

PLASTIC HEALTH SUMMIT - AMSTERDAM, OCTOBER 21st 2021



PLASTIC HEALTH



Organized by the Plastic Soup Foundation in collaboration with the Plastic Health Coalition, with the central concept of "ONE PLANET, ONE HEALTH", the talks were organized in four categories:

EXPOSURE AND TOXICITY ENVIRONMENTAL JUSTICE PLASTIC AND ME NEW GENERATION

This report mainly includes the detailed talks of the first two parts "Exposure and Toxicity" and "Environmental Justice". The other interventions are simply summarized here. However, you can watch them in their entirety by following the links indicated.

Short Video Summary: https://www.youtube.com/watch?v=scHzwJJvHfM



PLENARY OPENING

1. Maria Westerbos, Founder & Director, Plastic Soup Foundation

Does plastic make us sick?

This is a question that was already asked two years ago at the first summit. In recent years, more and more scientific evidence shows that plastic represents not only a danger to our health, but also our children's health as well as the future of humanity. We have less than ten years to solve this plastic crisis, otherwise it will be too late. Climate change, biodiversity loss and a global pandemic are threatening us all. Despite this, large corporations continue to deplete the Earth's resources by putting profit before common sense. The plastics crisis is a direct result of this nonsense.

Maria calls on the World Health Organization to consider the plastic crisis as a public health crisis. The UN must also address the massive production of plastic as a violation of our human rights.

Recorded intervention

2. Jo Royle, CEO & Founder, Common Seas

Only 30 people in the world have had their blood plastic levels checked, and Jo is one of them. Jo's blood contains pieces of plastic! And chances are, so does ours.

We can't allow plastic to get into our bodies the way we've allowed it into the oceans.

Three aspects worry scientists. First, the very presence of plastic particles in our bodies. The body cannot destroy them, and autoimmune diseases, such as diabetes, may result. The second aspect is the chemical toxicity. 144 chemicals known to be hazardous are used in food packaging. Scientists show that through the digestive system of a mammal, these chemicals are released 30 times faster. The third aspect is



vector transfer. Bacteria build a biofilm and settle on plastics. Some microplastics thus contain pathogens. As we breathe and swallow microplastics, it facilitates the entry of these harmful agents into our bodies, increasing the risk of making us sick.

In 1950, 2 million tons of plastic were produced per year, whereas in 2019, 370 million tons were produced. Plastic is everywhere. Is it really a surprise to find plastic in our blood when we find it in our water, the air and soil? The plastic problem is not just an ocean problem. Today, we humans are the species most affected by plastic. To solve this problem, we must reduce the amount of plastic in our world, in our lives.

Over the next twenty years, it is expected that \$2.3 trillion will be invested in new plastic production plants, causing production to double. This shows how far we are going in the wrong direction. It is a disaster for us and for the environment.

We have the right to know if it impacts our health. There are several studies underway. Common Seas is supporting research on several subjects such as the types of microplastics in the blood, the health



risks of microplastic accumulation in intestinal and brain tissue, the potential for microplastic accumulation in our bodies when we eat food packaged in plastic, the pathogens present in diapers that are thrown into waterways in Indonesia and the risks of diseases, especially childhood diseases, which they can induce locally.

But we need to go further than these few studies. We must call on our governments and philanthropists to significantly fund research on the effects of plastics on our health. Last June, 80 NGOs, scientists and Members of Parliament called on the UK government to set up a £50 million fund for research into the health impacts of plastics.

We need to understand the effects of plastics through scientific study but at the same time, as production and our exposure to them continues to increase, we cannot wait for a full body of scientific evidence before we start to reduce plastic production. We have seen in the handling of the climate crisis that science alone will not stop the problem. Science has been issuing warnings regarding the consequences of climate change for 70 years now. The plastic crisis is linked to the climate crisis by the same industries. The gradual withdrawal of fossil fuels, 20 years too late, does not make the oil companies reduce their growth. They are now building plastic production plants and investing in marketing campaigns which are telling us that we cannot be sure of the harmfulness of plastic. The same marketing campaigns also said it was not certain if fossil fuels were responsible of global warming.

That's why we need the most incredible and committed advertisers, storytellers, and activists to counter these sellers of doubt with the power of marketing tools.

And to reduce our exposure to plastics, our governments must address the problem and protect their citizens, set targets and enforce reduction ratios, put in place policies that make production reduction a priority and hold companies accountable. The polluter must pay. Plastic producers must reduce their production of single-use plastics rather than increase their production capacity and invest in recycling technologies. Currently only 20 companies are responsible for 50% of single-use plastic waste.

We need companies that provide us with products that do not generate waste and that participate in the circular economy.

Finally, we need to act as citizens and not just as consumers. We need to act with our ballots, in the stores, and in our professional lives.

No one wants microplastics in their bloodstream and since we know how to reduce exposure to plastics, let's do it!

Recorded intervention

3. **Dr. Dick Vethaak**, Expert on micro- and nanoplastics, Deltares and Vrije University Amsterdam

Does microplastic affect our health?

One thing is certain: plastic pollution will continue to grow and therefore our exposure. Plastic doesn't break down; it gradually fragments into smaller and smaller pieces. So, the plastic waste which is already in the environment will produce microplastics and the level of particles will be increased constantly. We are already having a hard time dealing with this pollution now, so what is going to happen in the next couple of years with the future additional plastic waste? The more plastic there is, the more microplastics there will be. Some scientists say we are sitting on a plastic time bomb.



Microplastics are small and very complex particles composed of multiple components such as numerous additives, biological and chemical co-contaminants. Their surface changes depending on their environment and the age of the particle. We also found that particles do not react in the same way outside and inside the body, or through tissue barriers.

Dick analyzed his vacuum cleaner bag after cleaning his house and workshop. He found microfibers and various other plastic particles such as fragments from the paint on his walls and primary microplastics used in cosmetics or cement powder. He also looked for smaller elements in the water with the microscope and found microfibers. On an even smaller scale, synthetic microfibers were found in mussel tissue from the North Sea.

Currently, we are not yet able to analyze nanoplastics smaller than 0.0001 mm found in the environment or biota, and this is a problem. However, there are promising advances.

To analyze the risk of our exposure to microplastics, a simple equation applies: Risk = Hazard * Exposure. Exposure makes all the difference in this equation. And some individuals or groups of individuals are more vulnerable than others to dangerous exposures.

Referring to air pollution, we know that fine particles that come into contact with our mucous membranes or are absorbed by our body induce an immune response that can produce oxidative stress and chronic inflammation. Concerning microplastics, there is currently very little direct evidence that they can produce this kind of effect. For now, we already know that workers in the textile industry, who are exposed to very high concentrations of plastic dust, develop respiratory diseases and even cancers.

However, we have more and more indirect evidence. Studies on laboratory animals show that by swallowing and breathing plastic particles, they can cross intestinal membranes, enter the circulation, cause systemic exposure, accumulate in certain organs, and cause inflammation. Most of the effects observed are immune and inflammatory reactions.

