AUGUST 2024 | 002

DERGİ21

GREENWASHING ALUMINUM MANUFACTURING WASTE AND SUSTAINABILITY **DEFACTO** **INTERVİEW** SEAGRASS MEADOWS OF THE WORLD **MICROPLASTICS** AIR POLLUTION **MINIMALISM** İTÜ ENVIRONMENTAL ENGINEERING CLUB **RECKWITT INTERVIEW**



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VISION

Dergi21 is a publication that addresses the concept of sustainability, which is one of the most important global agendas of the 21st century, with its structures that brings together various sectors.

MISSION

Sustainability is a reality where everyone can make significant impacts through small changes. Dergi21 is an objective magazine that approaches the concept of sustainability with a realistic perspective from everyday life, addressing current issues, approaches to these problems, and genuinely effective problems.

WHO WE ARE

We are university students who aim to convey the globally crucial topic of sustainability to everyone without sectoral limitations. This magazine, with a priority for Marmara University students, embraces the collaborative efforts of all disciplines without discrimination.

It is a publication prepared as a result of the collective work of many branches of science, such as Engineering, Law, Business, Social Sciences, Natural Sciences, Architecture, and Art. This magazine community consists of students who want to highlight the importance of the concept of sustainability, feature global news, and discuss current technologies and the significance of sustainability.

PREFACE FROM THE EDITOR

“Sustainability is a concept that is familiar to most people, yet not one that many would have thought deeply about. Waiting until 2030 and 2050 for it to draw attention wouldn’t be accurate. As long as we humans live, we leave behind many irreversible marks such as carbon footprints, emissions, waste production, and resource consumption. Is it really possible to reduce or limit this footprint? Can a single person impact the future?

Dergi21 begins with the belief that not only environmental sustainability but also social and economic sustainability are possible. It aims to raise awareness about sustainable living models. The magazine strives to be a collection of articles that will capture everyone’s interest by discussing current news, issues, and potential solutions.

Through interviews with experts who have proven themselves in various fields, information obtained from reliable resources, and an objective perspective on contemporary issues, Dergi21 is a carefully curated magazine for you.”

Zehra HOROZ

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GREENWASHING

Ayşe Zeynep HALİLOĞLU *Translator: Utku İLDAY*

The economy, which is perhaps the most important of human activities and has the greatest impact on daily life, is basically the whole of all kinds of practices carried out in the process of meeting human needs. Examples of these practices include production, trade, distribution and consumption. The main purpose of economic practices has been to increase social welfare. With the increase in the use of natural resources in certain geographical areas by individuals and institutions that set out with this purpose and the development of industry and intensive technologies in addition to this use, the pressures on natural resources have become evident. Harmful waste has intensified in the regions where industrial facilities are densely located, and social welfare, which was set out with the aim of increasing, has started to decrease. [1] With the increase in the environmental and ecological awareness of society, pressures were put on these individuals and institutions and as a result, ecological economic movements emerged.

The ecological economy perspective draws attention to the life-threatening aspect of the problems caused by economic activities, emphasizing that humanity is dependent on a well-functioning ecosystem with all its elements and that environmental problems should be taken vitally seriously.[2] The practices carried out by some companies using this perspective are called 'greenwash'. However, although the practices carried out under the name Greenwash are considered sustainable, the reality is different. Today, greenwash practices are defined as follows: 'When a company or organization claims to be environmentally conscious for marketing purposes, but does not actually make any significant sustainability efforts.'

The concept of greenwashing originates from the phrase 'whitewash', which refers to the process of concealing one's faults in order to keep one's reputation clean. For this reason,



'greenwashing' describes the process of exonerating products or organizations that they are ecologically faultless, even if in reality they are not.[3] Although green painting is initially thought of as an environmental movement in terms of consumers, its true nature is that it is an advertising strategy. The reflection of environmental problems on the world public opinion has created pressures on companies and led them to create a green image. This concept, which emerged in the 1960s, aimed to reduce social pressure by presenting the unsustainable practices of companies to consumers as environmentally friendly products.

Greenwashing firms can sabotage markets by negatively affecting companies and financial institutions that make genuine sustainable investments, causing consumers to become skeptical. When consumers become less trusting of businesses' green claims, the motivation of genuine green businesses will decline, and the development of the green economy will be hampered. These deceptions include the misuse of words and terms that do not mean a single thing, the practice of coloring, claiming that a product is green based on minor details without all elements of the product being green.[4]



A world-famous fast-food brand introduced paper straws instead of plastic straws in its UK branches in June 2018 as part of its efforts to protect the environment. The paper straws, which were introduced as a result of the UK government's environmental policy, were stated by the company as recyclable. However, a year later, the facts were revealed by a local British newspaper. According to this news, paper straws, which were seen as environmentally friendly, could not be recycled. In addition, the recycling rates of the plastic straws they replaced were higher than paper straws. The brand acknowledged this situation in a statement in August 2019.

As seen in this example, the application presented to consumers and encouraged to use actually creates more waste and causes more damage to the environment. The purpose of this advertising strategy applied by large companies is to reduce the pressure against them and to instill a false sense of confidence in consumers. Thousands of malpractices, such as the example above, harm consumers' desire for sustainable living.

The biggest scandal related to green coloring occurred in 2015. An automotive brand with a reputable position and great customer loyalty in the world automotive market was accused of cheating in exhaust emission tests in diesel vehicles in a report published by the US Environmental Protection Agency (EPA). In the published report, it was stated that the values were deliberately underestimated in the emission tests carried out at the factory thanks to software intentionally placed in the vehicles. It is an example of green painting that the brand, which adopts the expression 'Clean Diesel' and wants to give its consumers the image of minimum pollution, creates such an impression even though it has not actually implemented it.

As consumers, our main desire is to minimize the damage we cause to nature by adopting a sustainable life model. However, such practices of brands harm the realization of this ideal. Companies should determine realistic policies with experts in their field, implement these policies honestly and be strictly audited. This is what we consumers demand from all companies and supervisory institutions, regardless of whether they are large or small.

ALUMİNUM MANUFACTURİNG WASTE AND SUSTAİNABİLİTY

Sude ARABACI *Translator: Alp Kağan ŞENLİK*



Aliminum, which has a long history behind it, has significantly expanded its both trade and its production value.

Aluminum is the most common 3rd element found on earth. It cannot be found purely in nature. Aliminum, which has been used in many industrial and engineering applications, gained economic and trade-wise importance at the end of the 19th century.

