural resources. The banana republic was used to refer to countries in Central and South America.

Ecuador is currently the world's largest banana exporter. Colombia, Cuba, Ecuador, Guatemala, as well as Honduras, were once the largest exporters of bananas. From the name Panama disease, one can tell that Latin America was once the largest producer of bananas. The first company in the world to grow and distribute bananas was Boston Fruit Company, which later changed its name to United Fruit Company (UFC). It is now known as Chiquita Brands International. Let me briefly go over what UFC has done to Latin America.

The United States of America expanded its mainland as it purchased Alaska from Russia and annexed the Hawaiian Islands at the end of the 19th century. It then turned its focus to Latin America to lead the world by realizing the Pax Americana dream. With this powerful support, the banana company UFC landed in Latin America. The company acquired arable land to cultivate banana plantations and built railroads, ports, and communication facilities to quickly transport bananas. Cold-storage ships also appeared around this time to distribute bananas as fresh as possible. Every developmental step was for the banana company. The locals, people who lived there, could use none of these facilities because the company had no interest in the laborers' lives. Finally, in 1927, 32,000 workers in Colombia couldn't endure any longer and went out on a strike. The strikers asked for the followings: to

improve the workers' bathrooms, to provide medical services, and to pay salaries in cash instead of paper coupons. At the time, UFC paid their workers with paper coupons that could be only used at the UFC-owned stores. However, it was the Colombian government, not the UFC, that responded to these simple requests by killing more than one thousand strikers. The strike, which began in 1927, became uncontrollably politized. It gave rise to guerilla warfare until 1950, killing more than 180,000 citizens. How horrifying to think of a government aiming guns at its people for going against the U.S. company! That is how the name 'banana republic' was coined; to ridicule the Colombian government for being the U.S. puppet or a figurehead. But if you look into it, it was actually the UFC that manipulated the unstable government of the developing country. It was because the company prioritized its profit over people's lives. That is how Colombia came to be disgraced with the title, of *banana republic*.

We do not go through any trouble when eating bananas, but there is such a tragic story behind it. I am sure there are countless tragedies as a result of greedy conglomerates with no sense of responsibility for their workers and the ecosystem. If we cannot learn from the past, the past is condemned to repeat itself.

Soil contamination due to mass production is not the only problem. There is also the problem of employment, where the livelihoods of the local people are instantly threatened. The banana companies can find

new arable land if a plantation collapses from the Panama disease. But who do you think will be left there to suffer the painful outcomes? It is the locals who live in that area.

The Panama disease, which wiped out bananas in Asia in the 1960s, started to outbreak again in Africa starting five years ago. About 100 million people are working on banana plantations in Africa. More than 500 thousand people were working on banana plantations, in Mozambique, before the strike of Panama disease laid off two-thirds of the workers. Many workers in the Philippines also lost their jobs as typhoons and the Panama disease decreased banana production by more than 20%. This means that the banana’s extinction is not simply a matter of the loss of one food item. It is interrelated to food problems, working conditions, and environmental problems. In a broader sense, it affects the entire ecosystem.

Protecting the disappearing

Biologists created the concept of ‘biodiversity’ after noticing the great losses of plants and animals' lives. To develop this concept, Climate Change Convention was agreed and the Convention on Biological Diversity was opened for signature at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, Brazil in June 1992. The Convention on Biological Diversity entered into force on 29 December 1993. As the 154th member state, South Korea hosted the Meetings of the Convention on Biological Diversity and its Protocols at

Pyeongchang, Gangwon-do in 2014. The scope of the word organism, mentioned in this context, is broader than one might imagine. It includes not only living organisms but also genetics, species, and ecosystem.

Other living organisms provide us with a wealth of services from food, health, industries, and recreational activities. Yet, we have little interest in preserving them. Experts are classifying the current massive biodiversity losses as the 6th mass extinction. Nevertheless, we cannot guess the seriousness of the issue because we still see many living things every day even though many lives are disappearing. We desperately need to keep an eye on the ecological and economical values of biodiversity. So what can we do to help?

I'd like to suggest reducing the number of fast food to at least once a week. You might wonder about the correlation between biodiversity and fast food. Let's take a hamburger, the most common fast food, for example. You would need a half-sliced burger bun, a beef patty, lettuce, tomato, and sauce to make a hamburger. This means that a person needs at least wheat, meat, and a couple of types of vegetables for a meal. McDonald's, the world's largest hamburger restaurant chain, has more than 35,000 stores worldwide as of November 2014. It has about 68 million customers per day. That means at least 68 million hamburgers a day! To make millions of hamburgers, millions of buns and patties with nearly identical taste and quality must be supplied all around the world. Millions of cows will need to be raised to make millions of patties for the millions of burgers. To feed the millions of cows, forests will be wiped out

to cultivate millions of corn and beans. Then, what would happen if a person decided to eat a meal made with locally grown ingredients instead of a burger from McDonald's for a change? That one meal will need more ingredients than any menu from McDonald's. And just doing so will contribute to maintaining biodiversity. Agriculture became a business to produce cheap ingredients instead of food in a more traditional sense as it is industrialized. That is why, I believe, diversifying our palates is the number one priority.

Gathering power in groups is also needed. Massive deforestation is taking place in the Amazon rainforest of Colombia, reminding us of the frontier expansionism in North America. Traders, who wanted to grow coca trees for cocaine, bribed loggers to chop down trees in Amazonia. However, the Colombian government argued that logging is done only on a small scale. So Avaaz, an international nonprofit organization, released satellite photos taken with the fundraising of its members and revealed that logging in Colombia was the 'worst in history.' The organization did not stop there. It filed a case for destroying Amazonia and appealed for a signatures-seeking campaign. Amazonia does not only belong to countries like Brazil or Colombia because more than half of all species on Earth live in that rainforests. That is why Avaaz appealed to the entire citizens of the world. This type of collective action makes it difficult for the Colombian government to neglect the ruthless logging of Amazonia. A biodiversity protective action includes an individual donating to a nonprofit organization or participating in a signature-collecting campaign.

On top of individual and group awareness and effort, there is corporate ethics. The company’s goal is to make a profit. But wouldn't it be dangerous to prioritize profit before living creatures? That is why citizens need to demand ethics from companies. It is also important for governments to manage and monitor companies to not sell harvested crops from ravaging the ecosystem. Needless to say, citizens must keep their eyes on the companies and government for them to do their share.

Chapter 3 Avocado and Local Food

The smaller the food map the better

Where did our food come from?

April 27th, 2018 is a very special day for us. It was the day of the Panmunjom Declaration for Peace. The leaders of the two Koreas met in Panmunjom after a long, strained relationship with the Military Demarcation Line lying between the two countries. With the world looking on, every topic was bound to go viral. One of them was Pyongyang naengmyeon (Korean cold noodles). Pyongyang naengmyeon carried all the way from Pyongyang! Every naengmyeon restaurant was seethingly crowded on that day; which shows how excited people were at the time.

Pyongyang naengmyeon, as the name suggests, originated in Pyongyang. Come to think of it, there are quite a few cuisines named after the geographic regions they originated from; Jeonju Bibimbap, Chungmu Gimbap, Cheonan Walnut Cookies, etc. The reason that these dishes are called by the name of their origins is that they have been made with local ingredients from that specific region for a long time. Naturally, they became renowned for having rich and distinct tastes. They are like the athletes representing the regions. As a result, the regions become familiar even to people who have never been to or heard about the areas. We can also learn about the regions through their special products. “The buckwheat flowers were starting to bloom, sprinkling the fields like white salt under the pleasant lunar glow.'' It is a passage from Lee Hyo-Seok's novel, <When Buckwheat Flowers Bloom>. I’m sure you have all heard of it before. I used to imagine fields of buckwheat flowers

that resemble white salt and the pleasant lunar glow when I first read this novel as a middle school student.

Farmers plowed paddy fields to harvest buckwheats when rice was poorly harvested. After the plow, farmers could harvest and eat buckwheats within two months, right before the first snow of the year. They were called *famine food*. So, can you imagine how useful it must have been to the people in the barren mountainous regions of Gangwon-do Province? As a result, Bongyeong, a mountainous region in Gangwon-do, has become the home of buckwheats. As people became more aware of buckwheats' healthy benefits, they established themselves as the local special product of the village.

For a certain crop to be continuously cultivated in one area for a long time it must be well suited to the local environment. And if the crop does not burden its surrounding environment, it is considered *sustainable*. Knowing where the ingredients of the food we eat come from is also a way to make our environment sustainable. But look at our dining tables. How many foods on your table are you aware of their origins? Of course, trying out different food from abroad is one pleasure in life. But apart from its enjoyment, food can become a trend. Especially, in an era of social media, a trend seems to come and go in an instant. I noticed how avocados are gaining popularity these days.

Avocado’s Journey and Carbon Footprints

Avocado exploded in demand over the past few years as TIME magazine selected it as one of the top 10 superfoods in the world, along with broccoli and oats. Avocado was considered a delicacy among the Aztecs, Incas, and Mayans since about 900 B.C. Its origin is from Central America, such as Mexico and Colombia, to the east side of South America. It is said that humans started to cultivate avocado when it was brought to California in the mid-19th century. When horticultural technology developed in the early 20th century, avocado cultivation began on a full scale. Although it is rich in minerals and vitamins to be called a superfood, I don’t think it became popular just because of its nutrition. Of all fruits, why only avocado?

Did you know you can learn ways to eat avocado if you search for it on the Internet? There is a big, hard seed inside an avocado. It may even surprise first-time eaters because it doesn't cut with a knife. But even this unfamiliar experience can be considered fun. Besides, you can have fun showing off eating this exotic and nutritious fruit, with beauty benefits, to other people. Maybe that is why it became so popular.

Avocado grows well in tropical climates. Although its minimum growth temperature is minus four to five degrees Celcius, it is greatly affected even if the temperature goes down to minus two degrees Celcius. It won’t survive the winter of Korea. That is why we must import avocados if we want to eat them here.

Avocados must travel thousands of miles to travel to Korea. This requires a significant amount of energy as they must be kept at the right temperature during transportation. They must be carried using transportation, such as an airplane or a ship. So energy is required here as well. As long as fossil fuels are used, *requiring energy* means carbon dioxide emission. This is called a carbon footprint; the total amount of greenhouse gas emitted through human actions or product-making processes from the manufacture, distribution, to consumption. Avocado has a high carbon footprint since it travels long distances.

According to the carbon footprint calculation, the production and distribution of 100 grams of avocado cause about 10.37 grams of carbon dioxide. That is four times the amount (2.49 grams) emitted from 100 grams of a banana. Quite a difference, eh? That is why Korea is also trying to foreign fruits. Not only because of environmental problems related to importation but also to obtain economic benefits by self-production. It could be possible since Korea is setting a foot in a subtropical climate with the recent temperature rise. Jeju Island has already succeeded in self-producing mangoes and bananas. However, self-productions of these fruits are difficult, especially on a large scale, because the cost is too high to set the right climatic conditions. In some way or another, we have no choice but to import avocados.

Avocado consumption is growing worldwide. The consumption rose tremendously as the Chinese began to enjoy eating avocados, as well as

the Americans. China imported only two tons of avocados in 2010. Then in 2017, the amount increased to 32,000 tons. We are next in line. South Korea imported 6,000 tons of avocados in 2017. This is a whopping 15-fold increase compared to 400 tons in 2011. Isn't that crazy?

People who are losing water every time we eat avocados

A price increase is inevitable when there is rapidly growing demand, but limits in production. That is why avocado is called *green gold*. Right now, Mexico and Chile are the largest producers of avocados in the world. The area of avocados' arable land in Michoacán, Mexico, is about twice that of Seoul. Most fruit-bearing trees go through biennial bearing. It means that if fruit trees carried a heavy crop one year, they would carry little or none the next. Because of the fluctuating harvest, there is a tendency to expand the land to grow avocados to meet the rising demand. Sadly, the number one candidate for arable land is a forest. People seem to think of forests as a land of no value. Maybe that is why they deforest the land to harvest more avocados.