Other studies suggest that microplastics can damage DNA and cause developmental disorders.

Finally, studies carried out over the last two years on cellular models in the laboratory have shown that certain small particles can cross the intestinal walls, the lungs, the placenta, or the blood-brain barrier. They could therefore impact the functioning of placental or brain cells.

As far as exposure is concerned, we know that microplastics are everywhere, in food, in drinking water, in the air, etc. There is currently no standard methodology to measure microplastics or nanoplastics. We have some data on larger microplastics and can make some inferences. We know, for example, that there is a higher concentration of plastic inside buildings than outside. Microplastics are particularly present in-house dust.

The main routes of entry of microplastics into the body are inhalation and ingestion, but access through the skin must also be considered.

One study estimated that, based on current knowledge, we would be exposed to 100 million microplastics per day including what is deposited on our skin. This number seems huge, but it is important to put it in perspective with the quantities of other particles, to which we are exposed, which can be even higher.

But how much micro plastics do we have in our body? What is the interaction between these microplastics and our cells? Do the doses that are present in our blood and tissues make us sick? What is the influence of their shapes and sizes on these effects? There are still many questions that need to be answered urgently.

The good news is that many institutions are interested, and large research projects have been launched in Europe. Like the <u>Momentum Microplastics and Health consortium</u> in Holland for example.



To conclude, there is still a lack of scientific data to know if microplastics represent a serious risk for our health. But there is more and more evidence that they can be dangerous. We need much more research especially on our internal exposure.

However, it will still take many years to get a full assessment of these risks. Probably 10 years. We

must apply the precautionary principle. The pressure of chemicals and particles on the environment and humans is increasing. And if you think about it, plastics have had a big part in this trend. Dick agrees with Maria that plastics represent a public health emergency.

The concept of "one health" must be emphasized. We share our well-being with that of animals and the environment. To protect our health, we must therefore protect the environment and other living beings. There is no more time to lose, we can no longer accept that the profit of big companies is more important than the health of our children.

Recorded intervention

<list-item><list-item><list-item><list-item><list-item><list-item><list-item><list-item><list-item><list-item><list-item><list-item><list-item><list-item><list-item><list-item><list-item><text>

EXPOSURE AND TOXICITY

4. **Dr. Heather Leslie**, Senior Researcher, Dept. of Environment and Health Expert in international (micro) plastics research, Vrije University Amsterdam

Plastic is the river of life

In collaboration with the University of Vrije and Plastic Soup Foundation, Dr. Leslie conducted a study focusing on microplastics, including nanoplastics, in farms. The study is called "Plastic in the river of Life" and focuses on plastics in the bloodstream.

Since the 1970s, scientists have conducted laboratory tests by feeding plastic powders to animals. After a few hours, they could analyze the amount of plastic in the blood and then in the tissues and organs. Once ingested, the particles enter the tissues and organs through the bloodstream. But these studies were conducted in the laboratory with intentionally dosed amounts.

To find out what happens in the real world, Heather's study project used a real-life situation of exposure to microplastics in the environment of farm animals to see how much could get into their bloodstream.



Blood samples were taken by a veterinarian from cows and pigs on several farms and analyzed in a laboratory in Amsterdam.

PVC was detected in the blood of all animals tested. Polyethylene and polymers containing styrene (such as polystyrene) were also detected in the samples of all pigs tested and most cows tested. PET and Polypropylene were also detected but in only a few individuals. In terms of concentration, PVC and styrene-containing polymers were the most detected.

This study focuses on exposure and not on the consequences of this exposure in terms of toxicity. This is the first time that exposure to microplastics in farm animals has been acknowledged.



Measuring microplastics in the bloodstream allows us to trace the source of what has been inhaled, ingested through water and food.

It is known that plastics are not digestible. We cannot metabolize them with our enzymes. This means it is possible that they are either redirected to the liver and eliminated by the kidneys or deposited in tissues and organs, which previous studies have shown. For lactating animals such as cows, another route of elimination may be through milk.

Since organs and tissues are all blood-fed, it goes without saying that there is a high chance of finding microplastics in the milk and meat of exposed animals. This will the subject of this project's next analyses.

Knowing that blood is the river of life, we must decide if we really want to let plastic into it or if we want a world with more dignity.

Recorded intervention

5. **Hanna Dusza**, Researcher, Veterinary Medicine at the Department of Population Health, Utrecht University

Microplastics and the placenta

Hanna conducted a study on microplastic exposure during pregnancy. What happens in the mother's womb during pregnancy is a determining factor for the child's health in the long term. The study focuses on pregnancy and mainly on the placenta, about which little is still known by the general public. The placenta is an incredible organ that develops during pregnancy. It brings oxygen and nutrients to the baby and is responsible for the elimination of its waste. It also functions temporarily as an endocrine organ producing essential hormones. Everyone, woman and man, has grown in a placenta. The placenta's purpose is to pass the mother's nutrients on to the baby. After the first trimester, the placenta is already very shaped and the size of a volleyball. Soaked in the mother's blood, 25% of the mother's blood passes through the placenta.

At this point, it is difficult to determine if finding plastic in the placenta is a problem, but conclusions can be drawn by looking at what happens with air pollution. Air pollution particles come from dust, dirt, and the burning of fossil fuels. These particles have been found in the placenta and several epidemiological studies linking pollution to exposure have shown adverse pregnancy outcomes such



as: premature deliveries, preeclampsia, miscarriages and even stillbirths. Air pollution particles and microplastics are similar in size.

To analyze whether microplastics can enter the placenta and affect it, a team of scientists used a placental cell called BeWo b30, which represents two very important cell types called: Syncytiotrophoblast and cytotrophoblast. These two types of cells are in direct contact with the maternal blood, and it is through these cells that the exchange of nutrients and oxygen occurs.

The outcome of this study is that BeWo b30 cells which are put in contact with microplastics will absorb plastic particles, even those up to ten micrometers.

But are they also transported through the cell barrier? The answer is yes. The larger particles accumulate, but the smaller ones make their way to the developing baby.

As for their toxicity, we need to look at the chemical molecules that can be released by these plastic particles. A recent study shows that there are more than 10'000 chemical substances associated with plastic. In addition, preliminary results from the study of placental cells show that these chemicals are released and disrupt endocrine function. Certain genes that are involved in the production of estrogen and progesterone are affected. These genes' role is to maintain a pregnancy. A drop in progesterone levels, for example, leads to premature delivery. We can therefore see that plastic particles can have the same effects on the placenta as air pollution.

Two studies have just been published showing the presence of microplastics in the fetus. This means that these particles are transported through the placenta and reach the baby.

Projects such as <u>Aurora</u> or <u>Momentum</u>, which bring together scientists and experts from around the world, are not only telling us more about the problems we face, but also provide solutions such as roadmaps for risk assessment and exposure prevention.

