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PROTESTS

Demonstrators in
Myanmar demand
democratic rule

COVID-19

Africans are
waiting for
vaccinations

TECHNOLOGY

How KfW Development
Bank manages projects
from afar



Chemicals management

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We are grateful for your appreciation of our work, and would be grateful for support. Best wishes, Hans Dembowski (editor-in-chief of D+C/E+Z)



Chemicals management

Dangerous pollution

Pakistan has laws to protect the environment. They are hardly enforced, however, so chemical health hazards abound, writes journalist Imran Mukhtar. **PAGE 21**

Stop toxic global trend

Around the world, the use of chemicals is intensifying. Many substances are useful, but all too often, they cause health and environmental risks. Internationally coordinated regulation is urgently needed. Hans-Christian Stolzenberg of the German Environment Agency (Umweltbundesamt – UBA) assesses matters and points out that a global target to limit chemical intensification would be helpful. Katja Dombrowski of D+C/E+Z elaborates in what sense the EU is an international leader. **PAGES 22, 26**

Toxic items

The general public does not have a clear understanding of just how dangerous plastic waste is. WasteLess, a non-governmental organisation in the Indian state of Tamil Nadu is raising awareness – with a special focus on children and teenagers. Mukta Martens of WasteLess explains the approach. Due to their chemicals content, common consumer goods, including clothes and toys, can harm people's health. Olga Speranskaya of Health and Environment Justice Support (HEJ Support), an international civil-society organisation, gives an overview. She wants private-sector companies to be forced by law to disclose comprehensive information. **PAGES 27, 29**

Taking aim at pests

Africa is starting to catch up with other world regions in the use of chemical crop protection. The continent still has a long way to go to ensure that toxic pesticides are not only used effectively, but safely too. Patrick Ajwang of Kenya's Jomo Kenyatta University of Agriculture and Technology (JKUAT) gives account. **PAGE 31**

Relevant reading

What impact so-called micro and nano plastics have on human beings and the environment is a hot topic. The World Health Organisation, the World Wide Fund for Nature and Germany's Federal Institute for Risk Assessment (Bundesinstitut für Risikobewertung – BfR) have considered the matter in publications. **PAGE 33**

Monitor

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Planetary boundaries

Chemicals are everywhere: in our clothes, in our food, in tools and toys, digital devices and homes. Thanks to them, thousands of products have the desired traits. Unfortunately, a large share of those substances is harmful, which is inevitable in some cases. To kill weeds or bugs, a pesticide must be poisonous, and fuels must be combustible. In many cases, however, a chemical's dangerous aspect does not serve useful function. Such usages must stop.

International chemicals regulation must achieve more things, however. It is also essential to limit the use of chemicals in general. At the current rate, the international chemical industry is doubling its production every 10 to 12 years. Ten thousands of different substances are sold on the world market, and new ones keep being invented. Scientists agree that this cannot continue without planetary boundaries being breached. To some extent, they have been breached already. Achieving sustainability will depend on three approaches which serve environmental protection in general:

- The efficiency of products and production processes must improve. Apart from technical innovation, this will require the political will to insist on more durable goods.
- Recycling must increase. So far, only very few chemicals are re-used in ways that would fit a truly circular economy.
- Consumption must decrease. This applies particularly to prosperous nations that consume an excessive share of global resources.

Without international cooperation, humankind will neither achieve sound chemicals management nor sustainability in general. Chemicals permeate the world economy, with patterns of production, use and disposal spanning the globe. Rare earths, for example, are mined in Africa, then used in China for the production of smart phones, which are then sold in the EU or the USA. As electronic waste, they tend to end up in Asia again. Recycling rates are poor, however, and must increase dramatically. At the same time, the benefits of chemicals must be shared more fairly – and the costs must be spread in an equitable way. So far, health hazards and environmental impacts particularly affect localities where raw materials are produced or waste is disposed of.

So far, chemical intensification and its impacts are not getting the same attention as global heating and the dwindling of biodiversity, two other existential global crises. Obviously, these trends are mutually reinforcing. For example, pesticides, chemical fertilisers and plastic-waste contamination are driving genetic erosion. The energy-intensive chemical industry, moreover, causes considerable carbon emissions. Rising temperatures, in turn, make some chemicals more toxic.