What would happen if the forest turned into an avocado plantation? I pointed out earlier that deforestation means habitat loss for the animals living in the forests. It also disturbs the water cycle because forests store water like dams, as you all know. So water scarcity is an unavoidable result of clearing forests to plant avocado trees. Petorca is a Chilean town located in the Petorca Province, Valparaíso Region. There used to be a river in this town 15 years ago, but now the people are suffering from a

drought and water scarcity. The town's people either get tap water supplied by the government at a set time or depend on water trucks that occasionally visit. Can you imagine how uncomfortable would that be? They don't have enough water to wash, do laundry, or even drink. The town is suffering from intense water scarcity, not only because of an ongoing drought but because of the avocado plantations I mentioned above. According to the AFP news agency, avocado production is highly water intensive. 100,000 L of water is needed per 0.01 km2 every day. This is equivalent to the amount 1,000 villagers use per day. The crisis is as serious as for the government to step in and regulate the use of water for farmland. But since water is privatized in Chile, regulation is not easy.

Like the carbon footprint, there is also the water footprint. The only difference is that it refers to the total volume of freshwater consumed by an individual or used to produce goods. A great volume of water is used not only in agriculture but also in industrial processes. For example, 100 ml of crude oil is needed to make a single 2L PET bottle. But 3~40 times more water is needed.

Then what can we do to solve water scarcity in avocado plantations? The simplest way is to regulate imports. This is an ethical issue. It is very unfair how one side is suffering from intense water scarcity, while the other side is enjoying a fruit harvested from that water to keep up with the latest trend. One can argue, *shouldn't the locals be suffering more if the demand for avocados decreases? Aren't we helping*

them by asking for more avocados? The answer to these questions is in the profits made by avocado plantations. Restaurants in England and Ireland are taking avocados off their menus. Not only for ethical reasons but because of the reports saying that the money made in avocados plantation is spent to support mafias. Now, do you get how eating avocados don't equal farmers' prosperous lives?

Who is exploiting the land?

As I mentioned before while talking about banana farms, intensively growing only one crop can cause it to become vulnerable to pests and diseases. So farmers would spray more pesticides, harming the ecosystem. In fact, the ecological environment of the avocado-growing regions is destroyed as the demand for avocados increases. If it had been okay to produce just enough avocados for the local people to eat, farmers wouldn't have farmed to such an extent destroying the ecosystem. It is not just about the ecosystem. Recklessly spraying pesticides negatively affects farmers' health as well. This is happening because corporations have treated agriculture as a commodity. Do you now see how we have to double-think when consuming avocados?

Now let us expand on this idea that we started with avocados. A place is where one lived, lives, and will continue to live. So, every place has its history. It is where the lives of the people living there are unfolded, so there must be a uniqueness to it. In the old days, people often grew up, got married, and died in the same village they were born.

Since most of them worked in agriculture, they lived such lives unless there were any special circumstances. The villagers also managed not only the forest, but also other surrounding environments including wells, rivers, and reservoirs. It was only natural because the surroundings had close relationships with the villagers. There were many benefits if the local villagers' managed their surroundings in this way. They are also well aware of the environment because it was a place where they lived for a long time. So they may have tended to preserve the environment. They couldn’t have imagined exploiting and destroying the land because their descendants will live for generations to come. Do you think the people who cleared the forest to cultivate avocados are the villagers or outside capitalists who sought *green gold*? Needless to say, they are the latter. In other words, they are the people who ravaged the land without either understanding the culture or knowledge of the region because they were not meant to live for generations.

Eating Locally Grown Produce

The local food movement, as I mentioned briefly earlier, started to solve such problems by reducing carbon and water footprints, and becoming healthy altogether. It is often referred to as food produced within a radius of 50 km without going through long-distance transportation. Classic examples of local food movements are Green Care Farm from the Netherlands, Jisan Jiso Movement from Japan, The 100-Mile Diet from the United States, and the well-known Slow Food from

Italy. Korea started the local food movement in Wanju, North Jeolla Province, with the policy to eat locally produced food. If we eat food from a close distance, we can lower our carbon footprint. This is a win-win situation for both producers and consumers. Consumers can feel safe knowing where and who produced the agricultural products that they eat, and producers are secured with a stable income. Foods you find in Hansalim, WomenLink, or Dure Coop are local foods. Some of these stores do sell imported items, but most of them are fair-trade products.

Come to think of it, aren't you curious about the journeys that foods go through before they are put on to our tables? How about we make a list of our favorite fruits and set an ecological index? An ecological index is an evaluation of foods from an ecological and environmental point of view. It can be done by examining the food's origins, harvested season, and cultivation method. If it is difficult to do it alone, you can do it with your friends or with your entire classmates. If you are doing it as a group, it would be better to first create an ecology index for each fruit, and then select the ones you like. Along the line, you will learn how much carbon footprint you are causing by eating each and one of them. You can take a step further by recording whether it is organically grown or on large scale. Thorough research will be needed to create an ecological index. Seems like you will learn a lot doing so. Learning with being graded! Sounds fun, no?

Some might think that the process is a hassle to go through for eating fruit. However, today's necessities in life, including food, clothing, and shelter, are all connected with our ecological environment. That is why there is a need to carefully look over our daily lives to look after the environment we live in. One might ask, *am I not allowed to eat fruits imported from other countries?* That's nonsense! All I am asking is to make an ecological index and think about it together. You should eat whatever you want. But there must be an effort made to cut down what I meant to eat twice to once.

Avocado, as we discussed in this chapter, is a very symbolic fruit. Meaning, other fruits have similar problems. In fact, we don't really know what kind of processes that our food, clothes, and goods we use go through. This is because there isn't a way to find out, or because we do not bother to do so.

Someone once conducted an interesting experiment. One summer, on a crowded beach, a person started to dance. Hardly anybody noticed the dancer because everyone was busy enjoying their vacation. And yet, the dancer kept dancing. Then, suddenly, one person began to dance with him. Then another one joined along. Sooner or later, an entire crowd was dancing on the beach.

I'm sure there was that one person who decided to import the delicious avocado before anyone else did. And another 'first' person, who

made a dish with avocado and posted it on social media. Others must have decided to follow these people and that is how everyone gradually started to eat avocados altogether.

Similarly, how about we begin letting others know about current situations? What do you think will happen if we let others know about how avocados have a high carbon footprint and how they are causing intense water scarcity in Chile and Mexico, and suggest ways to ameliorate the situation? What difference will that make? I don’t know! Let’s give it a shot and find out!

Chapter 4 Water Bottles and Plastic Waste

Today’s dinner menu: microplastic stuffed grilled fish

Whales with plastics in their belly 10,000 meters deep under the sea

What is the first thing that comes to your mind when you hear the word ocean? For me, it is the novel <Twenty Thousand Leagues Under the Sea> by Jules Verne. I used to imagine a great big ocean as I read about Professor Aronnax, in his submarine *Nautilus*, exploring various marine animals. I thought that someday I would also like to go down the ocean myself and see the marine animals with my own eyes. But I have now changed my mind because I have learned that the sea is no longer a wondrous place. After listening to the two stories I'm about to tell you, you'll get what I'm saying.

The first story is about plastic bags. There are long, narrow hollows on the ocean floor. These hollows are called oceanic trenches, and the deepest oceanic trench discovered so far is the Mariana Trench. Its maximum known depth measures about 11,000 meters, deeper than the height of Mount Everest. In this deep ocean, plastic bags were found. According to the researchers, they must have been around there for about 30 years. The Japan Agency for Marine-Earth Science and Technology (JAMSTEC) sent down submarines to take pictures of the deep ocean and captured plastics wastes. The picture of a starfish holding onto a plastic bag looked as if it was taken in garbage dumps. How much plastic waste can there be in the ocean to have plastic bags floating to that depth?

Something similar happened in the Pitcairn Islands in the eastern South Pacific. Among the islands, there is an island named Henderson. It is one of the few coral atolls in the world with no human presence, located 5600 km away from Chile. Its biological diversity is very well preserved because of a low human disturbance. It was even designated as a World Heritage Site by UNESCO to preserve this remarkable biological diversity. Then, in 2015, Dr. Jennifer Lavers from the University of Tasmania (Australia) accidentally found an unknown lump on the island while looking at Google Maps. After conducting a 4-month joint study with the Royal Society for the Protection of Birds (RSPB), Dr. Jennifer discovered that the unknown lump was actually a pile of garbage. Over 38 million pieces of plastic waste were piled up all over the island with a total weight of 17.6 tons. The waste was mostly plastic and it consisted of our daily items, including fishing gear, powdered formula cans, and disposable razors. How did such a huge pile of garbage put together on an uninhabited island in the middle of the Pacific Ocean?

My second story is about whales. One day in 2018, a short-finned pilot whale was found ashore near the border between Thailand and Malaysia. Many people came together to save the whale. They covered the whale with a damp cloth or put an umbrella on it so that its body wouldn’t dry out or get burned by the sun. Sadly, the whale died three days later. When a whale dies, an autopsy must be conducted to find the reasons behind its death and whether the death is related to the marine environment or climate change. If that is the case, it would be an

important matter for us, humans, as well. During an autopsy, veterinarians removed 80 plastic bags from the whale's stomach, which weighed about 8kg. How could the whale have survived with a stomach full of plastic bags?

There are actually countless numbers of marine animals that die because their stomachs are full of plastic bags or marine waste. There are also well-known shocking photos of albatrosses' stomachs full of plastic waste such as PET bottle caps and cigarette lighters. A video photographer and environmentalist named Chris Jordan took a video of a mother albatross feeding her baby with food which in my eyes was more like a piece of plastic. Without being able to make a difference between food and waste, the baby albatross dies after eating it. I can't think of a greater tragedy.

Both of these dreadful stories are set in the sea, and most of the marine waste discussed above is plastic. (You are aware that plastic bags are also a type of plastic, yes?) What would it mean when there is so much plastic waste in the ocean?

Planet earth crowded with plastic waste

Plastic is a truly fascinating material. It makes us whatever we want. When we complain that *a bowl made of iron is too heavy* or that *paper bags are no use because they tear easily when wet*, plastic made a grand entrance. People no longer had to worry about rusting or breaking

when using plastic-made products, unlike products made with iron or aluminum. They even seldom or never break into pieces. Aren't they just the best troubleshooter?

The more people crazed over plastic, the faster it made dazzling technological improvements. About 8.8 billion tons of plastics were aggressively made for 65 years from 1950 to 2015. Its weight is equivalent to about one billion elephants or 2,500 102-story Empire State Buildings in the United States. Isn't that crazy? Within 65 years, plastic use has increased nearly 200 times compared to its beginning. About half of the plastics made so far have been used only after 2000. Plastic usage only spread widely from beverage bottles to packaging, mobile phones, and construction materials.

However, the brighter the sun the darker the shadows. Then what would be the shadow of plastics? It takes ages for plastics to decompose in nature. Its longevity, the plastic's greatest strength, became an existential threat to planetary health. The reason plastic cannot be decomposed is that there is no material to degrade plastic in nature. Have you ever seen mushrooms on a tree in a forest? Mushrooms act as decomposers that help trees to naturally break down in nature. Unfortunately, no substance can act like mushrooms for plastics. That is why the only way to solve the problem of non-perishable plastics is to recycle the used plastics as much as possible. Then, out of all the plastics used over the past 65 years, how much of them were recycled? According

to research, about 6.3 million tonnes of plastics were produced worldwide by 2015. Of this, only 9% were recycled, 12% were incinerated, and 79% were thrown away.

If you look into the types of marine waste, fishery waste accounts for most of its proportion. Not only fish nets but fishing equipment such as buoys for fish farming was not properly collected and thrown away as waste. Moreover, waste generated on land was thrown into the ocean, landfilled waste was poorly managed, and some waste flowed into the sea due to natural disasters such as floods. Even if the waste is properly buried underground, it could still wash away by rain.

Have you ever heard about a pile of waste, that is 7 times the size of the Korean Peninsula, in the middle of the Pacific Ocean? This is called the ocean gyre. It is a large system of rotating ocean currents, that draws in the waste we release and increases the concentration of waste in some areas. That is how the Great Pacific garbage patch was created. Come to think of it, I wonder how the plastic bag was found in the trench. Plastics are supposed to float in the water due to their lightweight. How did they end up over 10,000 meters deep down in the sea? There are several hypotheses for this, and the most plausible one is that algae got stuck in the plastic and led it to sink to the bottom of the ocean with other debris. Since it happened in the sea, it will take some time to find out what happened exactly.