Studies: <u>Occurrence of Polyethylene Terephthalate and polycarbonate Microplastics in infant and Adult</u> <u>Feces.</u> <u>Plasticenta: First evidence of microplastics in human placenta</u>

Recorded intervention

6. **Dr. Patricia Hunt**, Meyer Distinguished Professor in the School of Molecular Bioscience Expert on transgenerational effects of exposure to EDCs, Washington State University

Chemical disasters on the endocrine system

Chemicals in plastic affect the health and fertility. It was by chance, while studying the impact of women's age on the risk of conceiving a child with a chromosomal abnormality, that Dr. Hunt discovered the endocrine disruption caused by chemical plasticizers such as bisphenols and phthalates. That was 20 years ago.

There is indeed a link between advanced maternal age and Down syndrome. By the age of 40, half of a woman's eggs are chromosomally abnormal.

Early in her research, Dr. Hunt suspected that the hormonal signals controlling the growth and maturation of an egg begin to change with age. Experiments with mice seem to support this hypothesis. However, as the experiments progress, control mice also begin to produce eggs with chromosome defects.

This led Dr. Hunt to investigate whether the environment of the mice contained endocrine disruptors. The boxes the mice lived in and the bottles they drank from were made of plastic and showed signs of



deterioration. The person in charge of the cleaning, used a detergent to clean the boxes which had gradually altered the polycarbonate plastic. The effects on the mice started long before the deterioration of the cans was visible. The link was made!

There is now ample evidence that exposure to these types of chemicals – to which we are all exposed – can have an impact on fetal development and affect both male and female fertility. Even if all these chemicals were to disappear from Earth, the effects would still be seen in future generations, since the effects are transgenerational.

All species on the planet are impacted.

One of the effects of BPA (Bisphenol A) that Dr. Hunt studied occurs at the very beginning of the process of the egg creation. Eggs start to form and develop while females are in the womb. Therefore, if a mouse mother is exposed to these chemicals during gestation, subtle changes occur in the egg production of her offspring. By the time they become adults, half of the eggs produced by the new generation of females are abnormal.

What about other species? Dr. Hunt conducted the same studies on monkeys and worms and the results were similar to those of mice. This led her to conduct studies on humans which turned out to be much more complex. Humans are exposed to many more chemicals, such as other bisphenols and phthalates, that have the same effects on the hormonal system as BPA.

Like alcohol or food, when a person ingests chemicals, they are metabolized and excreted through urine. Urine is therefore a good indicator to understand the level of exposure since it reflects what has entered the body. By analyzing urine samples, using a modern indirect detection method via metabolites developed by one of his chemist partners, Dr. Hunt found huge amounts of bisphenol A in some individuals. The levels were so high that they found themselves having to defend their data and their method. She questioned the traditional direct methods used to detect BPA and indicated that human exposure to BPA had been underestimated. These direct methods were used to define acceptable levels of exposure at the regulatory level.

Dr. Hunt's indirect methods have also detected other substances, such as phthalates, for which she wonders if exposure levels have also been measured incorrectly. There is still much work to be done to be truly certain of the level of human exposure to these toxins.

Here are three final suggestions from Dr. Hunt.

First, it is important to support chemists. Support them in developing green chemistry because they can design safer chemicals and make sure they are safe before they are put on the market. It is also necessary to support them in the development of analytical tools for chemicals. This would allow us to verify if our past measurements are correct, especially the human exposure measurements. Secondly, the fact that these chemicals can be transgenerational is incredible. Geneticists need to understand how these chemicals work, and that is how they will get the key to counteracting their harmful effects. Finally, transparency must be the order of the day. As individuals, we need to know where these chemicals are used so that we can understand how we are exposed to them and be able to manage our exposure.



7. **Dr. Raymond Pieters**, Associate Professor Veterinary Medicine at the Department of Population Health, Utrecht University

What does air pollution do to our immune response?

To understand whether microplastics can affect our health, our immune system, Dr. Pieters suggests looking at what happens when immune cells are exposed to plastic.

His analysis focuses on dendritic cells, which serves as a sentinel to the immune system as it analyzes what is in its environment and cleans up what should not be there. By exposing a dendritic cell to a large polystyrene particle, Dr. Pieters noticed that the cell seems to try to engulf it but fails to do so, then eventually chokes and dies. The particle is then released again, and other cells take over with the same consequences. He then shows what happens when a smaller particle is inside a dendritic cell. The particle seems to interact with the cell, which becomes activated and produces all sorts of molecules sending signals to other cells to help it. But it does not manage to solve the problem. Indeed, this system can destroy bacteria but does not seem to be able to destroy this type of particle. This would probably lead to inflammation.

There are only assumptions for the moment, but they are based on what we already know about the inflammatory effects of ambient particles in the air. It is known that particles in the air affect our lungs. Studies carried out on mice exposed to ambient particles collected in the environment have shown inflammatory effects because of this exposure. By performing the same study with polystyrene particles, inflammatory responses were also identified. The scientists even managed to make mice allergic to polystyrene. It is therefore certain that these polystyrene particles can affect the immune system. Whether this is the case in the real world is difficult to say because of the lack of exposure data. However, we already know that there is an increase in inflammatory cells in humans exposed to these particles.

Dr. Pieters, conducted a study with volunteer cyclists. These cyclists rode at 20 kilometers per hour for 5 hours in different urban settings (parking lot, truck route, subway). After analyzing their blood samples, Dr. Pieters found a 30% increase in neutrophils (leukocytes involved in inflammatory responses) only two hours after their last cycling session. The next day the level was back to normal. What happened to these particles remains unknown to this day. Do they wander around in our body? Do they go to the liver or the spleen and wait for other particles to arrive and accumulate, which could have long-term effects?

He also suspects inflammatory responses on intestinal immune cells.

It is important to have more information about exposure to these chemicals, and for this Dr. Pieters has received European funding for the Polyrisk project which will study the relationship between human exposure and effects on the immune system. In this study, they will analyze human exposures and their effects in real-life exposure contexts such as the textile industry, indoor sports fields with synthetic turf, road traffic, tire factories and also what happens when you drink from a plastic bottle.

These teams also collaborate with the Momentum and Aurora projects. Aurora and Polyrisk are part of a group of European projects called <u>CUSP</u>.



8. **Dr. Bas Van Der Zaan**, Senior Scientist, Expert in environmental microbiology, Deltares

Microplastics in air and water

Dr. Van der Zaan presented the first results of his research on the microbiological risks of microplastics circulating around the world. Microplastics that enter the environment are colonized by microorganisms such as bacteria, fungi but also viruses.

Microorganisms need surfaces to grow and live on, which are given by microplastics. The numerous microorganisms that develop on microplastics create their own environment, which is now called the plastisphere. These numerous species can travel on microplastics all over the world to and from different environment. With still very little knowledge on how it impacts our health, it is important to start by knowing the environments in which plastics and microorganisms meet.



This is the case of wastewater treatment plants (especially from households and road runoff). In the water treated in such plants, there are all kinds of chemicals, different organisms such as fecal bacteria or different viruses with potentially pathogenic characteristics. After treatment, which only removes certain elements such as phosphorus and nitrogen, the water is released into rivers or the sea, with bacteria and microplastics that can form clusters and thus enter the environment.

