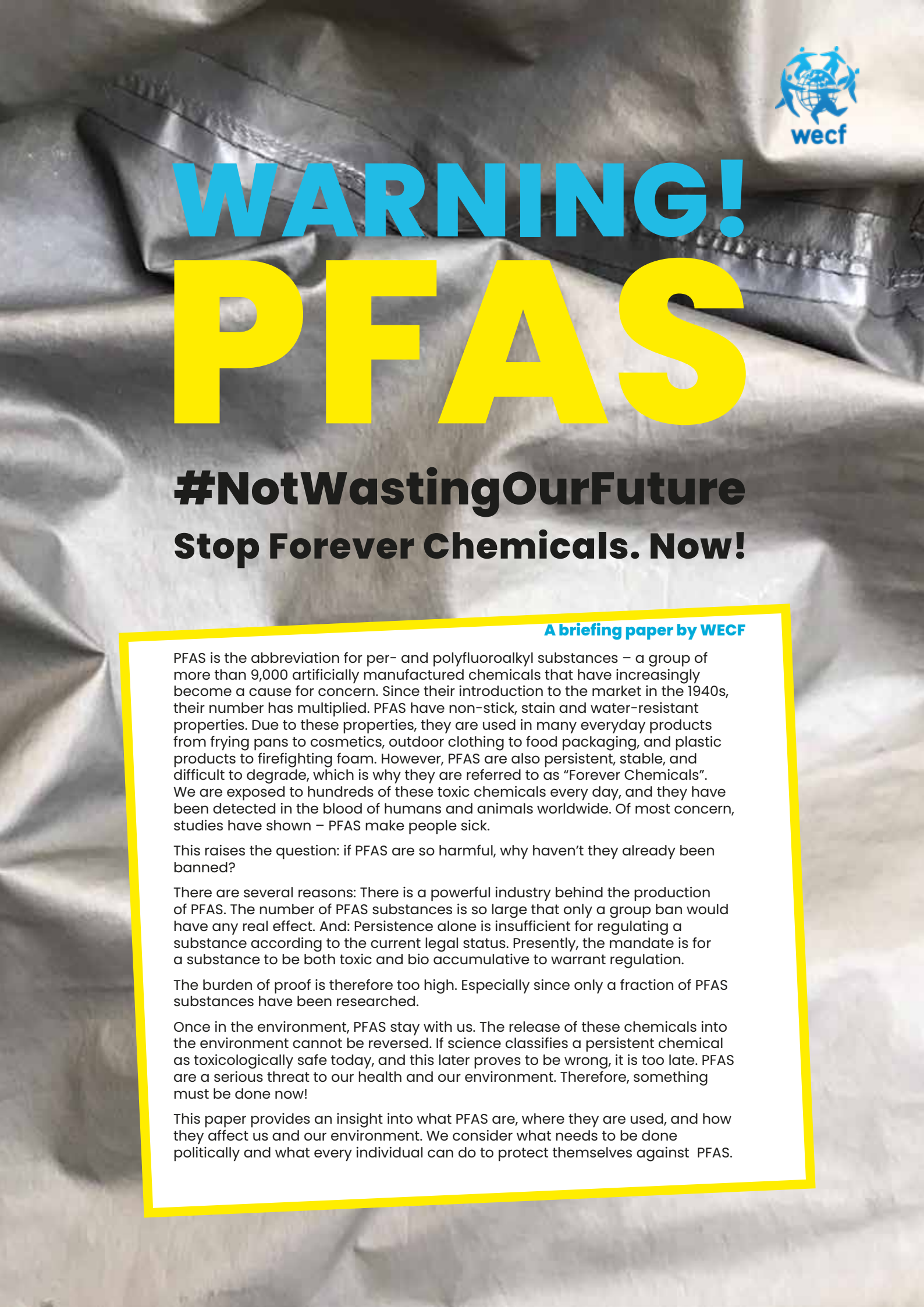


WARNING!
PFAS

#NotWastingOurFuture

Stop Forever Chemicals. Now!

A briefing paper by WECF

PFAS is the abbreviation for per- and polyfluoroalkyl substances – a group of more than 9,000 artificially manufactured chemicals that have increasingly become a cause for concern. Since their introduction to the market in the 1940s, their number has multiplied. PFAS have non-stick, stain and water-resistant properties. Due to these properties, they are used in many everyday products from frying pans to cosmetics, outdoor clothing to food packaging, and plastic products to firefighting foam. However, PFAS are also persistent, stable, and difficult to degrade, which is why they are referred to as "Forever Chemicals". We are exposed to hundreds of these toxic chemicals every day, and they have been detected in the blood of humans and animals worldwide. Of most concern, studies have shown – PFAS make people sick.