The manufacturing of Aliminum starts with the extraction of bauxite ore and the process continues with rafinating the ore. The rafination process happens in two different techniques. The first of which is the main method called Bayer process. This also is the cheapest way to produce aluminum.Bayer process is the process of producing metallurgical quality aluminum from bauxite using chemical methods. The other method is producing aluminum through scrap metals. This method is based on recycling scrap metals and is more ecologically efficient than the Bayer process. However the quality of Aluminum is considerably more poor. In recent years, there has been an increased tendency to switch from the Bayer method to secondary production in aluminum production. It can bee seen that the developed countries are taking the first steps towards this trend. The biggest reason for this situation is that the second process is more energy efficient and more ecological than the first method. At the same time the shortage of bauxite and the pollution the Bayer process causes, has set the scene for more ways to create aluminum other than the Bayer process and the scrap method. But sadly this search has not been past the research state. Also no matter how ecological the steps taken for the usage of the second method has been, it is a fact that this method cannot produce enough aluminum to meet the needs of the world. That's why most countries understandably partially gave up on this method.

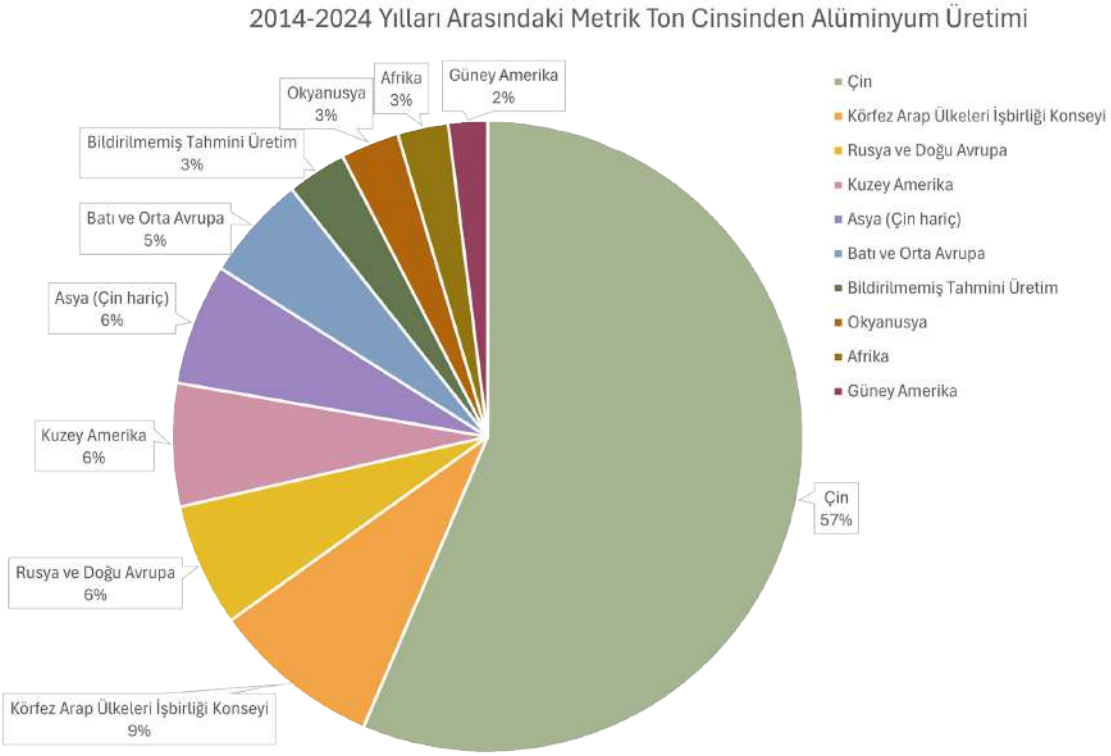




Image 2: *Extraction of bauxite*

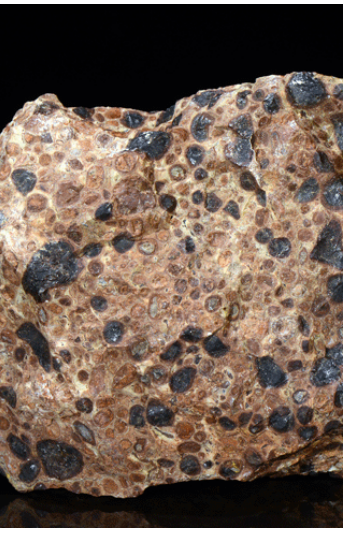


Image 3 - 4: *Bauxite ores*



Let's dive deep into the Bayer process which has been mostly used throughout the world and has severe enviromental effects. How can we deal with these effects? What are the precautions used globally and what are the solutions for this effect?

Quality Aluminum production process, has it's side effects called Red Mud (RM) through the use of Bayer process. For every ton of Aluminum there is 0.5 to 2 tons of Red Mud created. In recent years, with the speed of production of Aluminum increasing, the production of Red Mud has also increased and the global stock has risen up to 5 billion tons. Red Mud, no matter how purified it is, after a long time of waiting underground, damages the underground waters and the soil. Also, this matter carries a great threat to ecology while threatening the living environments of people. Production waste red mud is collected and stored in soil dams. This causes land waste. The alkali contained in red mud may dissolve and these dissolutions may result in leaks into the soil. The aforementioned Red Soil has also caused bigger ecologial disasters than leaking into the soil and underground waters. These disaster has sadly not limited to land invasion. For example, the approximately 2 million cubic meters of bauxite waste leakage in Mirai, Brazil, in 2007, and the leakage of an unknown amount in Dahegou, China, are just a few of these disasters. In 2010, the accident that occurred at the Ajkai Timfoldgyar Alumina Plant in Hungary caused more serious consequences than the previous disasters. Approximately 1 million cubic meters of highly alkaline waste mud has leaked from the soil dam and spread over an 40 square kilometers area. This tragedy caused tens of people getting hurt and many deaths and also left irreversible damages to the area as well. These types of accidents still happen in todays world too. In these types of accidents, not only the bauxite waste is harmful. Everywhere around the world many waste dam accidents happen often. The last bauxite waste accident recorded happened in China 2022 and the last waste dam accident happend in 2024 January in Myanmar.

Red Mud, which is an Bauxite waste, is clearly dangerous and harmful for people and environment. What are the ways to limit RM's damage to people and the environment? What can be made for RM's purification and recycling?

Many researches have been made and many techniques have been tried throughout years in order to better understand how Red Soil can be recycled and/or be sustained. Since RM is a metallurgical waste and contains precious metals and its destruction will lead to waste, its sustainable use is preferred.

For sustained use of RM, the preferred method is the neutralization of Red Mud. There are a couple ways to neutralize Red Mud. However some can lead to secondary pollutions whereas the other ones are too expensive to be used generally. An other way is for red mud to be used, regarding its chemical components, in constructions. This method is hopeful considering the low costs and high demands. It is also possible to contribute to red muds sustainability by seperating it to metals it contains. The recycling of this precious metals can contribute to businesses economy. It can also ease the destructive effect the production waste generated during the aluminum production process from bauxite on the ecological environment.



Image 5: Red mud (*Stade, Germany)*



DEFACTO
DEFACTO RETAIL TRADING. Inc.

Rahmi Say
Deputy General Manager of DeFacto Product and Sustainability

“We attach importance to upcycling as much as recycling and we are taking steps in this area.”