On a trip to Jakarta, Dr. Van der Zaan discovered crowded riverbanks where poor people, lacking waste management and sanitation facilities, dumped everything directly into the water. Agricultural land is also often found along these same rivers. Plastic waste is buried in the sediments with many microorganisms, including some pathogens, which are then in contact with these plastics. Shortly after this trip, he decided to start researching the types of organisms that can grow on plastics, what resistance they have and how long they survive. Different samples of water and plastics of various sizes were collected from rivers in Indonesia and the Netherlands. The results differ according to the size of the plastics. The population of microorganisms found on the smallest pieces of plastic (<10 micrometers) is quite similar to that found in the surrounding water. On larger pieces of plastic (100 to 500 micrometers), a biofilm can develop in which a wide array of microorganisms can be found.

Microorganisms are therefore present on plastics collected in rivers, but are they harmful? Following a study on the effects that microplastics colonized by bacteria have on the immune system, it appears that the larger the size of the microplastic, the greater the activity of the immune cells. It also appears that the environment matters because the immune responses are different depending on the cleanliness of the water in which the plastics are collected. The dirtier the environment (water leaving treatment plants, agricultural runoff), the more antibiotic-resistant bacteria there are and the greater the immune response. It is therefore clear that there is a risk of harm that depends greatly on the environment in which the microplastics circulate.

It is important to do more research to identify which environments are the most harmful and how long these organisms survive. Dr. Van der Zaan is currently working with the organization Common Seas to study used diapers collected from the Brantas River in Indonesia. Pathogens are present in the diapers and the diapers degrade in the rivers over time. He hopes to present results in 2023.



9. **Dr. Esperanza Huerta Lwanga**, Researcher in Soil Ecology, Microplastics specialist in terrestrial environments, Wageningen University & Research

Microplastic in the soil

At the end of wastewater treatment, microplastics are therefore found in rivers, but they are also found in the soil when sewage sludge is used as fertilizer. Following a study made in 2019, it appears that a correlation exists between the number of applications of sewage sludge as fertilizer and the concentration of microplastics in the soil.

Compost is also a source of microplastics. Analyses done in 2021 in Spain and the Netherlands found microplastics in soils where compost was used. Plastic mulches used in agriculture can also cause damage if left in place, as they will be broken down by UV light and wind. Soils on which plastic mulch is used have a higher concentration of microplastics than soils where compost is used. The sizes of these microplastics are between 50 and 150 micrometers, the same sizes as the fragments found in the placenta in Hannah's study, or in the bodies of farm animals studied by the University of Utrecht.

Poor waste management is also a source of microplastics. 20% of all waste is plastic. When it is burned in the open, it becomes a problem for the soil. This practice has been used for a long time in Europe and is still used in Southern Europe, Latin America, etc., because of the lack of efficient waste management systems. While analyzing home gardens in Mexico, Dr. Huerta Lwanga found microplastics, scattered in the soil, in the bodies and excrements of earthworms, as well as in the crop and gizzards of chickens that are consumed by humans.

If the soil contains microplastics, an ecosystem is disturbed as a whole, including all its subdivisions: the organic part, the water flow, the aggregates. This has a consequence on the plants. The varieties of plants must adapt as well as the organisms that surround them.

Photosynthesis is also affected.

A study by Qi et al in 2020 showed that the diversity of microorganisms and bacteria present in the soil at the root level of plants changed in the presence of microplastics (whether fragments of bioplastics or low-density polyethylene).

Another study by Li et al of 2020, found that nanoplastics could accumulate in plant roots. In Italy, scientists also found microplastics of about 1-2 micrometers in an apple and a carrot.

Earthworms are good indicators of soil quality. If there are microplastics in the soil, the worms can ingest them, carry them in their bodies, lose weight and depending on the concentration die. Microplastics can also be transported into deeper soil layers as some worms are known to tunnel. By analyzing earthworm droppings, Wageningen University found that the microplastics detected were smaller than those found in the surrounding soil. Bacteria present inside the earthworms were found to be able to degrade the plastic.

The transport of microplastics can also occur when farm animals ingest microplastics. This is the case in Spain where plastic mulch is left to rot and animals graze on the same spot.

Dr. Huerta Lwanga also conducted studies on agricultural soils in the Netherlands in collaboration with the Plastic Soup Foundation, the highest concentrations of microplastics were found on agricultural land where plastic mulch was used.

To make further progress about micro- and nanoplastics in agriculture, there is a project called <u>Minagris</u>, in which different stakeholders are involved.



10. **Dr. Terry Collins**, Terasa Heinz Professor in Green Chemistry, Director of the Institute for Green Science, Carnegie Mellon University

Endocrine disruptors: a lethal challenge to civilization

Europe has developed a brilliant strategy to regulate chemicals for more sustainability that gives Dr. Collins great hope.

A field that was heavily polluted when he was a child in New Zealand has been transformed into a beautiful place, thanks to a citizen's initiative. The field's chemistry has been changed by the cleanup.

At Carnegie Mellon University and the Green Science Institute, his teams are also working to create a chemistry that can clean up the chemistry, making sure they don't create new products that are even worse than the previous ones. They are paying particular attention to the analysis of the risks of endocrine disruption at low doses. It's really thinking about the future



in the present. Those like Dr. Collins who know about the subject need to speak up. We could have a good future where children grow and thrive just like the rest of the living world. But that requires massive change.

Dr. Collins has been teaching green chemistry since 1992. All these years have made him realize that the problem is not with the development of science but with humans themselves.

Endocrine disruptors are agents outside of our bodies that interfere with the production, release, transport, actions, and elimination of our natural hormones. These hormones regulate our body (homeostasis). The endocrine hormones tell our cells what to become. For example, during gestation, endocrine hormones send signals to stem cells to become brain cells, lung cells, or other cells when the time comes.

Endocrine disruptors should therefore be banned!

The book "Our stolen future" that Dr. Collins read in the 90's, as well as "Silent Spring", made him realize what Chemistry could do. These books already mentioned endocrine disruptors.

Shanna Swan's most recent book "Count down" highlights the decline in our reproductive potential. Between 1973 and 2011, men in Europe, North America, Australia, and New Zealand lost over 50% of their spermatozoids. The decline is certainly continuing since then and is expected to approach zero by 2045.

For Dr. Collins, chemicals are the major cause of these effects. All societies where chemicals are used extensively have a low birth rate. Where data on spermatozoids counts exists, it shows a collapse. In China, where there is little vigilance and people are highly exposed to chemicals, sperm counts are plummeting.



This did not happen intentionally at the beginning. On the other hand, now that we know these effects, we can ask ourselves who is responsible for this. Today, when a chemical technology is developed, which interests people, or which can allow some to get rich, you can create a company. The problem is that it is not only the functionality of the chemical that matters. We must be able to integrate health, environmental and justice performances with technical and cost performances to define whether a chemical is truly sustainable. This means really making sure that chemicals are free of endocrine disruptors. Dr. Collins believes that 90% of the harmful effects of chemicals occur at low doses with the best-known primary mechanism of endocrine disruption.