Low prices and convenience are the problems

I once took a walk around my neighborhood's hill and collected hips of trash. The trash collecting began by noticing disposable paper cups, plastic cups, and plastic containers lying around on a rock in the middle of the trekking course. It seemed as if the people had left for a while to come back later. I frowned and finally came down the hill with the trash in my hand. Then, suddenly, a thought came up. Would the people have thrown the cups and containers away like this if they were expensive? The same goes for water bottles that become garbage as soon as one is done drinking. They were bottles with clean water and are in relatively good shape. So every time I see bottles being thrown in trash bins, I think 'what a waste!' Nonetheless, people would use them for a short while and throw them away because they are inexpensive. With that being said, I have a good idea to solve the plastic waste problem at a single bound: raising the price of plastics. How does it sound? No? Yeah, true, you are actually right. Plastic is a by-product of refining crude oil. So you can't just raise the price by ignoring its original price. You can't also ignore the fact that plastic is often linked to hygiene and health issues.

Oceans worldwide are full of garbage, as the statistics state that a lot of garbage is either landfilled or dumped in rivers and oceans. According to European Union (EU)'s statistics, more than 80% of marine waste comes from the land, and most of it is plastics. In the <Foresight Future of the Sea Report> published in 2018 by the British Government

Office of Science and Technology, the cumulative amount of plastic in the oceans in 2015 weigh about 50 million tons, and by 205, the amount will triple in 10 years with 150 million ton by 2025. Even the polar regions are not free from plastic pollution. In early 2018, microplastics were found in the snow and seawater that Greenpeace analyzed.

Have you ever heard of the term, microplastic? It means an extremely small piece of plastic debris less than 5 millimeters in size, usually under 200 micrometers. That is why it cannot be seen with the naked eye. It is appalling that such microplastics are found even in the polar regions. This could mean that almost all oceans are polluted with microplastics.

Countries that understand the seriousness of the plastic waste problem in the oceans are trying to reduce their use of plastic. The United Kingdom began to sell plastic bags, which are fatal to the marine ecosystem, and imposed a deposit on plastics, glass bottles, and cans. California, the United States, is also making efforts with the Zero Waste challenge. If you look at the number of used plastic bags in major countries of the European Union, as of 2010, Greece used 250 bags per year. Following Spain with 120, Germany with 70, Ireland with 20, and Finland with four bags. In addition to these countries, several countries in Asia and Africa have also implemented plans to reduce plastic bags by having people pay fines or deposits for using plastic bags. The research showed that, as of 2015, one person in South Korea used 420 plastic

bags per year. It looks like we must reduce the number of plastics as much as possible!

Today’s dinner menu: microplastic stuffed grilled fish

Microplastic has been used in cosmetics and toothpaste to remove dead skin and tartar. But many countries, including Korea, have now banned its use. But the problem is still there. According to research done in 2018 by Friends of the Earth, 19,000 tons of microplastics were released from automobile tires every year in the UK and poured down the water channels. Paint shavings from building walls and roads, and synthetic fibers from washing clothes have also ended up in oceans as microplastics. It means that you are polluting the ocean with microplastics just by doing the laundry.

Microplastics are so tiny that they are not filtered by sewage treatment plants and travel through rivers to the sea. A large piece of plastic floating in the sea can be broken down into microplastics by intense sunlight, salinity, and ocean waves. These are what zooplanktons feed on. This can be proven with microplastics found in plankton’s bodies. What will then happen next? Small fish will eat zooplankton that ate microplastics, bigger fish will eat that small fish, and so on. Ultimately, microplastics will end up in our bodies. What did you say? You are fine because you are not a big fan of fish? Then what about salt? I am sure there are not many people who can live without salt. There were even

microplastics found in salt. I was shocked when I heard the news that microplastics were detected in every salt field in Korea. Another research showed that there were microplastics detected in several world-famous bottled water products. Shortly after the research publication, the World Health Organization (WHO) announced that it will review the potential dangers of microplastics in water bottles. The plastics we threw away have spun around to return to us.

Nobody knows exactly how microplastics will harm us once they enter our bodies. There are only a few speculations. Some microplastics may contain endocrine-disturbing chemicals bisphenol A or polychlorobiphenyl (PCB). They also absorb and concentrate toxic chemicals. This means that microplastics can concentrate toxins in our bodies as well. It is known that microplastics with a size of 150 micrometers and more excreted without being absorbed in a body. The problem is when they are less than 150 micrometers. Although the probability is low, you cannot completely rule out the possibility of microplastics being absorbed into a body through the lymphatic system. Some scientists have raised the possibility of nano-sized microplastics blocking blood vessels. There is also another possibility of pathogenic bacteria spreading in the cracks or surfaces of microplastics that entered a body. The microplastic problem is worrisome because of how all of these possibilities will cause problems. Using plastics is convenient. But, it is horrifying to know that plastic waste will be there worldwide,

including in oceans, our bodies, and other living forms for a very long time.

Let us return plastics to where they belong

Do you happen to remember the Plastic Waste Crisis in 2018? There is a company that collects recyclable wastes from households. Then suddenly, companies in Seoul and other areas refused to collect plastic waste. The problem began when China no longer accepted waste from other countries. This was when many people found out that Korea has been exporting waste to China. Korea is not alone in exporting waste. Most of the developed countries around the world export a significant portion of their waste to several countries, including China. But, when China banned the waste import, domestic companies refused to collect waste since they could neither export nor recycle them.

Why can’t we dispose of recyclable waste in Korea? First off, there is not enough space. But there is something more important than that. How do you throw away a PET bottle? Do you just throw it in the plastic recycling bin? That is not the ideal way to separate and put out recyclable waste. When you are throwing away a PET bottle, you should remove the label, flatten it, and separately dispose of the lid and the bottle. You must separate the lid from the bottle. This is because the material used to make the lid is different from the material used to make the bottle. However, there is a possibility of a lid following down the rivers and the ocean due to its small size and lightweight. Therefore, flattening the

bottle and closing the top with its lid, would not be exemplary, but would be the best way to recycle a PET bottle.

if various types of plastics are thrown away in one place, the company that collects the plastics must separate them one by one. It will, of course, cost a lot, including the labor fee. That is why proper separation is not easy, making it more difficult to recycle. That is why we export to countries where labor cost is cheap. It is, therefore, necessary to properly throw away waste. So much for throwing away a water bottle, right? True. It is bothering and troublesome work. But I believe it is very important to have a sense of responsibility for the water bottle we used. We did produce nonstop and enjoy the convenience of non-perishable plastics. So, shouldn't we also take responsibility as well?

Of course, the plastic waste problem cannot be solved by an individual effort of using less and separating plastics. Along with an individual's awareness of the issue, the wisdom of corporations and administrative authorities must be gathered. First thing is to use recycled raw materials when making a product and build a waste collecting and recycling system. When doing so, if we use the same raw materials to make a product we wouldn't have to be bothered with the separation before disposal. The government must make policies for companies to make such products and heed monitoring and supervising them. Companies should make products that are easy to recycle.

NGOs and environmental activists are also working hard to solve this problem. I have mentioned above how many countries suffered from China's plastic import ban in 2018. At this time, environmental activists around the world started a Plastic Attack campaign. It literally means attacking plastic usage, and the campaigners would strip all the plastic packaging from the food they have purchased after the checkout. The movement began in the UK and spread to different parts of Europe and of the world. On July 1st of the same year in Korea, citizens, and environmental activists gathered in front of a supermarket and shouted, "We do not want to buy garbage!" They argued why shoppers need to buy plastic waste when buying vegetables. It is also important for consumers to raise their voices and call customer service to reduce the overpackaging of products.

There is a similar campaign in the Mangwon market in Korea, called the Almang@Project. As you can tell from its name, the campaign aims to sell and buy only the *almang* (product) so that there is no packaging waste such as plastic bags. Although there were challenges to not only the sellers but also the buyers, this movement spread little by little. More and more stores are lending shopping bags and welcoming customers who bring their carry-out containers. It also launched a local currency called the Moa, made from plastic bottle caps. I think it is a very clever idea to give out local currency to the people who are shopping at the Mangwon market without plastic bags and have them use the collected currency like cash within the market.

There are also creative attempts to reduce microplastic emissions in our daily lives. There is a product for the laundry, called the Cora Ball in the United States. If you put this in a washing machine with your laundry, it can pick up a great number of synthetic textile microfibers and prevent microplastics from flowing into the ocean. There is a similar product in Germany. It is a washbag called the Guppy Friend. Putting the laundry in the bag before the wash will minimize the damage to the clothes, causing fewer synthetic textile microfibers. You can also separately collect and throw away the microfibers that have been shed.

There are many ways an individual can put it into practice. Now the drinks are served in recyclable containers instead of disposable cups inside cafes. We can take a step further and bring our tumblers instead of asking for disposable cups and straws. If you absolutely need a straw, there is a stainless steel or silicone straws as your options. It can be burdensome at first. You might often forget to bring it with you around. I would also forget to bring a handkerchief with me before I made it to my habit. Make sure to encourage yourself by saying, ‘there is always tomorrow,’ on the days you forget to bring a reusable straw with you. Changing one by one, instead of all at once.

Civilization will collapse if we do not change the line structure, of throwing the resources from our planet after using them once, to a cyclic

structure. Nobody can dispute the need to reduce or recycle waste to prevent such an outcome.

Reflecting on one's consumption is also important. Shall we reflect on ourselves who are dragged into the system that urges constant consumption? We can also ask ourselves, *is this really necessary*, before buying anything. If you think of the consequences to suffer for the fleeting moment of convenience, you might find yourself carrying a tumbler around instead of buying plastic bottled water. You never know, if the number of people carrying around tumblers increases, drinking fountains might show up around streets like in California and other states in the US where they banned bottled water and installed water fountains instead in public events.

I believe the world can change with the constant demands of citizens. There is a saying, *one behaves as one believes*. That is because one does as one believes!

Chapter 5 Cell Phones and Electronic Waste

The World's Loneliest Electronic Graveyard

Where do electronic wastes go?

Do you remember how many times you changed your phone so far? I noticed only a couple of people have an answer to this question. I guess others have lost count. So, why the heck do we change our phones so often? We don't throw away our good refrigerators to replace them with new ones just because the latest released model has a single update. Contrastingly, we get this urge to change our phones when new ones come out, or when we face fixable technical problems. Despite its high cost, a cell phone is a very private device compared to other electronics, which lets us not only communicate but also connect with the entire world. Not to mention that there is no better toy to keep ourselves busy when we are not with our friends.

How wonderful would it be if a cell phone only had good qualities? What do you think would be the downside of a cell phone? If you ask your parents, they would say how much it distracts students from studying. My answer is the waste problem. Nowadays, younger kids are getting cell phones, even the ones in elementary schools. This also means that the number of cellphone users has increased. But at the same time, the lifespans of electronic devices shortened. Electronics are making astonishing advancements and never-existed-before devices are being invented. That means more electronics are being thrown at a faster speed. One would expect cutting-edge technology would bring a longer lifespan but it is the opposite. That is how piles of e-waste grow higher.

Electronic waste isn't actually the official term. The official name is the waste electrical and electronic equipment (WEEE), e-waste or e-scrap for short. The term is to refer to discarded electronics such as cell phones, computers, tablet PCs, and televisions after the end of their useful lives or to replace them with a new model. The amount of e-waste generated in Korea increased by 26% in five years from 190,000 tons in 2010 to 240,000 tons in 2015. Then where would all the e-waste, including cell phones, we throw away would go?

There is an *electric waste graveyard* in Guiyu, Guangdong Province, China. Not food or plastic, but wastes of electronics! Here, e-wastes are piled up like mountains. The place is also called the *e-waste's blackhole* for sucking up almost all of the electronic waste in the world, and 80% of the e-waste in Guiyu is actually imported from overseas.