Could you tell us about DeFacto’s sustainability efforts and its roadmap in this field?

As DeFacto, we have made a promise to ourselves and all our stakeholders to voluntarily support sustainable development in every field both in the global arena and in Turkey. In our founding philosophy and values, production that respects the ecosystem, protecting the world and natural resources, adding value to people and taking a sensitive stance towards social issues have an important place. We support sustainability through both social and environment-oriented activities.

We are taking serious steps to support the end consumers we reach to reduce their carbon footprint. After 10 years of publishing our sustainability report, this year we are transforming it into an integrated report and announcing our first integrated report. We do not measure our success solely by financial performance, and we believe that while improving our financial performance, it is key to move forward by respecting nature, listening to our stakeholders and not losing our innovative perspective.

By 2030, we are working to reduce our carbon footprint by 55 percent and ensure that 90 percent of our ready-to-wear collections are sustainable and 100 percent of our energy needs are met with renewable resources. Our ultimate goal in sustainability is to become a “Net Zero” brand by zeroing our emissions by 2050 and to become a “climate positive” brand in the future.

Can you tell us about the product variety you offer under the concept of sustainability?

As DeFacto, we are aware of our responsibility to design products that treat the world fairly. In all our processes, we take serious steps to support the reduction of carbon footprint and contribute to making the world, people and society a better place, and we prepare special collections for fashion lovers with this vision. We maintain our commitment to production techniques that minimize water use and reduce the ecological footprint, and continue to offer our products with production processes that respect nature. As of the end of 2023, we reached 21% of our ready-to-wear products produced with sustainable resources and methods.

We use certified sustainable materials such as LENZING™, ECOVERO™ Viscose, EURPOEAN FLAX™ linen, regenerative cotton, recycled fibers in our collections. We support eco-friendly production with our innovative collections such as Vegan-Sustainable Apple

Skin Collection and Olive Skin Collection, Natural Dye- Ficus Collection, Wiser Wash collection, Natural Colored Cotton Collection and DeFacto X Maritaş regenerative cotton collection.

In our Vegan-Sustainable Apple Skin Collection, which is obtained from the waste fibers produced after the industrial processing of apples, we recycle the waste of the apple juice industry and turn it into a new raw material. We contribute to the circular economy by creating an opportunity for farmers to earn a second income from their waste. Thanks to this collection, not only waste management costs and environmental damage are avoided, but also this natural waste reduces energy consumption and emissions throughout the entire chain, replacing other chemical-intensive raw materials.

Another Vegan-Sustainable collection, the Olive Skin Collection, is an innovation that circularizes the olive industry's waste. The vegan olive leather from this collection reduces carbon emissions by 94 percent compared to traditional leather.

We aim to protect the future and nature by saving 88 percent water and 55 percent energy in our Natural Dye- Ficus Collection, which is dyed with natural colors produced from extracts of plant wastes and clays produced by natural factors. In our Natural Colored Cotton Collection, we save up to 35 percent energy and water and reduce the use of chemicals by 90 percent. In our new Regenerative Denim Collection, which we launched in cooperation with DeFacto X Maritaş Denim, we use fabrics woven with cotton from environmentally friendly agriculture that minimizes the use of chemicals, supports the soil to repair itself and contributes to sustainability. In our recent Lug Von Siga and Tea Leather collections, we offered our customers pieces designed with vegan leather and sustainable fabrics.

Can you explain the "Wiser Wash" method and its advantages?

With our Wiser Wash collection, we create more sustainable denim and shorten the production process to improve working conditions by reducing the ecological and water footprint. Thanks to the special treatment process and technology, water consumption is significantly reduced during the washing process without affecting the desired result. While it normally takes 16 liters of water to wash a pair of jeans, this process reduces it to just one glass of water. Compared to traditional denim, we save 80 percent water and 59 percent reduce the effects that cause climate change. With this project, we saved as much water as the daily water needs of nearly 2500 people in 2023.

Can you explain your practices on sustainable material use and recycling? Can you share the results of the water footprint reduction efforts you started in 2022?

We believe that fashion has a very strong impact on building a sustainable future. In terms of water efficiency and wastewater management, we apply environmentally friendly production techniques with the perspective of protecting water resources from the design stage of our collections.



With this awareness and consciousness, we continue to break new ground in our industry in this field as well. We have a sustainability strategy based on the United Nations Global Compact. We are one of the first two brands in the Turkish apparel and fashion industry to sign the Global Compact.

We have recently taken an important step towards managing the water crisis. In 2007, we were among the brands in the Turkish apparel and fashion industry to sign the CEO Water Mandate, a special platform established by the UN Secretary General and the UN Global Compact (UNGC) in partnership with the Pacific Institute to improve corporate water management worldwide. We are proud to be a signatory in this area within the scope of our sustainability efforts. We believe that being part of such an important platform that enables companies to share best practices and build partnerships to find solutions to urgent water challenges related to scarcity, quality, governance, access to water and sanitation will lead us to even greater success in this field.

Can you give information about DeFacto's achievements in social responsibility projects and its social contributions and what do you do to encourage your employees to participate in these projects?

We care about upcycling as much as recycling and take steps in this field. One of the most valuable projects for us is "Fabric Dreams".



We continue to support upcycling, economy, education, students' imagination and hope with our corporate social responsibility project "Dreams from Fabric". We send surplus fabrics and accessories obtained from our factories and suppliers to vocational high schools through the provincial and district Directorates of National Education, with which we have signed a protocol. Our students in vocational high schools turn waste fabrics into products with their own imagination and design skills in Fashion and Design courses. The final products made by the students are sold in our leading stores. After a preliminary study in two schools in Turkey in 2018, the project spread across the country and has now reached 11 provinces, 119 schools and nearly 12 thousand students. A total of 15,150 thousand tons were sent to schools. Today, we are taking steps to increase our numbers.





Seagrass Meadows of The World

Çisil GÜLKOPARAN *Translator: Nursena ULUSU*

Seagrass meadows are ecosystems common in temperate and tropical coastlines worldwide. They are usually found in areas with sufficient light, called photic zones. Seagrass meadows are estimated to cover an area between 0.12 million km2 and 0.6 million km2 globally. Although these ecosystems contain fewer species than seaweeds, they are important in terms of biomass, and they are particularly prominent in the Mediterranean. Seagrass meadows are declining worldwide, as are coral reefs, rainforests, mangroves and other important habitats.

In some areas such as enclosed bays and lagoons, where people can interfere with nature, the decline in seagrass meadows can be significant. The causes of this decline include natural factors, as well as human activities and climate change. Especially on the Mediterranean coasts, the decline of seagrass meadows has accelerated with the increase in human activities after the 20'th century.