This raises the question: if PFAS are so harmful, why haven't they already been banned?

There are several reasons: There is a powerful industry behind the production of PFAS. The number of PFAS substances is so large that only a group ban would have any real effect. And: Persistence alone is insufficient for regulating a substance according to the current legal status. Presently, the mandate is for a substance to be both toxic and bio accumulative to warrant regulation.

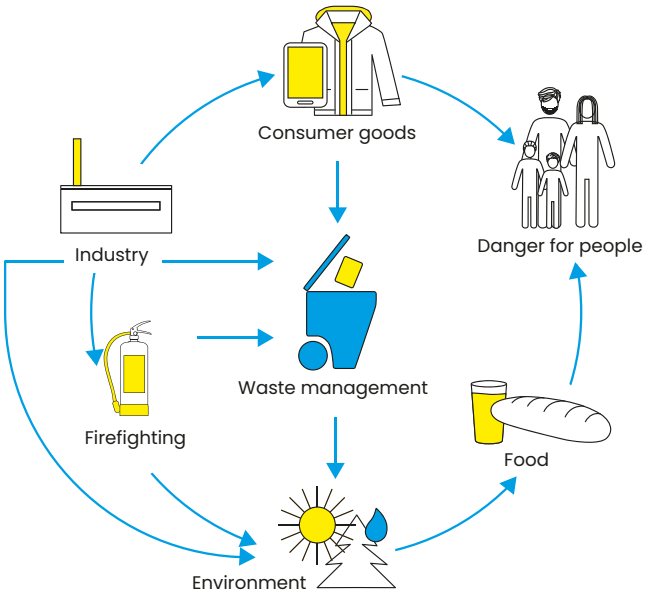
The burden of proof is therefore too high. Especially since only a fraction of PFAS substances have been researched.

Once in the environment, PFAS stay with us. The release of these chemicals into the environment cannot be reversed. If science classifies a persistent chemical as toxicologically safe today, and this later proves to be wrong, it is too late. PFAS are a serious threat to our health and our environment. Therefore, something must be done now!

This paper provides an insight into what PFAS are, where they are used, and how they affect us and our environment. We consider what needs to be done politically and what every individual can do to protect themselves against PFAS.

Where do we encounter PFAS?

Distribution of PFAS in our environment



PFAS are used in a wide range of consumer products. The best-known application is probably non-stick cookware, the so-called Teflon® pans (and pots). PFAS can also be found in grease- and water-repellent food packaging used for fast food, pizza, or microwave popcorn. They are found in waterproofing agents for textiles, waterproof outdoor clothing and tents, ski waxes, paint coatings for smartphones and solar panels, care products, and in surface finishes for carpets and furniture. PFAS can also be present in cosmetic products such as sunscreens, make-up foundations, hair moisturizers, and even menstrual products.

Furthermore, PFAS are used in the electronics and aviation industries, in oil and pesticide production, mining, and both for firefighting exercises and for extinguishing fires caused by liquid substances such as petroleum.

PFAS can easily pass through drinking water treatment plants, making PFAS contamination of drinking water an increasing problem. Also, in Germany, there are hotspots of PFAS contamination of ground and surface water - e.g., near industrial sites, water disposal plants, firefighting facilities, military training centers, and airports[1]. They are also found in foods such as fish, meat, fruit, eggs, vegetables, and plant and fruit products. The latter is partly due to their cultivation on contaminated soils or via packaging which contains PFAS.[2]

PFAS are also very mobile. They have been detected in places where they are not produced. Even the contamination of rainwater with PFAS is increasing.[3]

In a nutshell: We are exposed to hundreds of PFAS at the same time through various sources. PFAS can be found in every corner of the planet – in air, soil, water, humans, plants, and animals. PFAS have even been found in the Arctic and Antarctic. Their production causes environmental pollution through wastewater or air emissions. This results in the pollution of air, soil and water. We humans, are then exposed through the food chain, making us ill and burdening future generations. Hard to believe, but true: Despite the broad field of application of PFAS, there is very little information available on which PFAS are used in which areas and in what quantities in Europe.[4]

A BIT OF CHEMISTRY FOR A BETTER UNDERSTANDING

PFAS represents per- and polyfluoroalkyl substances. This group of chemicals is also known as PFT, perfluorinated surfactants, and PFC, per- and polyfluorinated chemicals. The basic chemical structure of these chemicals is formed by carbon chains in which the hydrogen atoms are either partially replaced by fluorine atoms (polyfluorinated compounds) or entirely replaced by fluorine atoms (perfluorinated). This makes them into chemicals with practical and PFAS-typical properties: they are water-, grease- and dirt-repellent as well as chemically and thermally stable. This is also what makes this group of chemicals especially treacherous.