Environmental pressure groups insist that sound chemicals management must become the third pillar of any sustainability strategy, along with the protection of biodiversity and the climate. At the international level, a UN convention on chemicals management – similar to the UN Framework Convention on Climate Change – could be helpful. It could define an upper limit for chemical intensification resembling the 1.5° goal of the Paris Agreement on Climate Change. For that purpose, two things would have to be determined first: How much chemistry exactly does humankind need? And how much can the global ecosystem cope with?

► You'll find all contributions of our focus section plus related ones on our website – they'll be compiled in next month's briefing section.



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Debate



The power of diaspora

With over 272 million people living outside their countries of origin, the relevance of diaspora communities is growing. It is crucial for both the host countries and the countries of origin to engage with them. Richa Arora, an Indian scholar, shares some insights.

PAGE 13

Tribune



Don't leave Africa behind

In Europe and North America, public debate focused on how fast Covid-19 vaccination programmes were progressing in recent weeks. In Africa, the question was when such programmes might begin. Ben Ezeamalu, a Nigerian journalist, reports.

PAGE 15

Remote control

In view of Covid-19, innovative approaches to managing projects from afar are in strong demand. The KfW Development Bank is using digitised tools. Typically, they have previously been applied in crisis countries. In the future, they should prove useful in many contexts, write KfW staff members Jochen Harnisch and Meinhard Rögner.

PAGE 17

SPECIAL INTERESTS

The power of the super rich

The fortunes of many superrich people have increased fast in the course of the Covid-19 pandemic, report the Swiss Bank UBS and the accountancy giant PwC. At the same time, they state that poverty has become worse. The two multinationals call for philanthropic action. In the meantime, social scientists are increasingly warning that right-wing populists are undermining democracy whilst serving plutocratic interests.

By Michael Steffen and Hans Dembowski

From the end of 2017 to July 2020, the number of billionaires around the world increased by 31 to 2189, and their combined wealth rose by 12.7% to \$10.2 trillion, according to a report recently published by UBS and PwC (2020). The pandemic is said to have accelerated the trend.

The document states that high-tech investors have benefited in particular, since digital technology and digital networking became more important. The authors state that 2020 will be remembered as a historical turning point in this sense.

At the same time, the report points out that, due to coronavirus, millions of people are suffering poverty, homelessness, hunger and other forms of need. UBS and PwC therefore call on billionaires to engage in philanthropy in ways that promote sustainable development. They warn that social disparities and environmental problems are worsening and that innovations are needed to improve matters.

Referring to the PwC Technology Team, the report emphasises the relevance of eight specific technologies in the next three to five years:

- artificial intelligence,
- augmented reality,
- blockchain,
- virtual reality,
- drones,
- the internet of things,
- 3D printing and
- robotics.

The authors rely on the narrative of philanthropy solving society's problems,

but they do not elaborate on exactly how innovations are supposed to contribute to climate protection and environmental protection in general. Moreover, they do not discuss power differentials or diverging interests in society. Approaches that please billionaires do not necessarily promote the common good, however, not least because different interest groups tend to have very different ideas about what the common good is (see Barbara Unmüssig in D+C/E+Z e-Paper 2017/12, Focus section). Peter Thiel, the Silicon Valley billionaire, has famously stated that democracy and freedom are incompatible because majority rule restricts the scope of the financial elite. The UBS/PwC document does not delve into questions of this kind.

RIGHT-WING POPULISM

At the same time, evermore social scientists are warning that right-wing populists are

undermining democracy whilst promoting plutocratic interests (see for one example Hans Dembowski in D+C/E+Z e-Paper 2019/09, Monitor). A recent example is a new book (2020) by Jakob S. Hacker of Yale University and Paul Pierson of the University of California (Berkeley). The two scholars elaborate how Republicans in the USA are focusing on the utilisation of constitutional rules and institutions that allow them to control power without having the support of a majority of voters. Examples include the Electoral College, the Supreme Court and the disproportionate over-representation of rural areas in legislative bodies.