The 5 main seagrass species found in the Mediterranean are: Posidonia oceanica, Cymodocea nodosa, Zostera noltii, Zostera marina and Halophila stipulacea. Of these species, P. oceanica is native to the Mediterranean, while the others are found in warm seas. H. stipulacea is a species that entered the Mediterranean through the Suez Canal. [1]

Posidonia oceanica

Posidonia oceanica meadows, found in Mediterranean waters to a depth of 40 metres, form dense or sparse monospecific meadows with shoot densities ranging from 150 to 700 shoots/m². These meadows consist of orthotropic (grows vertically) and plagiotropic (grows horizontally) shoots that accumulate sediments, and form a terraced structure called a mat. Deposits in meadows can be millennia old, with an accumulation rate of about 0.175 cm per year. P. oceanica requires organic-rich substrates, and it can grow in a variety of sediment types but prefers coarse sandy substrates. It thrives at constant salinity (33-40 ppt) and temperatures between 9-29°C. P. oceanica has a long-life span (70-350 days) and exhibits seasonal variation in shoot biometry and biomass, with the highest growth in February and the lowest in August. Reproduction occurs both sexually and asexually, and seedlings grow horizontally at a rate of 5-10 cm/year. Flowering usually occurs once a year between April and September. Flowering events are irregular and spatially variable, occurring mainly in the southern and eastern Mediterranean regions. Grazing of inflorescences may affect reproductive success. Overall, P. oceanica plays a critical role in coastal ecosystems, however, it faces threats from anthropogenic activities and climate change. [2]

The Seagrass Meadows of The World and Their Effects

Seagrasses are critical to ecosystems worldwide, and species such as P. oceanica have vital functions for the Mediterranean ecosystem. However, climate change poses serious threats to seagrass meadows. Factors such as rising seawater temperatures, changes in water level, increased storm intensity and frequency affect the distribution of seagrass meadows. Eutrophication causes negative effects on seagrass meadows, as it is the algae growth on the surface that occurs due to the increase in nutrients such as nitrogen and phosphorus. Reduced light levels, combined with overproduction of phytoplankton and macroalgae, limit seagrass growth and survival. The impact of climate change on the distribution of seagrass species can vary. Although the distribution of cold-water-favouring species has increased due to past ice ages, global warming may reduce or eliminate their habitat. Species that prefer warm waters, on the other hand, may benefit from the current warming trend. For instance, if the distribution of P. oceanica decreases, the areas of species that prefer warmer waters may expand. Seagrass meadows are also important for their carbon storage capacity; however, the loss of seagrass meadows can potentially lead to the release of large amounts of organic carbon into the atmosphere. The release of large amounts of organic carbon into the atmosphere results in an increase in greenhouse gases. This contributes



[Şekil 1.] Posidonia oceanica



[Şekil 2.] Cymodocea nodosa



[Şekil 3.] Zostera noltii



[Şekil 4.] Zostera marina

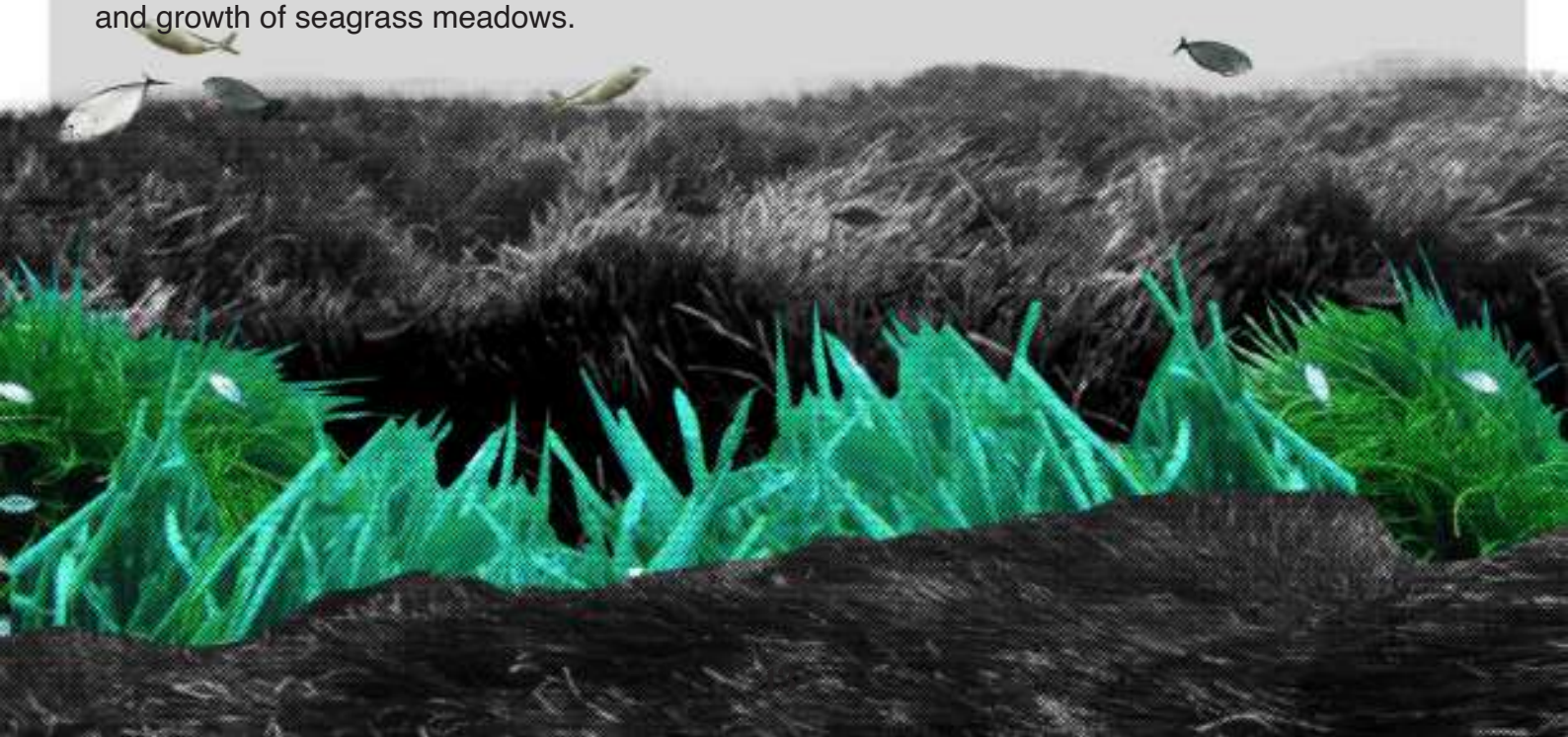


[Şekil 5.] Zostera marina

to climate change by accelerating global warming, which can have negative impacts such as melting glaciers, rising sea levels and increased extreme weather events. Therefore, protecting seagrass meadows is also important to preserve their carbon storage potential. Other global environmental problems such as acidification and rise in sea levels also affect seagrass meadows. Acidification may have negative impacts on plants and animals, while the rise in sea levels may affect the distribution and growth of seagrass meadows.