E-waste from every corner of the world is gathered not only in Guiyu, but also in other poor villages in Africa, China, and India like Zhejiang Province. 'Poverty' is what led to these graveyards. Local residents would handle these e-scraps covered with chemicals, without any safeguards, to get parts and raw materials from the wastes. This causes air, land, and river pollution, and the workers inhale harmful gas and stink over polluted rivers. They even have to buy water because there's not enough clean water to drink.

So, why did China import so much waste? After the 1980s, the Chinese government actively imported recyclable solid waste from other countries as a solution to the resource shortage. As a result, it has become the world's largest 'garbage importing giant.' China imported 7.3 million tonnes of plastic waste in 2016, which accounts for about 56% of the world's recycled waste. Apparently, the imported solid waste greatly contributed to the development of China's manufacturing industry. Meaning that the waste brought from Japan and the United States backed up Chinese industries. For example, beverage cans imported from the United States were processed into clothing textiles or metals for machine manufacturers in China. Discarded papers imported from the United States were made into wrapping papers and exported back to the U.S. Reusing plastic wastes to make new plastics save up to 87% of the energy needed. Imported solid waste (paper, plastic, metal, etc.) for the past ten years weighed more than 500 million tons, with an annual import volume of 50 million tons. But there is one thing that the Chinese government missed out on; the environment. It established rapid industrialization. But at the same time, it was stigmatized as 'the largest garbage-importing giant' and left fatal damage to its people's health and ecological environment. China decided to phase out the waste import in 2018 to prevent further environmental damage and people's health deterioration. But China realized the crisis far too late. Behind the Chinese government's decisions, there lies a documentary film named <Plastic China> directed by Jiu-Liang Wang. Director Wang argued that setting waste as the subject of trade was the underlying problem. He also

claimed that treating waste in the regions where it was generated is more of an ethical or moral issue, than an environmental issue.

Will China's electronic waste graveyard disappear, given the waste import restrictions? The waste will at least reduce since the Chinese government instituted policies. However, that does not mean the e-waste heading to China will vanish altogether. The waste still goes to poor countries; to developing countries such as Ghana, India, Malaysia, Nigeria, Pakistan, Philippines, and Vietnam.

Convenience for the rich and damage for the poor

Why do some countries send waste to others? There are a number of reasons. But basically, it is because modern society has a consumption structure that consists of mass production and mass waste generation. E-waste, in particular, is on the rise with the consumption increase in cell phones, computers, tablet PCs, etc. According to the UN University data, the amount of e-waste thrown out worldwide was 41.8 million tons in 2014 and is predicted to increase to 50 million tons in 2018. E-waste contains a lot of toxic substances. Since these substances cannot be disposed of anywhere due to their strict disposal regulations, the amount of waste only continues to increase. That is why every country is struggling with the electronic waste disposal problem and looking for a country where the regulations are relatively loose. And poor countries would welcome the e-waste because they can obtain resources from the electronics and worry less about the comparatively low recycling cost.

This sounds like a good plan in terms of recycling e-waste. However, this can become a problem because we cannot protect the ecosystem, such as humans and land, from the toxic substances in the e-waste. For example, developed countries use heat collected from incinerating plastic waste as energy. On the other hand, developing countries illegally incinerate waste because they do not have enough proper incineration facilities. Of course, it goes without saying that the environment will be polluted with harmful gasses from careless plastic burning. However, it seems like environmental issues are always laid aside when people are eking out a living. Do you now understand why e-waste is heading to poor regions of developing countries?

Is the production process safe, considering so many toxic substances in e-waste? According to the data released by the Korea Occupational Safety and Health Agency (KOSHA) in 2012, there are about 131 chemical substances that workers in semiconductor factories may be exposed to. Of these, 21 substances are cancer-causing agents and 28 substances have reproduction-toxicities. There are eleven semiconductor manufacturing factories in Korea that use 216 ± 125 chemicals on average. There have been more than thirty cases in which workers at semiconductor factories died of leukemia. Nonetheless, the companies repeatedly argued that the working environment is not the cause of the disease because the semiconductor industry is safer than any other industry. Are they really free of responsibility, even though the workers who worked in places with poor ventilation facilities, let alone proper

safety training, suffered from the same disease? There was also the case where a man in his 30s, who worked for a subcontractor that made parts for cell phones, lost his eyesight. It was because of the methanol used to smooth the surface. One has to be extra careful when handling methanol because it is highly toxic, but the worker worked without any personal protective equipment (PPE).

According to Labor Health, there was a total of six workers lost their eyesight due to methanol while working at a cell phone parts factory. It is disheartening that some people are losing their eyesight, or even their lives, to make others' lives easier. It makes us look back at how lightly we considered replacing our cell phones. We hear about human-related sacrifices, but how many more will be out there that we do not know of?

Reasons for keep buying new stuff

When I was a kid, there was an electronic store in every neighborhood. People usually took them to these electronic stores when home appliances broke down. The electronic stores' owners collected the parts from discarded home appliances and used them to repair the broken ones. Sometimes they sold the repaired appliances secondhand. The place was sort of like a recycling station at the time. When the store owners gained enough experience and skills, they would use parts from different manufacturing companies to fix broken appliances. If you find a place that repairs exceptionally well among the stores, it is as if you have

run into Gandalf. But, large corporations' service centers replaced the small electronic stores as the electronics varied, grew in size, and quickly changed trends. This was the beginning of the new era of paying money for convenience. A repairman would visit your home to fix your broken electronics over one phone call. There was also the disadvantage of repairing the broken electronics only with the parts made by their companies. If the company no longer produced a certain type of model, it was difficult to acquire the parts. Sometimes it was much better to buy a new product than to fix the broken one. Since now there are stores next to the service centers, one could easily get tempted to buy a new product if even he or she was there to fix their appliances in the first place.

I believe making things last longer is better than recycling. But why do we upgrade our phones so often? There might be companies' schemes behind this. For some reason, cell phones seem to cause problems at the end of the contract period. That is why one cannot help but question the way they are designed to cause minor problems at appropriate times.

A company needs to sell products consistently but it would be troublesome if the products never break or can be used for a long time just by replacing one or two parts. So companies come up with a solution to keep releasing new models and no longer producing the old ones. In that way, it would be difficult or even impossible for users to acquire parts. Even if users found the parts, they would have no choice but to

give up on the repair due to the high price. A more certain option would be to design the product in the first place so that users would have no choice but to change it after a certain period of time. This is called *planned obsolescence*, a type of sales strategy.

Planned obsolescence is a term first used in business administration to describe a deliberate action to artificially limit lifespan and purposely frail design to generate long-term sales volumes. There are three main types of planned obsolescence. The first one is systemic obsolescence, which is making the continuous use of the existing product difficult. Like how digital television has replaced analog television. The second is perceived obsolescence. This type of obsolescence occurs by companies using ads to tell their users that 'the products they are using are outdated or no longer fashionable.' It also occurs when companies create trends by changing designs but keeping the same functions. I am sure the perceived obsolescence is one reason why we repeatedly upgrade our cell phones. Last but not least, programmed obsolescence occurs by companies deliberately disabling a functional product to prevent it from working at a certain point. Purposefully limiting a product's useful life leads to its shortened lifespan even though the technology is being developed day by day.

Apparently nylon stockings made by Du Pont in the 19420s were strong enough to pull a car and they never came loose. But there are no such stockings these days because people will rarely buy stockings. There

are too many examples like this one. Companies' policy to maximize profits by selling more left humanity with the task of waste treatment and resource waste problems.

I also believe that freeing consumers from disposal problems, by taking away broken home appliances, led them to forget about the waste problem. If disposing of products was problematic, they would think twice before buying anything. Furthermore, size enlargement is also causing a problem. People would think "bigger the better," even when buying things they don't necessarily need.

Korea's per capita electricity consumption increased more than fivefold during the 25 years from 1989 to 2014. I believe the size enlargement and diversification of home appliances are surely related. According to <Sapiens> by Yuval Harari, the world's energy consumption per day increased 115 times over the past 500 years, from 13 trillion calories to 150 trillion calories, while its population only increased 14-fold, from 500 million to 7 billion. The population is growing but energy consumption is increasing at an explosive rate. How long do you think we can use resources? How many people do you think will consider the finiteness of resources while consuming goods? Native Americans made decisions on behalf of the seven generations coming. When will we even think of the 'next'?

Recycling resources already in use

In 2016, Samsung Galaxy became the center of world news. Twice Its cell phone was the issue. At first, it was praised as 'the best phone by Android.' It featured new functions, including the iris recognition system for the first time in history. However, within five days after the product release, more than 100 users reported their phone explosions. The phone even exploded inside a plane that was about to take off. It received massive numbers of recalls. 54 days after its release, it announced its plan to go off steam. At the time, about 4.3 million cell phones were made, which weighed about 730 tons. The company said it would destroy all recalled cell phones. Cell phones weighing 730 tons contain around 100 kilograms of gold, one ton of silver, and more than one ton of tungsten. Nonetheless, Samsung was willing to throw them all away. Environmental organizations argued that they should be recycled rather than discarded. They also claimed that companies are responsible for ethically consuming rare minerals and the mass disposal will yield environmental pollution. Ultimately, Samsung released refurbished products with only new batteries. What a relief!

Then where do all the cell phones and electronic devices we throw away go, and in what condition? How many resources will there be in the discarded electronics? Since the surrounding ecosystem paid the price while we exploited natural resources, recycling would be a better option than wasting them away.

Do you happen to have an unused cell phone inside your desk drawer? I believe now is the time to give your old cell phone a chance to go out in the world again. Old cell phones contain more than 16 types of rare metals including gold, silver, and palladium. Wouldn't it be a waste to keep such a rare metal inside a drawer?

As of 2018, nearly two billion cell phones are produced worldwide every year. About 14 million cell phones are being thrown away annually in Korea, as of 2009. Out of these, three million are collected for recycling and eleven million are either discarded or hidden inside desk drawers. If we waste resources like this, we will fall into a vicious cycle of sucking out natural resources to make new products, consuming energy, and generating waste. The ecosystem is also severely polluted in the process of mining and refining resources. One can extract 200~400 grams of gold from one ton of discarded cell phones. But he or she can only extract five grams of gold by mining one ton of gold ores. This means that collecting gold from cell phones has higher payability than mining gold ores. Not recycling cell phones can also pollute soil because there are metals with hazardous substances in cell phones such as arsenic and lead.

So there is now one thing we can do to reduce e-wastes and to make a safer world from harmful substances: recycling discarded cell phones lying around in our homes. Post offices collect discarded cell phones for them to the Seoul Resource Center. The center collects

needed metals and recycles them. It even donates profits made to local communities and charities.

The Seoul Metropolitan Government adopted the *Urban Mining Project*. Mines in the city? Some of you might wonder what's going on. It is a recycling project to extract valuable metals such as gold, silver, and copper from home appliances including old cell phones and PCs. The *mining* part of the name comes from the project's activities to mine resources. The project also collects old cell phones from home appliance companies. It collects cell phones, sends them to recycling centers, and sells valuable parts to support the underprivileged. Isn't it neat how the project both circulates resources and helps its neighbors?

I mentioned earlier how it is best to extend the product lifespan before moving on to the recycling phase. Have you ever asked yourself the following questions? Why can't we fix the broken electronics ourselves? Why do we have to go to the service center to have them repaired? Wouldn't we be able to reduce the number of e-waste and avoid the hassle of waiting in a long line at service centers if the local electronic shops sold the parts? Actually, there are people who ask themselves such questions. More people in Europe and the United States are demanding the users' rights to repair their electronics. They have no problem with recycling, but they would first create a self-repairing system to extend the product's lifespan. They are claiming that the e-waste is piling up because the law only allows the manufacturers to repair the

electronics. The European Commission announced the establishment of a 'right to repair,' forcing manufacturers to make their products last longer and easier to repair in January 2019. Product users, repair experts organizations, different civic groups, and legal experts worked together to pass this bill.

Reducing e-waste depends on all of us

Techniques to reduce cars' exhausts and to defrost freezers are helpful. They are the welcome ones. However, we do need to double-think about a consumption-triggering structure that creates unnecessary needs.