He and a group of scientists published a study protocol in 2013 entitled: "Creating the Next Generation of Endocrine Disruptor-Free Chemicals." It appears that the European Union has taken an interest as they are developing tests like those suggested by this protocol.

Two incredibly naive assumptions are common in the chemical industry. The first is to think that you can make a chemical that has great properties and that it won't imply other properties when you put it on the market for all sorts of applications. The second assumption is to think that we are so good at toxicology that we will be able to identify bad products and bad producers. The problem is that the regulation of toxicology is based on old ideas that are not adequate to deal with endocrine disruptors. This is the most important thing to do.

The European Union wants to make sure that endocrine disruptors are tested.

All this echoes perfectly with the issue of plastics. For example, the monomers that were mentioned in the previous presentations: bisphenols A, polycarbonates. In Holland, there are many greenhouses that are made with polycarbonate plastics. When these plastics are buried in landfills, they decompose, and release bisphenol A. Landfill leachate is so estrogenic that nothing can live in it.

Also, as mentioned earlier, polymers are far too stable. There is none that degrades in a reasonable way. The additives used are very often endocrine disruptors. We must try to recycle but none of these materials really recycle very well. And we know nothing about their toxicity. Talk of a circular economy is a fantasy. The plans to recycle plastic waste into bricks and build houses for the poor are well-intentioned, but the people elaborating such projects don't know enough about the subject. The plasticizing additives will be released in the house with time and will be breathed in by its inhabitants. It takes a lot of knowledge to embark on this kind of project.

Many of us say that we have not been conscientious enough with the chemical industry, which has a gigantic power.

The documentary film "Dark Water" bears witness to the crimes committed by the Dupont Company, which consciously poisoned the people of Parkersburg, Virginia, for decades. It took many years of trials before a conviction. This story shows the inequality of consequences for the people involved. Residents of Parkersburg developed cancer disproportionately, miscarriages skyrocketed, and other illnesses. In contrast, the people in charge on the DuPont side had a raise. The CEO at the time, Charles Holliday, left the company in 2008 and became a board member of Bank of America and then chairman of Royal Dutch Shell. Another official, Thomas Connelly, is currently the CEO of the American Chemical Company.

We should be having a great discussion about the business side of chemistry. But we don't.

The chemical agency's discourse shows a totally idyllic picture of chemicals. All the things they produce are wonderful and useful. Yet there are endocrine disruptors everywhere.



What can we do about it? Our civilization needs the people who are fighting for a more sustainable world to win against those who are responsible for the disaster. To win, we need to learn how to make green chemicals that make money. This requires testing for endocrine disruptors.

It is critical that sustainability comes before profits. It's time to love the future. The manufacturers of endocrine disruptors have cornered society on a deadly and unsustainable path. They recruited scientists to bring in data showing that there was no problem. Most of his data is meaningless. Then there are the investors who make a lot of money, then the politicians who get money from the



chemical companies, then those who patrol the aisles of power in Washington and Brussels to persuade the leaders that they don't have to worry about future generations.

Today's money-oriented society is failing massively.

The European Union must follow through on its strategy to regulate chemicals for sustainability. It is imperative to move from the current "no data - no problem" model of regulation to a "no data - no market" model.

<u>Book recommendation</u>: Silent Spring by Rachel Carson / A Stolen Future by Theo Colborn / Count Down by Shanna H. Swan <u>Movie recommendation</u>: Dark Waters by Todd Haynes - <u>Trailer</u>

Recorded intervention

ENVIRONMENTAL JUSTICE

11. **Dr. Susan Sawn**, Professor, School of Public Health, Albany NY, Shaw Institute Founder & President

Plastic trade is killing children

Today 600 million tons of waste are sent to 50 giant landfills around the world. In some countries, children as young as 5 years old are sent to the landfills and learn to dismantle electronic waste with their little hands, for long hours 7 days a week. This is the system and the jobs that the rich countries and their overproduction of plastic waste have created. Most of this waste goes from rich countries to low-income countries and is included in the recycled waste statistics. The global waste trade ends up in the hands of these children.





Recent studies have shown that only 20 oil companies, such as Exxon Mobil, Dow, Sinopec, are responsible for 55% of single-use plastic waste as they produce the main polymers used in our everyday products. As for consumer brands, a few large groups such as Coca, Pepsi, and Nestlé are the main users of these polymers for their disposable plastic products.

By 2050, plastic production could quadruple, which will only increase the volume of waste sent around the world.



In developing countries, 90% of waste is burned in open fires, about 620 million tons per year. And this creates extremely toxic fumes. In Accra, Ghana, there is the largest open-air electronic waste dump. Children add pieces of Styrofoam to the tires to make the fire hotter and easier to recover the metals inside the electronics. Burning plastic is a toxic nightmare. Hundreds of thousands of toxic substances are released: additives, plasticizers, particles, combustion products...

The toxicity of these fumes is known to affect the health of firefighters. Dr. Shaw and Dr. Kannan, in a study, showed that right after a fire intervention, the blood of the firemen contained high levels of carcinogenic substances such as flame retardants, fluorinated products, dioxins, and other yet unidentified toxic products. The toxicity of these fires comes from the fact that our houses are nowadays full of plastics (furniture, mattresses, electronics, insulation...). The protections are not enough to protect the firemen from this toxic soup. Cancer is the first cause (70%) of mortality among active firefighters.

The Western trade of plastic waste kills children who live in these toxic fumes from a very young age. This is a total violation of human rights.

A recent study published by Dr. Kannan of NYU, showed that babies' feces were full of microplastics, ten times more than adults' feces. This is in line with another study that showed that exposure to microplastics begins during gestation.

All of this sounds many of the same alarms that science has raised about other public health issues, such as the end of birdsong in the 1950s, tobacco in the 1960s, flame retardants in children's pajamas in the 1970s. But these battles then lasted several decades. We don't have that kind of time.

The Shaw Institute is currently collaborating with NYU Langone Health to analyze the high exposure of child waste sorters to understand what substances enter their bodies, at what concentration, and with what risk of getting sick from exposure as they grow.

The World Health Organization recently recognized the plight of these children and called for action and more scientific research.

The tsunamis of e-waste are growing and the children in contact with it do not know that plastic is toxic. By poisoning these children, we are poisoning ourselves. This shows our ability to care for future



generations. This is part of the moral challenge of the 21st century. We need to make these waste collection jobs obsolete, and to do that we need to radically change the waste business.

Recorded intervention

12. **Jojo Metha**, Co-Founder & Executive Director, Chair, Stop Ecocide International, Stop Ecocide Foundation

The concept of ecocide

Polly Higgins, now deceased, was the person who introduced Jojo Metha to the concept of ecocide and his commitment to incorporating ecocide into international law to protect the planet.

In 2017, Polly and Jojo launched the Stop Ecocide International campaign with the ambition to amend the Rome Statute of the International Criminal Court to include the crime of ecocide with three goals in mind. The first is to create a coherent legal basis that applies to many jurisdictions because the worst polluters are often transnational corporations. Second, the adoption process requires time and support. During this time, in anticipation of the law's passage, momentum can build and accelerate positive behavioral changes. Finally, it is a strategic legal intervention that creates a new moral taboo by criminalizing, at the highest level, serious harm to nature.