Future of The Seas: Seagrass Meadows Project

The adoption of March 1'st as "World Seagrass Day" by the United Nations General Assembly in May 2022 is a significant step in terms of protecting seagrass meadows and raising awareness. The second World Seagrass Day, the first of which was celebrated last year, was celebrated this year with the positive developments in the Marmara Sea.



The “Future of the Seas: Seagrass Meadows” Project carried out by the Turkish Marine Research Foundation (TÜDAV) and İşbank has provided an important study area for the conservation of Posidonia oceanica meadows in the Marmara Sea. Within the scope of this project, new seagrass areas were identified, and the boundaries of these areas were mapped thanks to the field studies carried out in the Marmara Sea.

In particular, the studies carried out on Paşalimanı Island revealed the presence of a seagrass structure consisting of more than one part, contrary to previous findings. In total, 280 seagrass beds were identified, and the total size of these beds was measured as 2,264 hectares. The project emphasised the ecological importance of seagrass meadows and the need for their protection. As a result, the “Future of the Seas: Seagrass Meadows” project has been an important step for the conservation of seagrass meadows in the Marmara Sea and it is expected that these studies will continue and contribute to raising awareness for the conservation of similar ecosystems. [3,4,5,6]

As a result, seagrass meadows interact directly and indirectly with global environmental problems. These problems can disrupt the significant contributions the seagrass meadows provide for ecosystems, and even reduce their carbon storage capacity. Therefore, seagrass conservation and restoration might be an important strategy in the fight against global environmental problems. [1]





MİCROPLASTİCS

Sena ÖZTETİK *Translator: Nursena ULUSU*

Plastics have been included in many various innovations from the time it was invented, as the increasing plastic production in the last 30 years has been prominent in many commodities such as clothes and electronics. Most of the products containing plastic become “waste” after they expire, and most of them are ungradable in the nature, ending up being a contaminant for many years to come. Research in 2017 found that only 9% of the plastics produced and expired was recycled. Most plastics that could not be recycled end up contaminating the nature and damaging the environment by being reduced into small particles such as microplastics and nanoplastics.

Microplastics are polymeric particles less than 5 millimetres long that cannot dissolve in water and might range in shapes. The term “microplastics” was first coined by Richard Thompson in an article in 2004. Microplastics between 1 µm to 5 millimetres directly produced as microparticles are classified as primary microplastics, whereas plastics having been reduced into between 1 µm to 5 millimetres over time are classified as secondary microplastics. Upon discovering that already existing microplastics reduce in size even more over time, plastics between 1 nm to 1 µm were coined as nanoplastics. Aside from nanoplastics being produced due to the degradation of microplastics over time, they can also be directly produced by industries.

Microplastics can be produced due to daily occurrences such as microfibers falling from degradable clothes, or the friction of tires. Additionally, industrial sectors such as cosmetics, self-care and cleaning products produce microplastics, which means microplastics are produced by many ways.

For example, an artificially produced microplastic-containing cleaning material used at home goes to treatment plants as wastewater after use, however, even if 83-95% of the microplastics in industrial and domestic wastewater reaching the treatment plants are removed in treatment plants, 5-17% of them are released into the environment. After being released into the environment, microplastics contaminating rivers, lakes, seas, and oceans are ingested by living organisms in the aquatic ecosystem, causing damage to their internal organs.



Excessive accumulation of microplastics can lead to malnutrition, reduced reproduction, and biological death of animals, as well as decline in species and new unknown diseases in marine organisms. A study found that microplastics ingested by pale-billed shearwaters cause a disease called “plasticosis” revealing the importance of damage caused by microplastics to the environment and the effects on the ecosystem.

In addition to harming marine organisms in the waters where they appear, microplastics also appear in the soil. It is possible for microplastics to enter the stems of plants through the roots of plants on land, causing the accumulation of microplastics in plants and in living organisms that consume the plants.

Microplastics found in extreme amounts worldwide are not only found in the bodies of animals and plants, but also in humans. They can enter the body directly through the respiratory system as well as indirectly by consuming marine life with microplastics in them, or agricultural products exposed to microplastics. The risk of their consumption is higher in environments especially where air pollution is intense.

Many health-related studies have shown that microplastics are present in our bodies and cause side effects. A study found that the diseases associated with exposure to plastic-related chemicals cost the US approximately 249 billion dollars in health expenditures in 2018.

Today, finding microplastics in the body is no longer limited to adults, as it has become possible to find them even in newborn babies. In a study conducted in Italy in 2022, scientists found microplastics in 75% of milk samples taken from thirty-four mothers. Today, mothers who breastfeed their newborn babies are a source of microplastics for them, proving microplastics are a problem in need of solution.

Plastics consumed in our lives have become one of the most significant problems of today, not just being an image of piles of rubbish, but having serious drawbacks. Measures should be taken against the increasing amount of microplastics in our ecosystem, such as individuals’ changing their habits and reducing the consumption of plastics, also opting for sustainable materials to decrease the amount of already existing microplastics playing a vital role. Applying the principle of sustainability can contribute to the solution of many environmental problems, and it will contribute greatly to the reduction of microplastics.

The projects conducted in this subject and raising awareness of the society have a key role in controlling the microplastic problem, as well as accomplish the principles of sustainability.







A sustainable common future is the responsibility of all of us.

AIR POLLUTION

Buse TUFANLI *Translator: Senrat Şira ÇAVLUER*

The rapid increase in the world population, industrialization and technological developments have led to many environmental and social problems. The most important of these problems is air pollution. This pollution disrupts natural processes in the atmosphere and adversely affects public health. For this reason, air pollution levels have been regularly monitored and air pollution has been combated all over the world for the last 30 years.[1]

The intensive use of coal and other fossil fuels in industry started with the industrial revolution in the 18th century. This had negative impacts on air quality. In the first half of the 20th century, air pollution became more evident with the rapid expansion of the use of automobiles and other motorized vehicles. Fossil fuels burned in various industrial facilities and residences, improper selection of the establishment locations of factories, release of flue gases, toxic gases and particles into the atmosphere without passing through filters, release of exhaust gases of transportation vehicles into the atmosphere are the main causes of air pollution. All these causes lead to climate change, health problems and ecosystem degradation. Today, this great danger caused by human activities has become more evident, especially in industrialized regions. Millions of people die every year due to air pollution.