The world is constantly creating needs for all of us. Eye-catching ads wherever we go play a critical role in instigating consumption. These ads make our belongings look old and outdated by persistently exposing new items to consumers. This type of production is problematic in a world where resources and places to discard waste are limited. I believe citizens need to pressure companies with overproduction.

Like every other problem, an action of an individual isn't enough. Governments must create systems to reduce waste and companies should follow them. There is actually a system to recycle electronic waste. It is called Extended Producer Responsibility (EPR), which means that the producers are responsible for the disposal and recycling of their goods. Responsibility indicates sharing costs. There is also the Waste

Charge System. It aims to prevent resource waste by controlling debris generation from the production stage. The manufacturer or importer shares the cost of waste disposal for the products, materials, and containers that contain a hazardous or toxic substance. Or the products, materials, and containers that are difficult to recycle or can cause waste management problems. That is one way to prevent resource waste and control debris generation from the production stage.

It is also a good idea to make the goods easy to recycle from the very beginning. To recycle waste, it has to be decomposed. So if a product is made to easily decompose or with only a few materials, less energy and effort will be needed in recycling.

In <The Long Emergency> by James Howard Kunstler, there is a quote, “The temptations of the oil and natural gas were so strong that we no longer noticed the true qualities of those miraculous gifts of nature. They were oblivious to how the resources were finite, unrenewable, and unevenly distributed.”

Let’s send our old cell phone to the post office. This little action can be the beginning of bringing awareness to others!

Chapter 6 Fast Fashion and the Laborers

Wearing the labor workers’ tear

They are sold out, but you can still buy them?

The term *wanpan-nyeo or wanpan-nam* is used in South Korea to refer to celebrities who have caused products to sell out by wearing or using them in a movie or TV series. *Wanpan* means that the entire amount of a product has been sold. So it shouldn't be available anymore; however, that is not true. The term is used to attract more attention to the goods and promote consumption sentiment. It is also a reflection of the consumer-oriented and trend-swept society we live in today. We are embarrassed by running into a person holding the same bag as us on a metro, or on a street, but why are we so keen to look like others? What do you think is behind this mindset? I believe it is fear. Fear of missing out. You can also feel deprived relatively for not having the clothes or items that everyone seems to have. We were born to live accordingly to our unique characteristics. So why do we constantly compare ourselves to other people? We can also relate this to the rat race in which we are all caught up in modern society.

Nonetheless, no matter how trendy clothing is, even if one wants to own it and try it on, he or she won't be able to afford it if it's too expensive. Then there come the cheaply-priced clothing brands for anyone to buy. These brands are called fast fashion. Fast fashion immediately reflects trends to produce clothes and distribute them at a fast pace. As the industry's trend changes at an even faster pace, we now hear the term, *ultra-fast* fashion. Zara from Spain, H&M from Sweden, and UNIQLO from Japan are typical examples of fast fashion. There's one

more thing these brands care about as much as the fast speed in designing and making clothes to keep up with the fashion- the price. Fast fashion clothing is fairly cheap, making it easier for consumers to open their wallets. I even saw T-shirts cheaper than a sandwich or even a cup of coffee. How can these brands keep making clothes in a variety of designs so quickly under such a low price? And is a low price always a good idea?

Are skinny jeans *really* comfortable?

<Taming of the Skinny Jeans> (Kim Jungmi and others, Prooni Books, 2014) is a collection of short stories written by teenage authors. In the <Taming of the Skinny Jeans>, the main character, Songhui Lee receives a pair of pink skinny jeans from her boyfriend as a gift. The jeans were the smallest size. So the plump Songhui goes on a hardcore weight loss to fit herself into the jeans. But the jeans do not help Songhui out. She has to even lie down on her bed to squeeze her legs into the jeans. As soon as she thought she got both legs shoved in, the jeans ripped. When Songhui sees her thigh peeking out from the ripped jeans, the author writes it was as if the thigh was saying "Finally! I can catch a breath!" I laughed so hard when I read the sentence because it reminded me of the times when I thought "how uncomfortable they must be" whenever I saw people in skinny jeans. As Songhui tried to fit herself into the skinny jeans, she wondered whether she was being tamed by them.

Do you own a pair of skinny jeans? I wonder how you feel whenever you wear those jeans. Apparently, they are the go-to denim option to look skinnier. But that's what others see. How do *you* feel when you wear them? Don't they feel uncomfortable as they fit snugly against your legs? Do you still wear them because you put other people's opinions before your comfort? Or because of your self-satisfaction?

Tight-sized clothes have led to commercial fad diets. "Fitting ourselves into small-sized clothes" would be the right way to put it since fast fashion brands retail clothes in small sizes. As Songhui said, the clothes are the ones taming us humans not the other way around. What do you think? Do you think we should be wearing clothes that fit our sizes or fit our sizes to the clothes? Unlike in the past when people made clothes by measuring their body size, we are drawn to the fashion led by the brands and fit ourselves into the sizes they tell us to fit into. The expression, ultra-fast fashion, tells us how quickly these brands are leading and changing new trends. What do you think is the secret to quickly retailing cheap clothes?

Tears of laborers hidden behind the price tags

Clothes also have their origins. You can tell where the clothes are from by checking their labels on the back or the bottom on the left seam of a shirt. On the labels, it is either written Made in China, India, or Cambodia. Same reason why there were so many clothes with Made in

Korea labels in the past when the country was an export-led economic growth. The clothing factories have now moved to underdeveloped countries with lower labor costs. This means that the cheap laborers are behind the cheaply-priced, trendy clothes.

This reminds me of Bangladesh's Rana Plaza factory collapse. The building housed several separate fast fashion apparel (aka. SPA) factories, such as Benetton, Zara, and Mango. The collapse caused about 1138 deaths and 2500 non-fatal injuries of the laborers. What's even worse is that cracks were discovered in the building the day before the accident. The shops and the banks in the building were closed. But the garment workers were ordered to return to work. That is how they faced the disaster. Most of the victims were women. Their monthly salary was $38, earning barely more than a dollar per day. When the Swedish environmental activists learned about the laborers' poor working conditions and low wages, they demanded to improve the labor conditions by shouting to 'never wear clothes sewed with blood' and 'pay more for clothes' to H&M. H&M was not one of the brands housed in the building. Nonetheless, since it was one of the leading fast fashion giants, it wasn't free from the blame. I don't think much has changed in terms of labor conditions ever since.

A book titled <Modeslavar> was released in Sweden to uncover the ugly truths of the fashion slaves working for H&M. According to the book, a 14-year-old child toiled for more than 12 hours a day in one of the H&M

factories in Myanmar. H&M explained that it did not violate international labor law. However, the International Labor Organization (ILO) stated that exposing underage children to hard labor violates international labor law. ILO also argued that working overtime until late at night is another matter. It also H&M is not the only one with the problem when it comes to child labor. All corporations that want cheaper labor are going through the same problem.

Cheap prices will not be as welcoming as they used to be once we found out that the clothes we easily wear and throw away are the hard-won clothes made by young children. Cheap clothes meant there are hidden tears behind the price tags. So what should we do about it? To be honest, there is not much we can do. It isn't easy to say that we will no longer wear cheap clothes. Just because we want to wear clothes that went through a fair process, we cannot buy them if they don't sell them. So companies treating their workers fairly would be the first step. To do this, the government must create a system that guarantees workers' labor rights and manage and monitor companies. It is also very important to guarantee a workers' minimum wage. There was also the opposite force that fought against introducing the minimum wage system to South Korea because companies wanted to make maximum profits with minimum investment. I cannot help but bring out the word 'distribution.' A society without equal distribution cannot yield a sound society. Wearing clothes, seems like, is linked to labor and distribution.

Environmental Pollution leans toward the vulnerable

A large dam called the Orathuppalayam blocks the Noyyal River located in the southern Indian state of Tamil Nadu. If you look closely at the dam, you will notice a dry, reddish land. There are also greenish bubbles floating on the water of the Noyyal River like the algae bloom that spread in the wake of the Four Major Rivers Restoration Project in South Korea. About 32 km west of the Noyyal River is Tiruppur, the city with the world's largest apparel industry. Toxic wastewater from these garment factories has polluted the Noyyal River. The Buriganaga River in Dhaka, Bangladesh, and the Mekong River in Cambodia have also been extremely polluted. People cannot farm in the river basins and are at risk of serious illness from drinking contaminated water.

Greenpeace, an international environmental organization, states that about 7,000L of water is needed to make one pair of jeans and about 2,700L to make one T-shirt. Can you imagine using up 7,000L of water at once? The report on water supply released by the Ministry of Environment states that, as of 2016, the average person uses 287L of water per day in South Korea. 287L equals 143 bottles of 2L water bottles. So if you calculate the amount of water a family of four uses, that's 1148L a day. This means that the amount of water a family of four uses for six days is needed to make a pair of jeans. Did that draw a picture for you?

Moreover, a lot of contamination occurs as the manufacturers go through *washing* to give a more old-fashioned feature to the jeans. The

method includes tearing, scratching, heating, and boiling the denim fabric. Naturally, a lot of chemicals, electricity, minerals, and water required in the process release pollutants. The process also needs to be done by hand. So it is beyond my imagination to estimate the amount of harm that is done to the workers.

It is not just about jeans. Various designs require dyeing that leads to more water and more pollutants. That is why the United States outsourced its clothing production to factories in Asia for the past 20 years. Remember that all the labels I mentioned above had Asian countries written on them? American Apparel & Footwear Association(AAFA) states that 97% of clothes sold in the United States in 2012 were made overseas. Americans are enjoying the pleasure of buying cheaply-priced clothes while the laborers in garment factories are enduring the pain of pollution. Doesn’t that sound a tad unfair?

Outrageous ways to throw away clothes

Not only the process of making clothes, but discarded clothes are another cause of environmental pollution. Clothes are on display for only about two weeks and move to outlets to be sold at lower prices. If there are still leftover unsold clothing items, they are either buried under the ground or incinerated. As of 2016, 7,500 tons of clothes are being exported a year to Southeast Asia and Africa at around 500 won per kilogram. However, luxury brands do not even bother to sell at low prices

and immediately incinerate unsold clothes to retain their value. Burberry, Britain's largest luxury label well known for its trenchcoats (that cost about 2 million won per pair), destroyed about 42 billion won worth of clothes and cosmetics in 2017 alone. It is disheartening to witness no respect for the workforce and the resources put into producing them. This happens often to other brands, not only high-end brands. In 2017, 15 tons of H&M clothing were used as fuel instead of coal at the Vasteras power plant northwest of Stockholm, Sweden. According to H&M, only molded and lead-contaminated clothes were used for incineration. The ecosystem is destroyed by the constant creation of fashion and the Earth is polluted by burning and burying clothes that are not sold. What a vicious cycle!

The Ministry of Environment states that, as of 2016, the amount of clothing waste generated in Korea is 165.8 tons per day. That means more than 60,000 tons of clothes are thrown away every year, and most of these clothes are incinerated. Polyester, a petrochemical product, is the main ingredient in making clothes, and it takes about 11 billion liters of oil to produce polyester a year. That is why incineration or landfills inevitably emits greenhouse gas such as carbon dioxide and methane. It does not end with throwing a piece of clothing away; it is the beginning of another pollution. The tale tells that the colors of rivers near the garment factories in Southeast Asia and dyeing factories in China change according to the fashionable color of that year.

Clothes that determine people's lives

Clothes also impact people's lives. According to the International Cotton Advisory Committee, prices of cotton are rising due to its high demand in Asia, especially in Southeast Asia. Cotton, also known as golden fiber, is the key raw material in making textiles. Higher demands mean a higher price, and a higher price means more land to cultivate to meet the increased supply. However, the world's major cotton-producing countries are scaling down the land for cultivation due to water scarcity. You may all be well aware of the water-shortages problem due to an increased demand for water in intensive agricultural land since I have mentioned it before in the previous chapter about avocado farms.