Each stage of the plastics life cycle unfortunately creates opportunities for ecocidal practices. The International Energy Agency has recommended that all new fossil fuel extraction projects be halted, since they already pose a threat to our climate. The chemical processes required to produce plastic can cause severe air and water pollution. It has also been recognized that even during its use, especially in synthetic clothing, plastic causes significant micro and non-plastic pollution that can be measured in the bodies of human beings. Finally, at the end of our still very linear approach of production and consumption, the problems linked to plastic waste are multiple: pollution of the oceans, threats on marine ecosystems, creation of dioxins and the most deadly poisons during their incineration, etc. If we take into account all its impacts, plastic pollution is considered by some scientists as a 10th planetary limit, which if exceeded, can unbalance the earth system and threaten the survival of the human species.

The use of plastic products can hardly be considered a crime at the international level, but what happens at the end of the life cycle, during production and disposal, is a different story.

Today, corporate managers have a fiduciary duty to maximize profits, which leads them to favor the cheapest substances and supply chains, and therefore often those that take the least account of environmental impacts.

International recognition of the crime of ecocide would create individual criminal responsibility for key decision-makers at the highest level, change certain standards, and deter harmful practices.

In June 2021, a panel of leading international criminal and environmental lawyers proposed a legal definition for the term ecocide, inspired by their diverse legal expertise and experience. This definition was drafted with ecocide in mind as the 5th international crime in the Rome Statute of the International Criminal Court, alongside

"ecocide" means unlawful or wanton acts committed with knowledge that there is a substantial likelihood of severe and either widespread or long-term damage to the environment being caused by those acts.



genocide, crimes against humanity, war crimes and the crime of aggression.

This text builds on legal precedents and addresses the worst possible harms, while taking into account and reinforcing existing laws that may vary from jurisdiction to jurisdiction. It addresses both the seriousness of the potential harm, and the illegality or recklessness of the act. This means that even if the activity is legal, if its impacts are disproportionately severe, it may fall under this definition. Like other crimes listed in the Rome Statute, ecocide is defined as a crime of endangerment and therefore does not necessarily involve actual material harm. For example, directing an attack against a civilization is considered a war crime even if the population is not harmed in the end.

Bangladesh, Brazil, Bolivia, Belgium, Canada, Chile, Finland, France, Luxembourg, the Maldives, the Netherlands, Spain, Sweden, the United Kingdom, and Vanuatu, 16 member states of the International Criminal Court, are already publicly talking about ecocide legislation at the government or parliamentary level. Scotland, the European Parliament, the Nordic Council and the Inter-Parliamentary Union are also talking about it. Others are talking about it in a less formal way. Senior insurance executives and political advisors confirm that it is well underway. It is clear that this law is on its way, the organization Stop Ecocide International estimates that the States could ratify it within 4 to 5 years. Until then, nothing prevents us from continuing to fight plastic pollution through criminal law or otherwise.

Stop Ecocide International https://www.stopecocide.earth/

Recorded intervention

13. **Jane Patton**, Center for International Environmental Law, International Pollutants Elimination Network

Social injustice caused by Formosa

In October 2021 CIEL published the report "The Formosa Plastics Group: a serial environmental and human rights offender". This is a case study that demonstrates how the plastics industry is a threat to human health, human rights, ecosystems, and the climate.

What is described in this report is not unusual. Around the world, communities living in the shadow of plastics factories are experiencing similar disasters and telling the same stories. This demonstrates how the industry poses a significant and recurring threat.

The Formosa Plastics Group was founded in 1954 and is now the largest Taiwanese conglomerate. It has operational plants in Taiwan, China, Vietnam, Indonesia, and the United States. It is involved in many business sectors such as petrochemical production, oil exploration, drilling, refineries, power generation, steel, textile, pharmaceuticals, electronics, automotive and others. In 2018, the group reported revenues of \$78.3 billion with profits of \$13.1 billion.

The group's structure is complex. It includes many subsidiaries or associated companies, with executive members sharing or overlapping in the organizational chart. This makes it more difficult to identify the correct jurisdiction for the entity responsible for any loss.

The report focuses on the Group's plastics and petrochemicals activities. The products manufactured by the organization include ethylene and the resulting plastics (PET, PELD, HDPE, ...), propylene and the resulting plastics (PP), vinyl chloride and the resulting PVC of which Formosa is one of the world's leading producers. Many of these products, their compounds and additives are known to be carcinogenic to humans or to have other toxic impacts.



Because of the toxicity of chemical inputs and associated by-products in petrochemical and plastics production, plastics refining, and manufacturing processes pose inherent risks to human health and the environment.

Moreover, when such hazardous industrial processes are managed by an organization with a reputation for environmental health and safety violations, the surrounding communities and employees are at even greater risk. An overview of major incidents in the history of the Formosa Plastics Group illustrates the human and environmental toll of the organization's business practices. In the United States, Cambodia, Vietnam and its home country of Taiwan, the company has a huge track record of endangering the public for private gain. There are thousands of victims. Some have lost their jobs; others have been injured or even lost their lives. And the environmental damage is colossal. It took 10 years of sample collection and civil trials to bring to trial one of the Group's Texan entities responsible for leaking billions of plastic pellets into the environment. In 2019, Formosa agreed to pay

\$50 million to settle the case.

Yet the company continues to grow. Numerous new chemical plant projects are underway. Even though the company has consistently violated all human rights, governments have failed to stop it. Some governments have even facilitated the damage.

The report includes a comprehensive and unique analysis of the methods used by Formosa to violate or be complicit in the violation of a wide range of human rights: violation of freedom of expression and association, arbitrary detention and torture, discrimination, violation of the right to information, violation of the right to a remedy, and in particular violation of the right to health and to a life in dignity.

CIEL therefore calls on the public and financial authorities to take several actions:

- to prevent Formosa Group from causing further damage
- to render justice to the public affected
- protect human and environmental rights by strengthening safety and environmental protection standards
- withdraw or not extend Formosa's operating and construction permits
- hold the company accountable for the damage caused in many countries and require them to clean up the affected areas or provide an appropriate remedy.

To prevent further similar damage, CIEL also calls for:

- Ban the construction of new plastic production plants
- Stop tax breaks or government funding of the petrochemical industry
- Stop private capital investment in petrochemical companies
- Exclude petrochemicals and plastics from financial products that seek to transition away from fossil fuels.

Read the full report <u>here</u>.



14. **Hugo Schally**, Head of Unit, Multilateral Environmental Cooperation, Directorate-General for Environment, European Commission

A global treaty on plastics

How do we bring about change? It starts with the acquisition of scientific evidence and knowledge. It is then translated into societal consensus. This consensus then leads to the development of policies that will enable action.

Hugo Schally was involved in the development of the European plastics strategy and in the drafting of the single-use plastics directive.