P is for problem substances: PFAS HARM THE ENVIRONMENT and people.

It was in the 1940s that industrial production of PFAS began. The problem is: PFAS chemicals are very stable and persistent due to their special carbon-fluorine bonding. Therefore, they hardly degrade. Once introduced into the environment, they remain there for decades. The current pollution by "Forever Chemicals" is still advancing through continuous production and can be carried on to the next generations that have not even been born yet. An indication of the range of production is indicated by the number of patent applications in the U.S. containing the word "perfluor-": there are approximately 400 such applications per month.[5]

What are PFAS doing to our health?

PFAS accumulate in our bodies.
PFAS can enter our bodies through breathing, eating and through our skin. They are bio-accumulative, which means they can bind to proteins and accumulate in the blood, kidneys, liver, and bones, affecting our health.

PFAS are toxic.
For many PFAS, toxicological data is not yet available. There is still, however, a particular concern for the PFAS that have already been analyzed. Some of the analyses show the association with liver damage, elevated cholesterol levels, as well as other adverse health effects[6]: An overview:

- PFAS are endocrine-disrupting chemicals (EDCs) that affect lipid metabolism and may contribute to obesity and thyroid disease.
- They affect adult reproductive functions and embryonic development (reproductive toxicity). They are also associated with reduced birth weight, reduced sperm quality, delayed puberty, and premature menopause, among other effects.
- They damage the immune system (immunotoxic), meaning that they can, e.g., reduce the immune response of children to vaccinations.

PFAS are also potentially carcinogenic and promote the development of certain cancers such as kidney and testicular cancer.

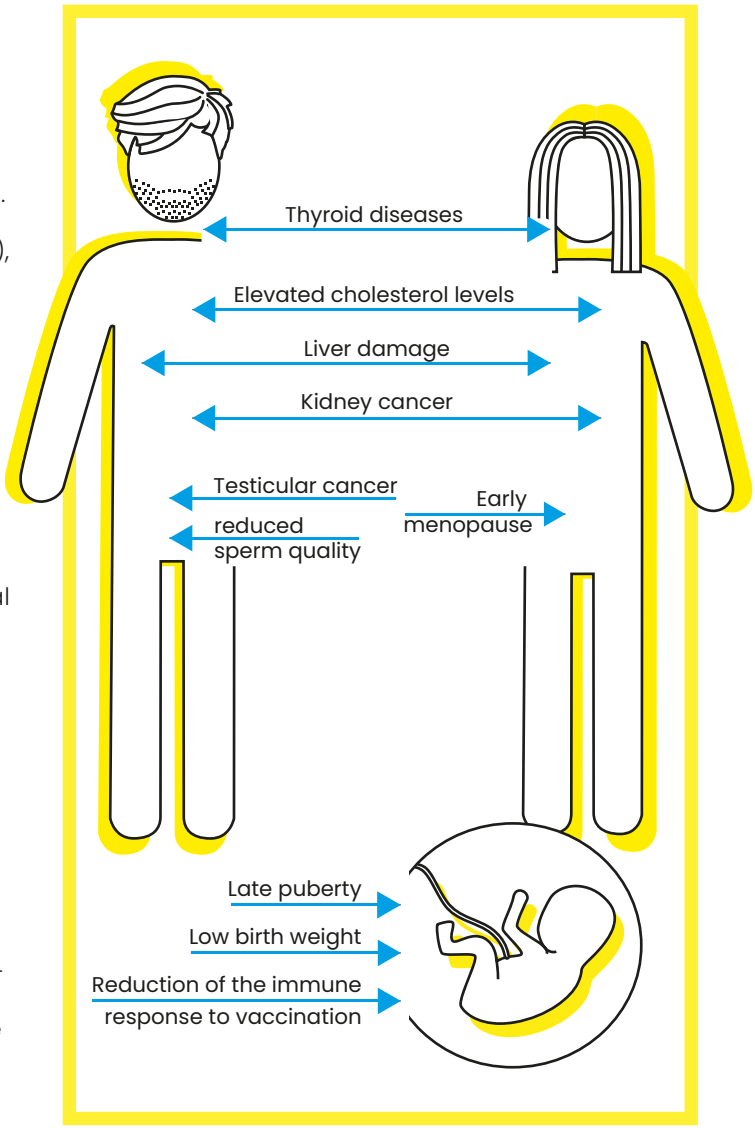
Who is affected and how? Gender and age pose particular risks.
People, depending on their gender and age, are affected differently by the effects of PFAS. Biological factors, developmental status, hormonal balance, social gender roles, and different exposure to toxic chemicals all play a role. Especially in hormonally controlled phases such as fetal and infant development, puberty, and menopause. The effects of hormonally active chemicals, which include some PFAS, are severe and can impair healthy development. For example, when a child's immune system is still developing and can hardly break down harmful substances.