Although air pollution is primarily caused by the increase in coal and other fossil fuel wastes that damage the atmosphere, meteorological factors such as temperature, pressure, precipitation, wind, humidity and solar radiation, as well as factors such as location and topography also play a decisive role in air pollution. [2]

Air pollution affects climate systems in complex ways, for example by contributing to the release of greenhouse gases into the atmosphere. In particular, greenhouse gases such as carbon dioxide, methane and nitrous oxide increase the greenhouse effect in the atmosphere, causing a rise in temperature. These activities, which disrupt the natural balance of gases in the atmosphere, irreversibly cause global warming if measures are not taken. This will make our planet less habitable. As a remedial step against this situation, the Kyoto Protocol signed in 1997 within the United Nations Framework Convention on Climate Change is very important. The Kyoto Protocol is also important as it is the first international agreement to set quantified emission reduction targets for Annex 1 parties. The Parties have made efforts to reduce the greenhouse gas production of the states in the field of warming and climate change.[3]

For example, in the Kyoto Protocol, the Parties shall individually or jointly reduce the total emissions of carbon dioxide-equivalent greenhouse gases caused by human activities by at least five percent below 1990 levels during the commitment period covering the years 2008-2012.[4]

According to the World Health Organization, Ulaanbaatar, the capital of Mongolia, has the most polluted air in the world. In 2016, Ulaanbaatar overtook both New Delhi and Beijing as the capital with the highest air pollution levels in the world. Built in a river valley like Beijing, the mountains surrounding Ulaanbaatar trap polluted air and smog like a pot of soup. This is a major contributing factor to the city's air pollution. In Mongolia, air pollution is the cause of death for one in every ten people. In addition, one out of every three babies in the womb in Mongolia fails to complete their development due to air pollution. This situation is very important in terms of showing the fatal effects of air pollution on human health.

In recent years, the Mongolian people have faced the white death catastrophe known as "Zut". Temperatures dropped to -50 degrees Celsius and almost 10 million animals perished due to cold and starvation. This disaster forced the rural population of 13 provinces and 171 districts, who depend on livestock for their livelihoods, to migrate. The economic damage amounted to more than 1 billion dollars. According to statistics, this migration has tripled the population of the capital in the last 25 years. More than 60% of the city's population lives in areas without natural gas networks and underdeveloped infrastructure. People living in these areas use coal stoves for heating in the winter months. In Ulaanbaatar, 5.3 million coal is consumed every year for heating. This means that 260 thousand tons of pollutants enter the city's air. Of the air pollution in the capital, 80% comes from heating in the tent zone, 10% from traffic, 6% from thermal power plants and 4% from floating particles. The government has initiated several projects to prevent air pollution. One of these projects encourages the use of electric heaters instead of coal stoves in the poorest neighborhoods. Starting in January, electricity will be free at night in certain dormitories and cabins. In addition, by promoting more efficient coal stoves, the authorities have begun to reduce pollution. Nevertheless, the country's infant mortality rate of 52% means that there is no healthy future.[6]

Based on this data, measures such as promoting the use of clean energy and reducing emissions of greenhouse gases and implementing sustainable development policies will help both prevent climate change and improve air quality. The principle of sustainability is leading the way in solving major environmental challenges such as air pollution. By acting in accordance with this principle, we must work decisively for a clean environment and a healthy future. Individuals, organizations and governments have an important role to play in tackling air pollution. With simple but effective steps that can be taken in daily life, we can contribute to reducing air pollution and lead to big changes. Let us not forget that a sustainable future is a shared responsibility of all of us.



MINIMALISM

Elif Duru ARSLAN *Translator: Senrat Şira ÇAVLUER*

Minimalism is an art movement that emerged in the United States in the 1960s during a period of political and social turmoil.

The 60's, in the shadow of the Cold War, was a period when events such as the Cuban Revolution, the assassinations of John F. Kennedy and Martin Luther King, the Vietnam War, increased social consciousness and political awakening all over the world, especially in the USA, anti-war protests, intense protests for workers' and women's rights, and a strong social awakening. In this atmosphere, Minimalism represents the awakening and self-realization of the individual against the melancholic mood after the Second World War.[1]

This movement, which has made itself felt in many branches of art such as painting and sculpture, literature, cinema, music and architecture, is that the works are completely objective and expressionless, design is prioritized, and both color and formal values are minimized and brought together harmoniously and harmoniously with an aesthetic attitude.[1] In addition to many branches of art, minimalism, which has found its response in everyday life, has deeply affected the concept of environmental sustainability and has shaped daily life through making environmentally friendly choices.

The simplicity that minimalism reflects in many branches of art has also manifested itself in the human-environment-sustainability triangle. In terms of sustainability, minimalism is the reflection of the simplicity in art to life and advocates the reduction of consumption habits and the reduction of consumption to the level of needs. The minimalist lifestyle thus contributes to individuals and society taking on environmental responsibilities, using resources more efficiently and leaving a more livable world for future generations. Minimalist living is not only limited to an aesthetic preference, but also has a deep relationship with the concept of environmental sustainability. When art and sustainability are analyzed in terms of minimalism, their common point is simplicity. The expression of simplicity is not to go to extremes in art. A similar attitude is followed in consumption habits and the fulfillment of basic needs. This lifestyle brings many advantages for society and the environment. In addition to its positive economic and psychological effects, it is also remarkable in terms of its potential to prevent consumption frenzy. Closely related to sustainability, minimalism also contributes to the environment through options such as reducing carbon footprint, recycling and reuse.







A minimalist lifestyle is the opposite of a consumption-oriented lifestyle. It refers to an environmentally friendly lifestyle where there is no over-consumption, focusing only on meeting basic needs, and where technology is used as little as possible.[6] It should be added that a Minimalist lifestyle does not mean giving up technology completely. Minimalism is a philosophy of life that advocates giving space in one's life only to what one values and what one really needs. In this context, technology can also have a place in a minimalist lifestyle, but the way and amount of use is important. Minimalists tend to eliminate distracting technological devices and applications from their lives. This allows for more focus and peace of mind. This is what is meant by technology taking up little space. At the heart of this way of life is embracing simplicity, letting go of attachment to materials and replacing meaningless possessions with meaningful experiences. "Meaningless ownership" or consumerism is the complete opposite of this philosophy of life and manifests itself in out-of-control, excessive, purposeless acquisition. In response to the economic difficulties caused by purposeless acquisitions, minimalism encourages frugality. As far as possible, all needs are acquired through renovation, recycling and sharing. Therefore, better quality, durable and long-lasting products are preferred. [2] Especially living with fewer items, researching the purchasing process, saving considerable money by preferring to repair broken items rather than re-purchasing them, contributes to their personal economy by distracting individuals who live minimalist lives from many unnecessary expenses.[2] Minimalism, which advocates simplicity not only in things but also in diet, advocates cleansing the body of toxins and eating natural and nutritious foods in harmony with healthy nutrition. A healthy diet cleanses the body and raises energy levels, leading to mental clarity and peace of mind. This lifestyle offers the opportunity to live life more deeply, avoiding complexities. Living with reduced material, reduced stress and anxiety leads people to a greater sense of freedom, happiness and contentment. Simplifying life and focusing on what is important are important steps for achieving inner peace and balance. Therefore, minimalism not only brings external changes, but also allows for internal transformations.