People say cotton is an eco-friendly raw material. I wonder whether people will still think they are environmentally friendly when they learn about its growing process. There was incidents of local farmers around India committing suicide since the 1990s. 17,060 farmers took their own lives in 2006 alone and 4453 farmers (25% of the number of Indian farmer suicides) died in the mid-western town in India called Maharashtra. Why did the epicenter of cotton meet such a crisis? One direct reason is that they were in debt. If you look deeper into this reason, you will encounter words like, 'opening of the new trade market,' 'neoliberalism,' 'globalization,' and finally, the multinational conglomerate named Monsanto. Indian government opened its agricultural market ever since it became a member of the World Trade Organization(WTO) in 1995, and imported low-cost cotton from other countries. Naturally,

cotton prices in India collapsed. Then the Indian government advised the farmers to plant genetically modified seeds from the United States. At the same time, Monsanto, a major producer of genetically engineered crops, advertised that farmers will make a lot of money because no pesticides are needed if the farmers plant seeds bought from Monsanto. Cotton produced on a large scale in the United States and cotton produced directly by farmers in India is incomparable. That is why the local farmers bought genetically modified seeds from Monsanto instead of planting the native seeds in India. However, unlike what Monsanto argued, new seeds were too vulnerable to pests that farmers ended up spraying more agricultural pesticides.

Monsanto sells seeds and pesticides. It is a funny company that also sells pesticides to get rid of the pests from their expensive seeds, and stronger pesticides for pests that developed resistance to the pesticides they sold before. As more pesticides were needed, farmers' debt piled up. That is how the plagues of suicides resulted in India. All farmers wanted was to make a living, but they were unable to eke out a living.

These inconvenient truths behind accessible, cheap, and pretty clothes we easily wear and throw away are upsetting. Nevertheless, I believe it is a topic we must go through together.

Reimagining clothes

On February 8th, 2018, people piled garment waste on the first floor of one department store in London, England. It was part of an event to put clothes that people no longer wore in the collection box set by the department store. The event took place for a month but the box filled up a lot quicker than that. The event aimed to inform the problem of clothes over-production. Greenpeace is running a campaign under the title of 'Detox My Fashion' to reduce the negative impact of the garment industry on the environment. According to this campaign, there are alternatives to minimize pollutant emission rates. Laser or ozone washing the jeans for dyeing requires less water or chemicals and emits no pollutants. Why can't we spread this technology? Maybe due to low awareness of the seriousness of pollution or the technology existence.

It is a matter of wearing less attractive clothes that did not cause any pollution or stylish clothes that discharged wastewater. It is individual responsibility in the end, but society and government must take roles so people can choose according to their principles. Actions that constantly harm the environment must be regulated and education on the environment, labor, and lives regarding clothes need to be improved.

Isn't alarming to learn that wearing clothes can shed tears and cause pollution that damages our bodies and ecosystems? Ignorance is bliss but the price must be paid someday. Up until now, it was the pain of others and the burden that future generations had to take over. But will

become a current issue for you to tackle right away when you become an adult. This is the very reason why the environmental issue should not be overlooked.

To fix these problems in the fashion industry, sustainable fashion has emerged as the new keyword. This movement has introduced a recycling system to fashion. Adidas made running shoes and soccer uniforms with plastic waste found in the ocean. The brand Patagonia, known for its various environmental sustainability efforts, offered jumpers with 100% recycled geese and duck downs from worn-out cushions, pillows, and blankets. Plucking feathers of live geese to make jumpers were also going against animal rights. So it was a great idea to make a new one by collecting down from worn-out items. There was also a similar case in Korea. One fashion company switched to upcycling after incinerating unsold clothing inventory that was over three years. The company dismantled and reprocessed the unsold clothing into new apparel and accessories. Upcycling expanded the range of materials from industrial collections including materials from airbags and car seats to military collections including outdated military equipment. I think it is a good idea to design new clothes using existing materials rather than with new materials. There was a concern about whether such items would sell well due to people’s prejudices against waste. However, some brands are gaining popularity with their high-end strategy.

It is meaningful to get in hold of such information about these kinds of eco-friendly products and apply them to our everyday lives. But I believe it is more important to spread the word so that more people can get join the practice. Buzzing sustainable consumption instead of silent sustainable consumption! How does it sound?

It is very important to be aware of causing harm to the environment and the ecosystem with our daily actions and think of what and how to wear to load off the trouble. Will you choose to wear clothes that shed tears or clothes that paid a fair price? Will you choose to wear clothes that caused pollution, or clothes that went through the process to minimize pollution? Will you follow the trend, or highlight your unique charms? I believe you will make a smarter choice after having learned all processes of clothes production. Let us now reimagine our clothes!

Chapter 7 Chemicals Counterstrikes and Social Responsibility

Will we be able to meet again in 100 years?

What goes around comes around

Let’s say you enjoyed using a certain item because it was very convenient. What would you do if you can no longer use the item because it turned out to be made with hazardous elements? Wouldn’t you feel less comfortable using it? Things like this keep happening without us even realizing it. Let me tell you two stories related to this.

The first story is about a whale. In January 2016, a killer whale was found dead on the Isle of Tiree in Scotland, the United Kingdom. It was one of the nine resident pods in the UK. People were very fond of them and even gave the whale the name ‘Lulu.’ Lulu was already dead when it was found. An autopsy was performed to determine the exact cause of the death. The results were shocking because its body was filled with polychlorinated biphenyls (PCB). PCB is a representative persistent organic pollutant (POP) that has a high heat resistance and electrical insulation property. That is why it is widely used as a plasticizer and insulating oil for transformers, circuit breakers, and capacitors. This exact substance was found in Lulu’s body, at more than 100 times the level at which it is known to affect the health of marine mammals. Normally, the level that negatively affects the health of marine mammals is 9 mg/kg, but the level in Lulu’s body was 950 mg/kg. How did Lulu become so contaminated? Scientists believe that PCB contained wastes either flowed directly into the sea or by sewage systems through disposal or landfill. These substances went inside small marine animals with microplastics

and eventually contaminated the apex predators in the ocean, whales. I'm sure the toxins went again from the mother whale to her calves.

What's even more shocking is that polychlorinated biphenyl is a chemical that has been banned since the 1970s. But it was found, in large amounts, inside a whale's body in 2016. As you can tell from its name, PCB can hardly decompose in nature. That is why it can stay inside the bodies of animals and plants, causing problems such as immune system disruption or damage to the central nervous system. PCB was known as a global threat. For these reasons, the usage of PCBs was banned since the late 1970s. So Lulu's death, after nearly 50 years, showed how much people have neglected its seriousness.

There is a lesson we can learn from Lulu's death; once a dangerous substance goes around it will come around. That is why we must check whether a substance is dangerous or not before using it on a daily basis.

My second story is about eggs. Do you remember the 2017 Pesticides Eggs Contamination incident? It became an issue because the deadly dichlorodiphenyltrichloroethane (DDT) was confirmed to be contained in eggs. It was even found in viable eggs, which were thought to be safe because they were from chickens raised freely in the grass. The farmers did not use DDT. It was sprayed there a long time ago, so

the chickens ate the affected plants that grew there and laid DDT-contained eggs. DDT has been widely used as an insecticide in the United States since the 1940s because it is effective against pests that carry typhus and malaria. The World Health Organization (WHO) even encouraged the active use of DDT as a plan to eradicate malaria worldwide in 1955. People then began to use it as a pesticide. However, the harmfulness of DDT began to rise in the late 1950s. Public awareness was raised when Rachel Carson, an ecological activist, warned of the harmfulness of this chemical in her book <Silent Spring>. The title <Silent Spring> means that even when spring arrives, the world will become silent with no chirpings of birds or insects as they will disappear once the DDT is sprayed. Eventually, most countries banned the use of DDT in the 1970s.

However, the DDT eventually ended up on our dining tables as it remained on the ground for a very long time. Did the chemicals begin their counterattacks? What scares me even more is the people's responses. They began to look for safe eggs once they heard about the contaminated ones. Phone numbers of pesticide-free farms spread around quickly. The rest of the eggs were soon blocked and all the chickens that laid the contaminated eggs got killed. But does knowing the number of pesticide-free farms secure our food's safeness? Shouldn't the public be more bothered with the companies and supervisors producing, distributing, and selling the contaminated products?

Chemicals everywhere we go

Chemicals are everywhere in our lives. According to the Korea Petrochemical Industry Association(KPIA), 70% of the things we use today are petrochemicals. They include: parabens for preservatives, phthalates for softeners in soft plastic products such as children's toys and rubber mats, Trichloric acid for antibacterial substances in soaps and detergents, perfluorinated compounds (PFAS) for frying pan coatings, bisphenol A for receipts and other plastic containers, permethrin for insecticides or mosquito repellents, toluene for dyeing rugs and sofa cover fabrics, Polybrominated diphenyl ethers (PBDEs) for mattresses and cushions from catching fire. As you can see, most household items, from medicines to clothes, are made of chemicals.

That does not mean that all chemicals are artificial. Some of them come from nature. For example, the reason why people feel refreshed once they go into the forest is because of the antibacterial substance called phytoncide. It purifies the air, makes people feel relaxed and recreated, and benefits human health in general. Venoms found in snakes, bees, and blowfish are also chemicals from nature. However, any chemicals found in nature is in small quantities. That is why humans began to mass-produce artificial chemicals.

There is one substance that is notorious for being particularly detrimental to human health, out of all the artificial chemicals. It is an endocrine-disrupting chemical, also known as the EDC. Since EDC is used to make various products, it damages our bodies as we consume contaminated products or food.

Chemicals have been substantially embedded in our lives. That is why even though there have been reports on damages, we are not much aware of its riskiness. Though, even if one is aware, it is not easy for an individual to know the degree of its hazardousness. You can’t also ignore human’s tendency to believe TV commercials and ads, as if what's being said on television is true.

I like to describe chemicals as Dr. Jekyll and Mr. Hyde because chemicals did bring prosperity to mankind. Chemical fertilizers brought an increase in food production, and the development of petrochemicals yielded cheaper, stronger clothing and convenient plastic products. Medicines, such as penicillin and aspirin, were able to be mass-produced thanks to chemicals. Hence, humans overcame numerous diseases and extended their lifespans. There are now about 137 million types of chemicals registered, and human dependence on chemicals is expected to increase in the future.

Come to think of it, cosmetics are also chemicals!

To use or not to use, cosmetics

Why do you put on makeup? Everybody must have his or her reason. I heard one kid say she puts on makeup to fit in at school. Putting on makeup seems to now have become a culture among teenagers. Wearing makeup can cause acne. So one would put on more makeup to hide acne, which outbroke in the first place for putting on makeup. It is a vicious cycle. It is especially important to properly know the ingredients used to produce cosmetics because they consist of various chemicals. Apparently, chemicals are more harmful when it is applied to the skin than when it is consumed as food. Chemicals consumed as food are partially destroyed or excreted by various digestive fluids in organs. Meanwhile, there are no filters once chemicals are absorbed through the skin. So, I took a look at the ingredient lists to learn about them. But, soon gave up, after looking at the long list of ingredients written in tiny fonts. Does a person *really* need to know all of the ingredients listed in the labelings? Wouldn't it be better if companies made cosmetics only with ingredients that are sure of safety?

Chemicals in cosmetics also threaten creatures you wouldn't have expected. I read a news article saying sunscreens can kill coral reefs. Sunscreens contain chemical filters that absorb ultraviolet rays and metal filters that reflect sunlight, both invisible to our eyes. That is why our skin does not burn in the sun. So what would happen when we go under the sea with sunscreen on? The washed-off sunscreen will remain in the

seawater. According to a study published in 2015 by several research institutes and universities, even a 62ppt of oxybenzone can cause destructive effects on coral reefs. This means that even a single drop of oxybenzone in 16,250 tons of water can be harmful to coral reefs. Isn't it unbelievable?

Oxybenzone and Octinosate are the two precarious substances that have fatal effects on coral reefs. These two substances are not only the ingredients of sunscreens but also ingredients of shampoos, mascara, lipsticks, etc. Supposedly, Korea has sold and distributed over 22,000 makeup products with the above two substances since 2000. But the reason why sunscreen is specially mentioned is that it is the most used item on beaches. Oxybenzone and Octinosate cause albinism, which turns corals white and to die. They also disrupt endocrine systems, turning male fish and other mollusks into females.