Mothers are the first environment for their children. Pollutants such as PFAS can be unwillingly transferred to the child via the placenta and breast milk. This can impair the sensitive developmental phase of the foetus and lead to health impairments that occur at birth or later in life.

Such impairments include, e.g. reduced birth weight, malformations of the reproductive organs, and miscarriages.[7] Also, during breastfeeding, PFAS can be transferred to the infant. Nevertheless, breast milk is still the best food for infants.

Men have higher PFAS body burdens and serum levels because they excrete fewer PFAS than women. It is suspected that PFAS may reduce semen quality in men.[8]

Risk assessment and policy regulations often fail to take these gender differences into account. In order to better protect everyone, it is imperative to incorporate a gender-differentiated perspective into the topic.[9]



Who pays the bill?

The PFAS industry's revenues are enormous. So are the economic and social costs of PFAS exposure as well. According to a recent estimate by the Nordic Council of Ministers, the annual health costs in European countries alone amount to at least 52 to 84 billion euros – a rather conservative estimate. This estimate does not include the cost of decontaminating polluted soil and water.[12]

Communities are particularly affected by PFAS production sites. For example, in Germany, studies have shown that areas near airports and military bases are affected by severe contamination of the drinking water. According to the Nordic Council of Ministers, 100,000 sites across Europe potentially emit PFAS.[13]

Policy and PFAS?

The global regulations of two PFAS compounds, PFOS (perfluorooctane sulfonic acid) and PFOA (perfluorooctane sulfonic acid), have led to a decrease in in exposure. Nonetheless, the declining use of PFOS and PFOA is often quickly offset by the use of other lesser-known substances from the large group of 9,000 PFAS. that are often unregulated and not thoroughly researched.

This so-called "regrettable substitution" that the industry likes to use can only be stopped if all 9,000 PFAS chemicals are regulated or banned as a group - in line with the precautionary principle. However, only a few PFAS have been regulated to date. The reason for this is that under current agreements, the high persistence of a substance alone is not sufficient for regulations. Presently, the regulations state that substances must be bio accumulative and toxic. The burden of proof is too high, as the level of toxicity is not yet known for many substances due to the lack of available data.

ALARMING FIGURES: EUROPEAN TEENAGERS ARE „HIGH ON PFAS"

The European Human Biomonitoring Program „HBM4EU"[10] has recently investigated the exposure of the European population to harmful chemicals, focusing on children and teenagers. The research found that more than 14% of the 2000 European teenagers who were part of their study, have combinations of several PFAS (PFOS + PFHxS + PFOA + PFNA) concentrations in their bodies that are higher than the "safe" limits set by the European Food Safety Authority (EFSA): in Germany, teenagers had an average serum exposure of 9,83 µg/l, in Sweden 12,31 µg/l, in France 11,26 µg/l. We need regulations to reduce the exposure of this vulnerable population group to such chemicals as it can take a long time for PFAS to be excreted from the body: the half-life for long-chain PFAS for short-chain PFAS[11] in the blood is up to 8.5 years, and up to 26 days.

Global Regulation
The Stockholm Convention on Persistent Organic Pollutants (POPs) is an international treaty that aims to eliminate or restrict the production and use of the most toxic chemicals. Currently, three subgroups of PFAS substances are listed in this convention: PFOS and related substances since 2009 for global restriction; PFOA and associated substances since 2019; and perfluorohexanesulfonic acid (PFHxS) since 2022, both for global elimination. Exemptions apply to essential uses. The meaning of "essential use" is subject of controversy and is under discussion.[14]

Within the strategic approach to international chemicals management (SAICM) to identify goals for sustainable management of chemicals, PFAS are among the issues of concern. Approaches are being developed here to reduce emissions of perfluorinated chemicals with the aim of eliminating these substances globally (UNEP-SAICM 2018).[15]

European Regulation
At the European level, various subgroups of PFAS are classified as Substances of Very High Concern (SVHC) due to their longevity, accumulation, and harmful effects on humans and the environment. The EU chemicals regulation REACH regulates such subgroups.[16] PFOS have been banned since 2010, and PFOA have been banned in 2020.