Minimalism is a way of life that serves the general interests not only of individuals, but also of society and the planet. By reducing unnecessary consumption habits and sticking to only what is needed, this approach helps to conserve natural resources, reduce waste and lower the carbon footprint. Items such as clothes in wardrobes that have not been worn for years, dusty bookcases and dinnerware stored for guests, as well as sauna and jacuzzi systems, plasma TVs and large-screen LCD TVs with a monthly energy consumption of approximately 5-6 kW/hour[3] are items that some people own and use in their homes in today's world. However, such objects can threaten the household economy as they unwittingly fill up living spaces. In addition, their negative impact on the environment and energy use should not be ignored.



These items may become waste in the future if they are bought unconsciously. They also cause the use of large amounts of raw materials during their production. For example, 10,800 liters of water are used in the production of a pair of jeans made from 1 kg of cotton, 2,700 liters of water are used in the production of a t-shirt made from 250 g of cotton, and 16,600 liters of water are used in the production of a shoe made from 1 kg of leather.[4] According to data from the European Union, the average person produces about 537 kg of waste per year. This means that almost 410 million tons of waste is generated in Europe alone. Reducing unnecessary consumption will greatly reduce the amount of waste generated.[5] Another measure that can be implemented is to live in a house that is the right size in proportion to the number of people. This can significantly reduce the amount of energy used for heating, lighting and other needs. Another concept is to use quality, long-lasting and sustainable products. This means using durable materials and choosing items that can last longer. Sustainable materials include bamboo or natural stones instead of the usual building materials, pumpkin fiber instead of many cleaning products, and a multi-purpose microfiber cloth. A minimalist lifestyle often encourages the selection of needed items from second-hand or recycled materials. This is another choice that can reduce the resources used in the production of new products. Second-hand is preferable for permanent and expensive necessities such as books, clothes and bicycles. This can be realized through both physical spaces and digital platforms. In addition, separating all expired products in homes as much as possible can provide a great convenience both in terms of recycling and home organization. This includes sauces, creams, make-up, medicine and their packaging. By developing a little awareness and changing our consumption habits, it is not difficult to adopt a minimalist lifestyle. Individual actions we can take according to a minimalist life philosophy:

1.Reducing unnecessary consumption and monitor waste generation,

2.Limiting energy consumption,

3.Using quality, long-lasting and sustainable products,

4.Choosing the items needed from second-hand or recycled materials,

5.Living in a smaller house
as the most important things in the world.

When you take the steps mentioned above, you will realize how much money you are spending on unnecessary things. Clothes that are never worn, all the sugary and carbonated drinks that do more harm than good, fast food, items that are bought because they are seen on someone else, cell phones that are replaced with the next model every year, private cars that make traffic even more unbearable...When you remove all these things from your life, you will not only feel financially relieved. You will feel more spiritually and physically fit. With a minimalist lifestyle, you will not only do yourself a great favor, but also the world.

ITU Environmental Engineering Club

The ITU Environmental Engineering Club was founded in 1994 by the then Minister of Environment and continues to operate today. The club aims to create environmental awareness among its members, strengthen social bonds, and produce technically equipped engineers for society as a requirement of expertise. Additionally, through its projects, events, and activities, it establishes a connection between students and industry professionals. ITU EEC is committed to sharing existing solutions and developing new ones for a sustainable world.



OUR PROJECTS

SUSTAİNABLE ECOSYSTEM DAYS (SEG)

Celebrating its 15th year, the Sustainable Ecosystem Days, organized by students from the ITU Environmental Engineering Club, is a nationwide event featuring expert speakers. Known as Turkey's and ITU's first carbon-neutral congress, the Sustainable Ecosystem Days have been held since 2009. The event offers free participation to students from all age groups from various cities in Turkey, as well as to academicians who have worked or are working with a sustainability mindset, environmental technologies, sustainable environmental approaches, and those with global sensitivity and vision on environmental issues. Participants are provided with seminars during morning and evening sessions over two days. The Sustainable Ecosystem Days aim to increase awareness among the new generation who will address global environmental issues and strive to convey developments in the areas of environment, energy, and climate change to participants.



Founded in 2013, Ekolojika is a web-based platform composed of ITU environmental engineering students and environmental engineers, working in collaboration with the ITU Environmental Engineering Club. The main goal of Ekolojika is to impartially discuss sustainable solutions to environmental and ecological problems and to promote environmentally friendly designs to a broader audience, encouraging action. Our site features articles on topics such as environment, sustainability, environmental economics, art, waste management, and environmental ethics. All content on Ekolojika is produced by ITU Environmental Engineering Department students, graduates, and academicians. This content is continually updated with new articles shared weekly. In addition to the articles published on our site, the environmental glossary provides engineers and students with the opportunity to use more accurate and scientific language in report writing and academic studies.

Sustainability Committee

The Sustainability Committee, organized by the ITU Environmental Engineering Club, conducts various sustainability events. The Sustainable Strategies Workshop aims to bring together university students and industry stakeholders to prepare management plans in line with ESG criteria, strengthening industry-campus relations and contributing to sustainability. The Sustainability Workshops, held periodically, aim to provide students with knowledge and experience on the role and functioning of sustainability in various sectors. The monthly Sustainability Bulletin compiles current sustainability news and events. Additionally, by collaborating with institutions like EELISA and AASEC, we aim to participate in international projects, competitions, congresses, and conferences. Finally, we aim to lead the field by preparing a sustainability report at the end of the year, detailing the events organized by the ITU Environmental Engineering Club.



Tears of Water

Tears of Water is a social responsibility project actively operating under the Istanbul Technical University Environmental Engineering Club since 2008. The project's goal is to inform and raise awareness among primary and secondary school students about environmental issues. So far, the project has reached over 100 schools and more than 10,000 students. Each year on April 23rd, it publishes a magazine titled "Havadan Sudan" for children. Over the years, Tears of Water has carried out various projects in different cities and will continue its activities this year.



CMK Academy

CMK Academy is an initiative aimed at increasing the recognition, awareness, and capabilities of the environmental engineering profession. In this context, it conducts high school visits to introduce students to the environmental engineering profession and ITU, organizes training sessions, workshops, and events for ITU Environmental Engineering students to enhance their skills, and provides training to corporate companies on topics such as circular economy, life cycle analysis, zero waste, and sustainability to increase interest and awareness in this field. Since its establishment in 2021, CMK Academy has actively continued its activities by organizing numerous training sessions and events in line with its objectives.

Environmental Meetings

Organized by the ITU Environmental Engineering Club, the Environmental Meetings are events aimed at contributing to the career development of environmental engineering students. During these meetings, alumni working in various sectors share their experiences and career plans with environmental engineering students. Environmental engineering is not limited to areas such as waste management consulting and water treatment but also offers opportunities in sectors like energy, finance, textiles, and construction. In recent years, with the increasing importance of issues such as climate change, clean energy, and sustainability, the scope of environmental engineering has expanded. The Environmental Meetings aim to provide students with information on career planning and job opportunities. Additionally, through a mentoring program, students can communicate directly with alumni to gain more insight into their future plans and academic lives.