Coral reefs are also home to many sea creatures. About 25% of all fish spend their childhood in coral reefs. That is why protecting coral reefs means protecting numerous marine animals.

The sun's ultraviolet (UV) light causes major damage to the skin. But I'm sure we can find a sunscreen that blocks UV rays without harming the coral reefs. There are two types of sunscreen, physical and chemical. Physical sunscreen sits on top of the skin to deflect the UV rays so it gives a white cast. On the other hand, well-absorbing chemical

sunscreen contains the previously mentioned chemicals; oxybenzone and Octinosate. How are you supposed to know all these when buying sunscreen? Don't you worry! *Seesun.net*, a website created by an environmental group, has all the information you need. All you need to do is type the name of a cosmetic product. It will immediately tell you what ingredients are in it. The name 'seesun(시선)' means to *see* the *sunscreen's* ingredients for the *sea*.

It would also be a good idea to go read *Hwahae*, a beauty app, before buying cosmetics. Its name Hwahae(화해) is an abbreviation of '화장품을 해석하다' which means to interpret cosmetics products in Korean. You can check out cosmetics without harmful ingredients or the product's safety levels by typing in the name or its key ingredients. Makeup was once reserved only for women, but it is now for people of all genders. It is also said that the timing of exposure is more important than the amount of exposure. That is why it is worrying how young girls and boys, who are still growing, are exposed to these harmful chemicals. It is even difficult to identify the cause and effect since it takes time for chemical reactions to occur. Not to mention the possibility of reactions being passed down from one generation to another. That is why some people think avoiding chemicals is overreacting; because the reactions don't appear right away.

Avoiding hazardous chemicals in daily life

It wouldn't be an exaggeration if we say we live with chemicals night and day. Do you often take care of your meals in convenience stores? Or microwave food in plastic containers? Did you know that bisphenol A, which is used to make plastics, has low tolerance against heat? When absorbed in small amounts, most of them are excreted within four to five hours. However, repeated consumption can cause infertility or precocious puberty. Bisphenol A is also used as a coating agent for cans. So, you might want to double-think when drinking canned beverages.

Body burden is the total amount of toxic chemicals in the human body. Toxic chemicals are stored in our bodies from everything we eat, drink, wear, or ride. Consumers are the biggest victims when it comes to harmful chemical substances. That is why we need to know the correct information. And that was what the organization called the National Action for Carcinogen-Free Society (No Cancer) is doing. Producers, workers, consumers, parents, teachers, environmental groups, health care practitioners, and experts have gathered to provide correct information about chemicals, and monitor the entire process from production, distribution, and consumption, to disposal of harmful chemicals to reduce or eliminate them. It also proposed legislation to oversee how the companies are safely managing and producing chemicals.

Europe has been aware of the hazards and risks of chemicals for a long time and has tried to reduce them ever since. BUND, Germany's largest environmental organization, developed an application called ToxFox to inform whether products contain endocrine disruptors. You can also send a complaint email to the manufacturer if there is a product whose ingredients are unknown even via ToxFox. If a consumer requests information on a product's ingredients, manufacturers are obliged to reply within 45 days. How sincerely the manufacturers would respond is another matter, but I believe asserting your right as a consumer itself is very meaningful. Do you think you will continue to buy the company's product if it doesn't answer your question honestly? Of course, you wouldn't. That's what Toxfox was aiming for. Over 1.2 million people downloaded Toxfox, and 70% of its users are checking Toxfox when buying body-care products. This is how much the app is influencing people's consumer sentiments.

There is another organization, in Denmark, that has been focusing on chemicals for a long time. It is a civic group called the Danish Consumer Council, which runs an app called *Kemiluppen*. The name roughly translates to 'the chemical magnifying glass.' Consumers can evaluate cosmetics and personal hygiene products where all ingredients are disclosed, and scan the barcode to provide information on harmful substances in the product. It holds information on around 10,000 products. Isn't it amazing?

In December 2018, the Citizens' Movement for Environmental Justice, a civic group in Korea, published a report with the title 'Evaluation of Companies' Safety Management Policies for Household Chemical Products.' The study was conducted based on the evidence submitted by ten companies that responded to the survey among 18 companies that signed the *voluntary agreement on the safety management of household chemical products* with the Ministry of Environment. What stood out the most in the survey was that there was a big gap between the stances of companies and citizens on consumers' rights to know. Companies felt like they had enough information disclosure policies, but consumers thought otherwise. Before publishing the results, Environmental Justice conducted a campaign to purchase household chemical products with all ingredients listed at supermarkets. But nobody wanted to buy a product based on that standard.

Consumers also bring distributors to an account. Consumers usually buy products from big supermarkets and expect the products to own a level of quality. Therefore, consumers not only demand safety management in Private Brand products but also National Brand products. Target Corporation, a comprehensive retailer in the United States, evaluates 7,500 products with a sustainability score on a 100-point scale and uses them as criteria for being part of its stores. Half of the 100-point is related to chemicals. So one can say that they are the deciding factors. This sort of product management system is included in

both NB and PB products. I hope companies in our country can learn from these examples. However, they are reluctant to disclose product ingredients and guard them as trade secrets. This is our reality.

What are we supposed to do with chemicals that are in almost everything we use in our daily life? Honestly, there is no good way to solve this problem. You can't carry around food from home every day, and stop wearing makeup all at once. All I am asking is to lessen them up a bit. Especially during the growth period, when you need to be more sensitive to chemicals. How about we begin by wearing school uniforms made with natural materials? That will be your first step in avoiding chemicals.

Demands to companies and governments

As a matter of fact, the chemicals themselves are not the problem. As I mentioned briefly before, the benefits one can gain from chemicals are enormous as well. One cannot avoid being exposed to various chemicals anywhere anyways. The problem is that there is insufficient research on the consequences of such chemicals. One official from the United Nations Environment Program (UNEP) mentioned that the reasons behind an outbreak of novel diseases are changes in the environment. According to the World Health Organization (WHO), 4.9 million people died from chemicals in 2011 alone. This statistic is based on known facts. So, I believe, the actual figure is much worse. People wouldn't have had

to die if they had known about the side effects of the chemicals in advance. This is a simple problem that can be solved by thorough research and study on the chemicals' safety level before introducing them to the world. The primary responsibility is in the companies. This does not mean that companies randomly produce and sell products. They undergo tests and get approvals from the authorities. However, many of the standards are outdated. The standards may have been okay in the past, but things are different now.

As technological developments affect human health, the principle of liability arose. It is a principle that prevents the development of technology that may harm human health. However, the concept is very vague. It wouldn't also be easy for companies to give up on a certain technology that guarantees a high profit. That is why, nowadays, instead of the principle of liability, the precautionary principle is applied. It states that countermeasures must be taken immediately under a serious risk of environmental destruction.

There was a chemical-related incident that caused great damage to our society. The humidifier sterilizer disaster, also known as the 'Sewol ferry of a master bedroom.' Humidifier sterilizers once used to enhance families' health, ended up taking their lives. People were sensitive to sterilization as the swine flu prevailed at the time. Companies that sold humidifier sterilizers put up a slogan that said, *safe ingredients for human health*. The slogan get people's attention, and the companies sold

600,000 humidifier sterilizers from 1994 to 2011. The problematic chemical is Polyhexamethylene guanidine (PHMG) which hardens humans' lungs once it enters. The users inhaled PHMG as they breathed around the humidifier sterilizers. As of March 2019, more than 6,000 people reported cases of humidifier sterilizers to the Ministry of Environment, and more than 1,000 of them died.

Why wouldn't the companies double-check the risks of ingredients before manufacturing their products? The tragedy told us that the Risk Review Report was only for its formality and was close to false. Such a tragedy would not have happened if companies had put safety first, before profit.

You can apply a similar principle to yourself. Wouldn't it be best to be careful and use minimum chemicals since it is still unclear what will happen due to their usage? I read an article that stated that Endocrine Disturbing Chemicals are at up to 385 times the standard level in school supplies, school bags, sneakers, and school uniforms. I am not sure how many school supplies are out there with safety labels, but make sure to prioritize safety over trends. Also, be more cautious in choosing cosmetics since applying chemicals on the skin is worse than eating them. Keep in mind that beauty shines brighter when one is healthy!

Chapter 8 Long Puffer Jackets and Animal Rights

How many animals do you need per winter?

Winter’s must-haves: long puffer jacket

Long puffer jackets became a must-have fashion item for winter. It is leading winter fashion by changing its designs every year. Winter sports athletes and related staff were the first to wear long puffer jackets in Korea because they needed to maintain their body temperature as they usually compete in cold play fields and wait long hours on benches. Puffer jackets also came in handy for the actors with outdoor shoots and labor workers working outside. Eventually, they became a fashion item for everyone as they are comfortable and give an effortless-stylish look.

Long puffer jackets are now a winter necessity for the masses regardless of their profession. Is this okay? As a matter of fact, many of us are inside vehicles when we travel and spend our time in buildings unless we have a job that requires outdoor activity. Buildings usually are well-furnished with heating systems. Sometimes we shiver inside a cold car but, most of the time, we sweat while taking public transportation in warm winter clothes. I believe that is why people came to favor a comfortable puffer jacket, which is easy to put on and take off at any time.

In the old days, the winter necessities were foot and hand wraps and scarves. At the time, people knew that they would survive the cold winter once they cover up their ankles, wrists, and necks; the three body parts that are easily exposed to cold breezes. They survived the cold winter with wisdom. Would you have believed me if I told you that this is a story from only about thirty years ago? Then my train of thought

arrived at the materials used to make puffer jackets. Did you know that duck or geese feathers fill our jackets? This means, technically, we are wintering by wrapping ourselves with ducks and geese.

Where do all the feathers come from?

Clothing stores pile new puffer jackets every year. How many feathers, do you think, will be needed to make all of them? Since these jackets change in style every year, some people own several pairs of them. All feathers come from animals, meaning that the puffer jackets are premised on animal suffering, no matter how big or small. That is why we must find out where all those feathers come from. Long puffer jackets that come down to the ankles contain 15 to 25 geese feathers per pair. Then, what about a full-length fur coat instead of a puffer jacket? It takes about 40 raccoons, 42 foxes, or 60 minks. Just to make a single coat!

How do we harvest the feathers? I once saw a video of a goose farm in China taken by an animal protection organization. It was hard even to watch it until the end. People pluck feathers from the breasts of live geese like machines. Harvesting feathers of live animals is called *Life Plucking*. We often scream in pain when our hair gets pulled off, even just one strand. But imagine recklessly plucking geese feathers! The workers would sew up the fallen flesh without any anesthesia. The shrieks of geese in pain were intolerable.

What kinds of environments do these suffering animals live in? The more animals with less investment the better for the investors. So you can imagine how poor the environment is for the animals to live in. They put as many animals as possible in dirty and small spaces so they could barely move. Most of the fur that is used to decorate the brim of the hoodie attached to the jacket is usually raccoon fur. This fur is obtained by skinning raccoons alive. That way, its value jumps as the fur maintains its glossiness. I believe if we wear puffer jackets even a year longer, wouldn't we be able to reduce animals' sacrifice, even a little bit? But instead, we end up buying puffer jackets every year to keep ourselves up with the trend. And buying a new jacket means sacrificing another animal.

It is difficult to realize that the fur in our clothes is from living animals, just by looking at the clothes alone. However, they were, without a doubt, once living animals that feared death. Do you think you will be able to pluck live animals that you grew up with? A normal person could never do that. But then again, we nonchalantly buy and wear clothes that went through the exact process. Of course, we were not aware that the clothes were made of feathers and furs of living animals. There must also be people who need warm clothes. They easily feel cold or have a very low tolerance for chilly weather. But does that mean we have to wear clothes made of animals?

I believe that our obsession with animal feathers and fur has to do with the social trend of evaluating people by their clothing or bags. Efficiency should be an important criterion for people buying cars. But there is a tendency to prefer large cars regardless of their efficiency. The logic behind this is *larger cars equal higher dignity*. If you look at it that way, the reasons and rationales do not really play a significant role when it comes to buying things. We are being swept away with external factors instead of focusing on the values that truly matter.