This ban also includes so-called precursor substances. These are chemicals that can transform into PFOA under certain conditions.[17]

Five European member states, including Germany, are currently working on an EU-wide proposal to restrict all PFAS. This is expected to come into force in 2025.[18] In addition, the European Commission has included comprehensive measures for PFAS group in its new chemicals strategy for sustainability, including the phasing out of all PFAS for all non-essential uses.

Legal framework for Germany
PFAS are a global problem needing global measures. The Stockholm Convention is crucial to regulate bans and restrictions on PFAS. Simultaneously, national action plans are equally important and can serve as a template for further action.

The German government, in the coalition agreement of 2021, sets out „to reduce the risks associated with

the use of substances that are hazardous to health (e.g., perfluorinated and polyfluorinated chemicals). „We are making correspondingly constructive contributions to the debate on the EU chemicals strategy. "[19] Thus, PFAS are explicitly addressed.

It will probably be a (long time) before PFAS are regulated or better yet banned. National options for restricting or labeling PFAS-containing products should be explored in the meantime, e.g., for food packaging. Denmark, for example, has widely banned the use of PFAS in food contact materials and has set an indicator value of 20 mg fluoride/kg in packaging materials.[20] Germany, on the other hand, is being very cautious about national measures.

PFAS IN THE CINEMA

Dark Waters und PFOA
The movie "Dark Waters" tells the true story of lawyer Rob Bilott. The protagonist took on chemical giant DuPoint after it was discovered that the company was contaminating drinking water with the health-threatening chemical PFOA (called C8 in the movie). The film, directed by Todd Haynes, starring Mark Ruffalo, describes Bilott's discovery and his more than 15-year struggle to get compensation for the thousands of people affected.

And now? Policymakers and the industry must act.

One thing is certain: policymakers must act quickly to ensure that PFAS are no longer released into the environment. The legal approach for action for precautionary environmental and health protection must be used. We at WECF demand, among other things:

Policy measures
- A complete ban on the entire group of substances to remove all PFAS from circulation, in cooperation with the EU and through global agreements.
- High persistence as a sufficient criterion for regulation.
- Transparency and mandatory information on the use of PFAS along their entire life cycle.
- Information from the government for consumers, especially pregnant women and parents.
- Due to their particular sensitivity, children and pregnant women must become the norm from risk assessment.

Responsibility from the industry
- PFAS chemicals should immediately be phased out and replaced with safer, non-PFAS alternatives.
- Industry and other polluters must share the costs of damage caused by these chemicals (Polluter-Pays- Principle).

How can consumers protect themselves from PFAS?

It is not always easy because PFAS are everywhere. Nevertheless, here we will share a few tips on how it is possible to reduce exposure to PFAS in daily life:

✓ It is better to use pans and pots without PFAS-containing coatings. Choose products made from, e.g., stainless steel instead

✓ Eat less or avoid fast food as this is often packed in paper or cardboard materials containing PFAS.

✓ Avoid using plastics wherever possible.

✓ When buying textiles, look for labels with the words „PFAS-, PFC-free." This also applies to outdoor clothing and tents. PFAS is used in them for making the products waterproof.

✓ Cosmetics: Avoid products containing „fluorine-„ or PTFE in the name (check the list of ingredients); also, dental floss with PTFE coatings. Choose certified organic products by Cosmos or other EU eco cosmetics labels.

✓ Labels can be helpful. Many chemicals are banned in products with eco-labels.

✓ Use the app „Scan4Chem" to receive information on substances of very high concern in products (concentrations above 0.01 percent by weight).

Become politically active
By putting pressure on policymakers, sustainable change can be realized. How? For example, contact the parliament members in your constituency via email or social media to address your concerns.

WECF takes action for better? health and environmental protection.
WECF has been campaigning for safe chemical management for more than 25 years. We will continue to advocate for a comprehensive ban on the entire PFAS group of chemicals to better protect people and nature from toxic chemicals. Join us!
https://www.wecf.org/de/chemikalien-gesundheit/ und wecf@wecf.org.

List of Acronyms

PFAS* Polyfluoroalkyl substances - outdoor clothing or food packaging

PFHxS Polyfluorohexane sulfonic acid (C 6) - waterproofing spray

PFNA Perfluorononanoic acid (C 9) - Misting or foaming agent

PFOS Perfluorooctane sulfonic acid (C 8) - Carpets or greaseproof paper

PFOA Perfluorooctanoic acid (C 8) - Carpet cleaning fluids or Teflon

PTFE Polytetrafluoethylen – Medical implants or sealing technology for gaskets

* Substance and possible areas of application

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