It is clear today that it has become urgent to approach the plastic crisis through its entire life cycle and not only at the waste management level. Furthermore, no single jurisdiction can address this crisis alone. Global action is needed. We currently only have conventions that address parts of the problem in a fragmented way. There are hundreds of initiatives that are commendable but do not address the problem on a global scale. We lack today a global treaty dedicated to this issue.

Yet the topic of preventing plastic pollution in the environment has been on the agenda of international discussions for years. Since 2014, all resolutions of the United Nations Environmental Assembly start by mentioning that the status quo is not an option. Yet it has remained a reality ever since. The main reason comes from powerful stakeholders who have consistently advocated for market self-regulation and voluntary action. For its part, the Ad Hoc Expert Group on Marine Pollution worked for four years and identified several options for moving forward. One of them, shared by the European Union and its members, is to negotiate a legally binding agreement on plastics. This agreement should fill the gaps in current regulations to address the impacts of plastics throughout their life cycle.

In 2019, at the United Nations Environment Assembly, a coalition of reluctant stakeholders succeeded in halting the process of negotiating an agreement. But since then, discussions at the Assembly on single-use plastics have motivated many countries to move forward and have grown the civil society coalition pushing for action.

Today, under the leadership of Peru and Rwanda, a growing number of countries, rich and poor, are seeking to promote a resolution at the next United Nations Environment Assembly in February 2022 that establishes an International Negotiating Committee on a global agreement.

Building on their internal commitments on the Circular Economy, the Green Deal, and the Plastics Strategy, the European Union and its members are working hard with more than 50 countries to ensure that this resolution is passed and that the mandate is broad enough to address the full life cycle of plastics.

The key points that the EU would like to see addressed in this agreement are:

- Setting standards for the design and use of products and materials

- Obligation to establish national plans to prevent, reduce and remedy plastic pollution

- Obligation of transparency and information of the entire supply chain of plastic and chemical products

- Establishment of monitoring and reporting mechanisms on the progress of implementation of this agreement and on plastic pollution

- For countries in need, establishment of mechanisms for technical advice, scientific and socioeconomic assistance, and financial support.

There is now a good chance that the Negotiating Committee will be established in February. The discussions are now more about what the agreement should contain. To reach an acceptable consensus, which does not minimize its content, we need to mobilize all stakeholders, including



industry and business. If all goes well, a Global Agreement could be signed within 2 years or more likely within 4 years.

Recorded intervention

15. **Lisa Hooyer**, Engagement and Impact Manager, Minderoo Foundation, Flourishing Ocean

Minderoo Foundation

The Minderoo Foundation works closely with the Plastic Soup Foundation to raise awareness of the dangers of plastic. Minderoo is also working to act on the plastic problem. It has done an analysis of the biggest polluters and their financial backers. She is currently working on pilot projects for pollution monitoring technologies in Indonesia. A scientific review of the impact of chemical compounds in plastics on human health is also underway. Minderoo is also developing methodologies and tools to measure plastic particles inside our bodies.

https://sourceofplasticwaste.org/

Recorded intervention

PLASTIC & ME

16. Sian Sutherland, Co-Founder, Serial Entrepreneur, A Plastic Planet

Creating change with business

With her experience as an entrepreneur, Sian presents business as a tool for change. It's time to think of a new model that is worry-free, guilt-free and focuses on solutions, not problems.

A Plastic Planet's goal is to turn off the plastic tap, by educating, informing through campaigns, lobbying for legislation, and working with industries to identify relevant solutions.



A plastic Planet has for example created a plastic-free aisle in a supermarket in Amsterdam. The organization also works with the fashion industry and finds that it is not at all ready to change. The debate is focused on plastic bags when it should be about the textile itself which is mostly made of plastic. There are so many designers who could go for innovation and sustainability, it's time to do it. A Plastic Planet is also tackling the bags used to sell products by the unit or in small doses. One trillion of these small plastic bags are produced every year.

<u>Book recommendation</u>: The good ancestor by Roman Krznaric <u>Movie recommendation</u>: A plastic Ocean by Craig Leeson <u>Trailer</u>



17. **Prigi Arisandi**, Founder & Executive Director, Ecoton **and Daru Setyorini**, Manager Research & Program Development Ecoton

Microplastics in the River

For those who have already visited Indonesia, it is known that the country is flooded with plastic. The Brantas River is one of the most polluted in the country. Prigi and Daru are fighting to make the rivers drinkable and swimmable again, and to make fishing possible again. To achieve this, they need policies that prevent plastic pollution, budget, and infrastructure to manage waste properly.

Flexible plastic packaging accounts for 17% of plastic pollution in the environment in Indonesia. Each year, the country generates 68 million tons of waste. 14% of this waste is released into the environment and 47% is burned in the open air. Burning plastic is very common when there is no infrastructure to manage it.

Ecoton conducted research on Persistent Organic Pollutants at 4 sites in Java where waste is burned extensively. They found high levels of brominated flame retardants, dioxins, PBCs, PBDEs in chicken eggs. In one village that produces homemade tofu using plastic waste as fuel, the concentration level of dioxins was as high as the contaminated soils tested on US bases during the Vietnam War.

The Surabaya River is a source of drinking water for over 6 million people. Today this river is full of plastic. 42% of the floating waste is plastic and 37% is diapers. This situation is alarming because children drink the water from this river.

Each year Indonesia produces 8 million tons of plastic waste of which only 3 million can be managed. 2.6 million end up in the rivers. It is imperative that the world stops the consumption of plastic.

The organization has tried several times to launch clean-up projects or diaper collection, to sensitize people to stop throwing away their waste, but in vain. The team of biologists therefore focused on the impact of plastics and to look for those that would affect the population the most. By studying the distribution of the river's fish by sex, they realized that the once perfect balance between female and male was now 80% female and 20% male. The microplastics ingested by the fish are at the origin of this imbalance.

To attract more attention, the organization recently asked the population to donate their excrement. In the 102 samples collected, 38 types of polymers were identified. The concentration of microplastics was 50 particles per 10 grams of feces.

Ecoton is working on zero waste cities projects, pushing for the reduction of single-use plastics, banning bags and all packaging that does not have the infrastructure to be managed when it becomes waste.

They are also creating a floating educational center called Yuyu to reconnect young people to the river and raise awareness about microplastics. From this project came the River Detectives project involving hundreds of children in pollution analysis. They also involve women's groups in their projects.





18. **Diane Wilson**, Executive Director of San Antonio Bay Estuarine Waterkeeper, Book Author, Environmental Activist

A journey fighting against plastic giant

Diane Wilson is a fourth-generation member of a large fishing family. In love with the area in which she lives, she has never left the Texas Gulf Coast. Diane has been fighting for 30 years against the Formosa Plastics company, responsible for the monstrous damage to the environment of this region whose main activities have always been fishing and maritime tourism. Activities that have been strongly affected by this pollution. This fight made her lose her marriage, her friends, her family. But she fought so hard that even alone against this giant, her perseverance finally allowed her to win the lawsuit for a \$50 million settlement. This is the highest amount ever reached in the United States for a civil suit.