Animals sacrificed for humans' pleasure

Animal sacrifice is not limited only to clothing items. Their pains are in every human necessity. It is disturbing to even hear about them. Still, we shouldn't look away. We have to understand their pain in order to think of alternatives.

Let us begin with dairy cows raised for milk. As soon as a calf is born, it is separated from its mother because she must be milked for humans from then. It is disheartening to watch the mother cow and her baby trying their best to be close to one another. It is only natural for calves to want to drink their mothers' milk. It is also their right. But babies are separated from their mothers for the milk.

Have you ever heard of Kopi Luwak? It is famous for being made from Asian palm civet cats. It is made from the beans of coffee berries that have been eaten and excreted by these cats, to be exact. As Kopi

Luwak became popular and sold expensively, humans imprisoned civet cats in tiny, barren cages to feed only coffee berries. Humans have inhumanely treated these free, wild animals as confined beings only to excrete *luxurious* coffee beans.

As buildings with glass walls became more popular, the number of bird deaths due to collisions increased. Bird eyes are on the sides of their faces so they poorly analyze their distances to obstacles. They see the reflection of mountains or skies through the glass and fly to it without realizing there is a solid barrier. Hundreds of millions of birds die each year by colliding with glass buildings in the United States alone. Then, I wondered how many bird deaths in Korea were caused by glass collisions. There could be some errors, but according to the statistics by bird experts, it is about eight million or more per year. They normally collide into building walls, glass windows, or transparent soundproof walls on highways. I believe that flying is a bird’s right. In that respect, it can be said that buildings with glass or transparent soundproof walls are violating their rights.

Their sufferings do not stop there. The following is an example of another country: people are setting up nets or traps, or gluing the branches on which migratory birds usually sit to catch them. Apparently, these birds become food ingredients. This is part of a documentary called <Emptying the Skies> I saw a few years back. It was exciting to watch the rescue team waging wars against the poachers hunting after migratory songbirds that travel between Europe and Africa. Perhaps the

director gave the documentary such a title, of the fear of birds slaughtering emptying skies. The more the birds flutter inside the trap, the tighter it becomes to tighten their small bodies. The caught birds are then soaked in a bowl of wine, and put in carved potatoes to bake in the oven (can you imagine how small they were to fit inside a potato?). These cooked birds are eaten and chewed bone by bone, and people cover their faces with a cloth as they dine. They do not want to see each other's faces while chewing the bones. It was shocking to see how these little creatures are being sacrificed for fine dining.

Animals are sometimes sacrificed for human transportation rights. There are countless numbers of animals getting hit by cars because highways were built where animals used to live. Animals that have been struck and killed by driving cars on highways are called *roadkills*. The Ministry of Environment said that 17,320 roadkill accidents were counted in 2017 only. Bird experts argue that birds are also sacrificed by being caught in the air currents generated by cars' speeding on the highways.

There are also cases of using rabbits as test subjects to verify the safety of products that can accidentally get into our eyes, such as shampoos. Rabbits are ideal for experiments because they are prolific and have big eyes. You all know from experience, but how painful and stinging it is when shampoo gets into our eyes? Rabbits suffer the same way and even sometimes break their necks from the struggle. That is why sometimes people fix their necks to prevent such mishaps.

Do you still want to use cosmetics that went through such an appalling process? I'm sure not. That is why knowledge is important. Nowadays, a list of companies that do not go through animal testing is out in the public. Let us show our will by purchasing products from such companies and saving animals from animal testing. You can also check out the list of cosmetic companies that are against animal testing from the Korea Animal Rights Advocates' website!

Animals are not for human entertainment

There was an incident where a cougar was killed 4.5 hours after escaping from a zoo at the end of 2018. It was an eight-year-old female cougar. When I heard this news, I thought 'the final four and a half hours must have been the only freedom that cougar got to enjoy from her eight full years.' Come to think of it, *escape* is a funny word. Cougar was not locked up in the zoo for doing something wrong. Humans were the ones who imprisoned the puma that was living fine in the wild. The cougar, which longed for freedom, happened to go out through the opened door. The zoo claimed that it shot and killed the cougar, concerning public safety. However, wasn't that concern always there when the cougar was first brought from the wild?

You have been to the zoo before, yes? I always felt a sense of melancholy whenever I visit the place. How anxious the animals must be? They are forcefully separated from the crowd in the wild and obliged to

live in an unfamiliar environment alone. To be watched every movement. How stressful it must be!

That reminds me of the few horrific incidents that happened at a zoo, which didn't take me long to retrace my memory. In November 2013, a shocking incident occurred in Seoul Grand Park where a zookeeper was bitten to death by a tiger. In February 2015, another zookeeper died from an attack by two lions at Children's Grand Park. I feel like this kind of accident is repeated. The animals that were involved in these accidents all ended up with miserable deaths. No single animal voluntarily walked into these zoos, but why do they have to be killed? We may already know the answer to the previous question. But don't you think we are either ignoring or skipping the answer altogether?

Those who argue for zoos say that people can acquire ecological knowledge and protect endangered species. In fact, zoos did play a part in saving endangered species from a crisis. They are also working on the *environmental enrichment* program for creating a captive animal environment as similar as possible to the wild. Then why are there endless controversies over the existence of the zoo today? The recently killed puma was also an endangered species. But she was killed by a human. Doesn't this show that even zoos can't perfectly protect animals on the verge of extinction?

It is easy for animals to adapt and live in an artificially constructed space called a zoo. Every animal, regardless of its size, gets stressed. This results in stereotyped behavior patterns, a set of meaningless

repeated actions. Also, a zoo is managed by humans. So mistakes, such as forgetting to lock the door, can occur anytime.

If extinction was really the concern, shouldn't we focus more on preserving their habitats rather than confining them in cages? The cougar might have died sooner if it lived in nature, rather than in the zoo. But, wouldn't it be better for animals if they could live a short life in nature where they can run and play freely? It is most natural when animals are in nature. Other than animals that cannot return to nature due to accidents, shouldn't no animals be living in zoos? We need to double-think whether it is okay to take animals out of their habitat and lock them in for our entertainment. Animal shows, where humans tame animals for people's entertainment, are no different. We need to think again about any act of bringing animals to an artificially constructed space.

How much do we know about animals?

I have an important question to ask you at this point. Why do we selfishly utilize animals for food, clothes, and entertainment? Just because we do not use the same language? Or because they cannot express pain as we do? Can an inability to communicate with us humans be considered inferior?

As a matter of fact, animals do feel and communicate. In the early 1990s, a biologist named Lee Dugatkin experimented with his fish called Guppy. Dugatkin divided the fish tank into three sections and put the similar-sized and patterned male fish at either end of the tank, and the female fish in the middle section. Then Dugatkin set up another fish tank and put one female fish. As soon as the fish acclimated to their environment, Dugatkin united the one left male fish and the one female fish. He let other isolated female fish watch the couple's courtship ritual. Then he put all the fish together and let the female fish freely select its mate. The male fish that conducted the courtship ritual was selected among the female fish. Among the twenty experiments, the same result came out seventeen times. From this experiment, Dugatkin learned that Guppy imitates choosing a mate. Imitation is possible only with memory. Can we consider a fish, with a memory ability, inferior?

An author and a socialist, Henry S. Salt wrote in his book <Animal Rights>: *we have turned free animals in their natural states into slaves. Only so that we, us humans, can benefit from them.*

In 1975, a philosopher named Peter Singer published a book called <Animal Liberation>, which caused a great sensation. He argued that since animals can feel pain, we cannot put their interests and ours on an equal standard. This book is like a textbook for animal liberation activists.

There was a philosopher who mentioned animal pains earlier than Singer in the 19th century, Jeremy Bentham. Bentham was one of the early advocates of animal welfare. He is famous for pointing out that the key is not whether animals can think rationally, but whether they can suffer from pain.

The book <Bird Sense> states that a bird can not only feel the five senses but also uses its magnetoreception and has emotions. Birds feel beyond our imagination. We weren't just able to recognize them yet. But birds are not our only issues, is it?

How can we put it into action?

Korea also changed its perception of animal rights. A project group named 'Constitutional Amendment for Animal Protection' appeared in November 2017. The group consists of lawyers advocating for animal rights, KARA, and the Animal Welfare Institute. It aims to have animal rights spelled out in the Constitution. Why Constitution? To treat animals as subjects of life, not objects. The current legislation has too many limitations on animal protection. The group aims to broaden the concept of rights, that are only given to humans, to apply them to animals as well. Animal right is now the basic concept when it comes to animal rights. And behind this concept, there are the Five Freedoms outlined by the UK Farm Animal Welfare Council.

1. Freedom from hunger or thirst by ready access to fresh water and a diet to maintain full health and vigor
2. Freedom from discomfort by providing an appropriate environment including shelter and a comfortable resting area
3. Freedom from pain, injury, or disease by prevention or rapid diagnosis and treatment
4. Freedom to express (most) normal behavior by providing sufficient space, proper facilities, and a company of the animal's kind
5. Freedom from fear and distress by ensuring conditions and treatment which avoid mental suffering

They are all very important standards when it comes to animal welfare.

A person was caught boiling 600 live stray cats over two years since 2014, to sell them where they were used as medicine. He was punished to serve 10 months in prison, two years of probation, and 80 hours of community service. What do you think of the sentence's severity for killing 600 cats? Don't you think they are just a slap on the wrist? It would be difficult to prevent animal abuse if the punishments continue to be weak compared to savagery.

This is why some people are trying to enshrine it in the constitution. Countries, including Brazil, Germany, India, Serbia, and Switzerland, have already specified animal protection or animal rights in their constitutions. Switzerland, in particular, stipulated *the sanctity of life* in the federal constitution. It administers justice rigidly if one violates

animal protection laws. An assailant can be imprisoned for up to three years and fined about 23 million won. Since the fines are imposed differently depending on one's property, it can be fined up to 1.145 billion won. Naturally, there will be fewer cases of cruel abuse of animals, don't you agree?

It will take a long time to enact animal rights laws. Even so, I believe these movements will bring changes to our society. Showing our interest and contributing to these matters also means that we recognize animal rights and the need to protect them. Wouldn't you double-think whether your purpose was to catch up with fashion or to stay warm? Every living being requires the sacrifice of the other being. That is why we need to make an effort to minimize any unnecessary sacrifice.

It is ultimately a matter of consumption

As people become interested in animal rights, companies began to turn their focus to producing ethical goods. Outdoor clothing companies such as The North Face, Columbia, and Millet began to use certified fur and feather which has been proven to be ethically harvested. The certification is called the Responsible Down Standard (RDS), and it proves that the feather and fur were not recklessly plucked from live birds but went through an ethical process. The puffer jackets worn during the Pyeongchang Winter Olympics were also RDS-certified. The feathers used here are said to have been collected after killing animals raised in a

cruelty-free breeding environment and treating them with chemicals. It met the ethical standard in the sense that it did not pluck live animals. As issues were constantly raised in harvesting feathers, clothing companies monitored the entire breeding process of geese and ducks and set standards to harvest feathers ethically. The process is called *Traceable Down*. Several outdoor clothing brands are currently following this process. Online stores sell with the RDS label. But, even the salespersons do not know of the RDS puffer jackets, due to the lack of publicity of RDS in offline stores. I am sure companies will pay more attention to producing ethical puffer jackets once people purchase them more and more in the future.

A more realistic and active choice would be to not wear clothes made with animals. They are called *vegan* clothes. Artificial fur was also developed from synthetic materials. I believe this is a good option since it does not involve animal sacrifice. However, it may not be the ideal alternative because it can pollute the marine ecosystem by producing microplastics in every laundry. Some animal protection activists are protesting against artificial fur because it continues to stimulate people's desire to consume and show off the fur. Something worthwhile to think about.

I mentioned earlier that sometimes feathers are recycled to make new puffer jackets. In this way, the power of consumers acts as the basis of companies' movements. Do you think companies would have

voluntarily changed their ways if consumers continued to purchase puffer jackets without paying attention to their unethical process? I don’t think so. That is why I keep saying that we can change the world by bringing our small powers together. It is also a good idea to not go to a zoo or go watch animal shows. We are now back again with the issue of consumption. There is no better solution than purchasing less.