RECKITT INTERVIEW

What is your company's sustainability and environmental protection efforts and your mission or vision in these particular topics?

Sustainable practices are central to our company's ethos. We have a purpose of protecting, healing, and nurturing in the relentless pursuit of a cleaner and healthier world. Our purpose statement itself embodies sustainability. Additionally, we believe that doing well and doing good do not need to be separated; purpose is at the heart of our company strategy. We're exploring how to impact sustainability in different ways.

Each of our brands has a specific purpose usually associated with the United Nations Sustainable Development Goals (USDG's). For example, Finish aims to provide dishwasher performance without wasting water, thus impacting water conservation. Vanish focuses on extending the lifespan of clothing, contributing to responsible consumption. All our brands aim to drive behavior change aligned with USDG's.

For each product and innovation, we ensure they enable embracing behavior change. For example, Finish delivers performance without waste, while Vanish protects colors and prevents stains, thereby extending the lifespan of clothes. Our goal is to generate more revenue from sustainable products, which is one of our key performance indicators.

We have a unique Sustainability Innovation Calculator to launch products that are more sustainable than previous iterations. Sustainability encompasses cutting the carbonization agenda, linked to SDG 13. Our sustainability calculator helps us track various KPI's such as carbon and water footprint reduction.

Abhishek Chuckarbutty
Regional Director for Turkey, Caucasus, and Central Asia Region Hygiene at Reckitt Turkey

In addition to revenue from sustainable products, we focus on reducing carbon emissions and improving water filtration. We aim to reduce plastic usage by transitioning from virgin plastic to PCR material and ensuring all our products are recyclable. Our brand strategy emphasizes the execution of sustainability through more sustainable products and reducing plastic usage.

We also focus on improving existing products regularly, known as vitality. We continually seek to enhance sustainability by improving materials, chemistry, and reducing plastic usage.

Our main focus is on elevating the conversation from not only plastic to the decarbonization agenda. So, for the decarbonization agenda, Scope 3, or the carbon footprint as an industry, is significant, mostly in Scope 3, for example. A large part of the carbon footprint usually lies in raw materials, logistics, and the retailer side. So, as I mentioned, the way we approach this is by trying to impact quickly with every product vitalization and new product development. We're looking to improve the raw material structure to reduce the carbon footprint. That's why we're discussing packaging improvements to reduce waste. Additionally, we're exploring more sustainable logistics methods.

Sustainability is a key focus across our product portfolio, which includes medical and hygiene products. Despite the diversity of products, each brand must align with a purpose linked to specific SDG. For example, Vanish aims to extend clothing lifespan to promote responsible consumption (SDG 12). While our products currently use plastic packaging due to compatibility reasons, we're committed to reducing plastic usage through technological advancements and collaborations. Reducing plastic becomes crucial in aligning with our mission of driving behavioral change and improving sustainability.





You have a product brand Finish, and there is a project about Tomorrow's Water. Are there any research and development studies in your other brands? Also, can you give us a little more explanation about Tomorrow's Water?

Each of these basically goes scientifically with other partners. Like, we are working for Tomorrow's Water with partners like National Geographic, TSKB BANK. Right at the end of the day, where we actually, before we launched the project with the bank, we tried to understand what the current behavior is.

We realize that every time that people are feeling because they don't believe that all dishes will get clean without having to clean the dishwasher. So, obviously, when every household with every time the previous is missing 57 liters for water, you can calculate the amount of impact that just having the planet. But you need for this project the right partners to amplify the message. That is why we became partner with National Geographic to see how much water is getting wasted and why water is precious.

I think partnership is also an extremely important journey. Also, there's a lot of science behind it because we are trying to work with different partners consumers. Now I'm talking statistics from all over the world. People don't wear the same garment more than 5 or 7 times right after a certain period of time.

When I was young, which was more the case back in the day, most of the garments were made of cotton. Cotton garments were generally more durable, and the cost of a wardrobe was much higher. Synthetic garments, on the other hand, were cheaper but more fragile. So, they don't last as long, that contact vanish is working with its science partners to we can make the existing garment last for longer, basically making sure that the colors look as vibrators before all the colors don't get damaged or less color runs in the in the machine, etc., and things like that.







So, the liquid product of Vanish is also depends on the kind of format it might not be suitable for certain garments, for example, powder cannot be used on, but liquid can basically. But we drive this awareness through the packaging label instructions and that way to use.

How do you manage to reach your 2030-2050 sustainability goals?

We are committed to doing well and doing good together. So obviously, from a company point of view, we have clear KPI's for 2025 and 2030, which we are on track to deliver. The reality is that, just a few years back, versus today, in a personal life, it's about making personal choices. So, I think from that point of view, education and awareness are key. Somewhere down the line, basically, it's not only one person's responsibility or one company. I think each one of us can come together, and at the end of the day, each one of us doing a small bit can have a massive network impact and influence. You can imagine, you can multiply if 7 million houses and every day, if you're saving 57 liters of water, 30 days times 365 times 5 times 7 million houses, is there any of my projects that are on that, you know, that will get you to achieve your goal, like in the 2013, he's one of the Rings have the clear pipeline in terms of how they're going to impact. There are pipeline projects which are working on how I reduce my packaging, make more packaging have higher PCR levels. So, from that point of view, at the end of the day, I'll be at a certain point. The magic is in the river of the execution always, right there because the more you execute, the more impact that you can have. So, at the end, where to get the way to impact the carbon footprint is those steps that I already outlined. So that's a continuous journey. It never stops. You're at a certain point. Now suddenly, there's a science which has been a chemistry and is made available to companies like ours. Obviously, we will see makeup products more sustainable.

How do you affect people by your products about sustainability?

Educating consumers through advertising and partnerships is crucial. Brands like Lysol, which are focused on breaking the chain of infection, work with schools and hospitals. Somewhere down the line, because obviously, children are the agents of change, etcetera. So, if you drive the right behavior change in terms of handwashing in the schools at home, a combination of partnerships like the ones with schools that we do, partnerships can be the one with the banks that we do to educate consumers on how to save water, etcetera, and all of that. And of course, then you go out and bring scale to that through advertising.

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“Polluted Water Popsicles”



To draw attention to the issue of pollution, three Taiwanese students have launched a project titled “Polluted Water Popsicles.” This project features 100 popsicles made from polluted water collected from Taiwan’s lakes, rivers, beaches, and harbors. These popsicles, containing contaminants such as garbage, heavy metals, plastics, arsenic, mercury, nitrates, or lead, highlight the dramatic state of the planet’s waters. The project, executed by students from the National Taiwan University of Arts, includes photographs taken by Hung I-chen, one of the three artists behind the initiative. [1]


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1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE AND JUSTICE STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS
THE GLOBAL GOALS
For Sustainable Development


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