Recorded intervention

NEXT GENERATION

19. **Gloria Majiga-Kamoto**, Center for Environmental Policy and Advocacy Program Manager, Natural Resources Golman Environmental Prize Winner 2021

A journey to Malawi

80% of Malawi's economy comes from its agriculture. Gloria has conducted several projects in this area. In one of her programs, a carrier goat was given to each farmer so that they could start their own farm. However, this program could not continue because of plastic pollution. In fact, 40% of the cattle slaughtered in Mponela are slaughtered because they have plastic in their stomachs.

Plastic pollution is a real scourge in Malawi. Many animals are dying, the once beautiful landscapes are devastated, many ecosystems are contaminated affecting biodiversity. Health problems are rising.

Gloria's struggles alongside several NGOs have paid off. In 2015, the Malawian government decided to ban the use of single-use plastic. After several setbacks orchestrated by companies, and thanks to a mobilization of the population, the ban became effective in 2018.

Action at the global level must be inclusive and include Africa in the discussions. Those responsible must pay to repair the damage done.

Recorded intervention

20. Kelly Bencheghib, Co-Founder, Make A Change World

How plastic barriers can stop plastic entering the ocean

Created 4 years ago, the crazy projects of Kelly and her two brothers caught the attention of the Indonesian president, who decided to hire 7000 people to clean up the most polluted rivers of the country. 80% of the plastic waste in the oceans comes from the rivers. With this in mind, the organization Make A Change World has set up barriers in the rivers to prevent plastic pollution from reaching the oceans. The collected plastics are then analyzed to better understand how to solve this



crisis. In one year, the Sungai Watch project has installed 100 barriers in 92 villages, collected 220,000 kilos of plastic, and continues to grow its community.

Recorded intervention

21. Kristal Ambrose, Founder & Director, Bahamas Plastic Movement

The power of youth

After participating in a 2012 expedition to the Western Pacific Garbage Gyre, Kristal realized she was part of the problem and was determined to act against plastic pollution in the Bahamas. She then created her movement which, with very little resources, works on 3 axes: education, community science, and political change.

Kristal mobilized a large part of the community to collect plastic debris on several Bahamian beaches. She found that 93% of the trash collected was plastic, and that half of it came from overseas carried by ocean currents and wind.

It then set up beach cleanups on 8 different islands with over 1000 volunteers. The foundation really wants to engage the youth in the protection of the oceans. They organize camps where young people can understand and find solutions to the plastic crisis. With all these projects and this beautiful community, all that was left was to make his dream a reality and ban single-use plastic from the Bahamas. This was done in 2020. The foundation continues its commitment to making this region waste-free.

Recorded intervention

22. **Aeshnina Azzahra Aqilani (Nina)**, Youth Environmental activist, High School Student

Take back your toxic rubbish

Do you know what happens once you throw your waste in a waste separation garbage can? There is a chance that your waste will end up being burned in the open or deposited in the garden of a family living in Bangun village, located 20 minutes away from Aeshima on the island of Java in Indonesia.

Due to the lack of waste collection system, Indonesia lacks paper and has been importing wastepaper since 1980 to feed its factories. But alongside the 2 million tons of paper imported each year, there are 900,000 tons of other contaminated waste, including non-recyclable plastics.

Since China banned waste imports in 2018, shipments of wastepaper to Indonesia have increased by 50%. This waste comes from Italy, the UK, Canada, Japan, the Netherlands, and the USA. This waste is dumped and burned in front of the villagers' houses. Some of the villagers take out the plastics that they can sell to recycling factories. But what cannot be recycled is sold to tofu factories that use the plastic as fuel.

People don't know that burning plastic releases greenhouse gases and toxic dioxins, so they continue to do it. The ashes end up on the ground and the chickens eat them. Their eggs then contain harmful amounts of dioxin.

In addition, recycling processes break up the plastics and use river water to clean them. This water is then released into the rivers, creating a huge pollution of microplastics.



Nina and her team are working to protect the Brantas River by monitoring the inflow from the paper and recycling plants. All the samples collected contain microplastics.

A letter, without response, was sent to President Trump in 2019 to stop the export of plastic waste to Indonesia. Then, another in 2021 to President Biden, which seemed to work as exports of contaminated waste from the US decreased by 50%.

Countries like the Netherlands have better infrastructure to manage the waste, it is time to stop the export of this waste to Indonesia which does not have the means to manage it. This waste is polluting the environment, countries must take their responsibility to solve this problem.

Nina is worried about the environment and her future.

The present generation has no right to rob the children and the next generations of their right to live in a safe and healthy environment. Developed countries must stop the export of plastic waste to Indonesia and allow Nina to live in a safe and healthy environment.

Recorded intervention

23. **Charles Moore**, Oceanographer who first discovered the Great Pacific Garbage Patch, Founder of Algatita Marine Research and Education, Long Beach Organic, Moore Institute for Plastic Pollution Research

Closing statement

The now global system of production and consumption is unable to provide the only essential benefit: health. Whether it is the health of humans or the health of the planet. This system ignores the calls to reduce waste and pollution, because the important thing for it is to maximize its returns on investment. And this implies a simple imperative: to make what is not profitable, i.e., the negative results created during production and consumption, someone else's problem. However, we have reached a point where problems can no longer be externalized because they have become everyone's problem.

This system produces research that leads to the production of profitable cures for Big Pharma. A series of ephemeral, sickly generations is more profitable than a series of healthy, lasting generations. This system thrives and endures while we and our planet get sick. The population absorbs the pollution and waste while thanking this system for its incredible growth, its great gadgets, and technical advances. They do this because they cling to the belief that the risks of the system can be managed.

This global system, which has now been adopted by the most populous countries, has certainly reduced poverty and labor, but it pollutes.

The current global political and economic system was born out of feudalism with the help of oil in its natural solid form as coal. Then it culminates in its synthetic solid form, plastic. Its energy needs for 400 years have been supplied by a non-renewable resource, which has become its most profitable and powerful industry. All the conferences at this summit have demonstrated the evidence of the evil destructiveness of oil. This industry must be controlled and phased out.

The illusion is to believe that only science and technology can save us. Albert Einstein said that no problem can be solved from the same level of consciousness with which it was created.

To achieve what every society desire, maximizing pleasure and minimizing pain, we cannot rely on science and technology. For our production systems are not designed to provide social good. Production is rewarded by generating irrational and aggressive markets based on short-term satisfaction rather than real needs.

We are becoming less and less able to reach the level of consciousness necessary to create a new system. Many tools are there to distract us.



Fortunately, nature is there, and it cannot be drugged or dumbed down. To communicate, she sends us floods, droughts, winds, and unstoppable waves. At this point, only she can create the radical change we need.

She is forcing us to take action to rebalance her system because she has the power to make our lives extremely difficult.

For those who are aware of this, we must create a new political, economic, and social reality. Put cooperation before competition. Refocus on the local, regional economy and seek autonomy to meet our basic needs. Live a healthy, waste-free lifestyle. It is time to move towards this reality, time is not on our side.