The starting point of the book is what Hacker and Pierson call the "conservative dilemma". It is that conservative parties tend to serve the interests of prosperous elites and thus have difficulties to rally those who are worse off. The conventional solution is to cater to identity politics to some extent, but also to build coalitions with various interest groups and emphasise specific sets of values.

As Hacker and Pierson argue, the Republicans in the USA have taken a different course. They focus unambiguously on policies that make the rich even richer: tax cuts and reductions in government spending.



Peter Thiel, the Silicon-Valley billionaire, visiting Donald Trump in New York in late 2016.

The irony is that most Americans want the rich to pay more taxes, not less. Divisive Republican rhetoric distracts voters' attention from these matters.

It discredits Democrats as corrupt or irresponsible. More often than not, such agitation has anti-Black and anti-minority connotations. One standard example is to keep declaring that more needs to be done to stop voter fraud, without ever providing any evidence of massive voter fraud. For a long time, Republicans have kept passing laws in various states that make voting harder for poor people – for example by requiring IDs poor people are unlikely to have. This has been going on for years, and it helped former President Donald Trump to make many supporters believe he won the November elections even though he actually lost.

Typically, Republican leaders do not offer coherent policies to tackle daunting societal challenges such as the climate

crisis or universal health care. Their party now fits Jan-Werner Müller's definition of a populist party (see Hans Dembowski in D+C/E+Z e-Paper 2017/02, Focus section). The Princeton professor says that such parties claim to directly represent the people, which they define as a homogenous unity to which nobody who dissents or is different belongs. They deny the legitimacy of all other political forces and, once they gain public office, try to manipulate rules and institutions in ways that they will not lose power again.

After Trump lost and even incited a riot in Washington in January, Republicans are currently split, with some wanting to abandon Trump, but most still hoping to hold on to his base. This divide may make either side too weak to keep exploiting constitutional loopholes the way they have been doing so far.

Those loopholes, by the way, were designed to protect minorities from the

tyranny of majorities. Hacker and Pierson, however, leave no doubt that Republicans have learned to use them to impose minority rule on disenfranchised majorities. They point out, for example, that the conservative-dominated Supreme Court has a track record of entrenching minority rule – for example, by permitting private corporations to donate unlimited amounts of money to candidates of their choice or making it harder for trade unions to organise inside a company.

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Fundamental change needed

According to a recently published Oxfam report, the Covid-19 pandemic has been deepening global inequality. The world's 1,000 richest billionaires are said to have recouped losses within nine months, and thus are once again as rich as they were before the pandemic. The poorest people, by contrast, may take more than a decade to overcome the impacts of this health crisis. Oxfam expects gender inequality to worsen, and disparities to widen between white, black and indigenous people.

According to Oxfam, the novel coronavirus has caused additional hunger. By the end of the year 2020, at least 6,000 people are estimated to have therefore died of hunger daily. Progress made in terms of fighting poverty in recent decades is likely to be undone (see Belay

Begashaw in Covid-19 diary in D+C/E+Z e-Paper 2020/07).

The Oxfam team interviewed almost 300 economists from different countries, and was shocked to find that two thirds of them said their national governments did not have a strategy for reducing inequality. Oxfam opposes market radicalism, which is driven by profit maximisation and patriarchal structures. In the report authors call for fundamental change to safeguard social and environmental justice in the future and to enable all people to live a good life. Everyone, they argue, must have access to public education, health care and social protection. Moreover, corporations and the superrich must contribute their fair share to funding those institutions.

Oxfam wants private-sector corporations to be democra-

tised and insists that they must serve the public good. Management decisions, the authors argue, must take into account the interests of all stakeholders, while shareholders' dividends should not exceed an upper limit. According to Oxfam, stringent antitrust laws are needed to promote the common good. In addition, sector specific regulations should ensure fair sharing of profits along

supply chains. Excessively powerful corporations, the Oxfam experts point out, should be disentangled into several smaller firms that do no longer control markets. Sabine Balk

LINK

Oxfam, 2021: *The inequality virus*. <https://oxfamilibrary.openrepository.com/bitstream/handle/10546/621149/bp-the-inequality-virus-250121-en.pdf>



Inequality results from the current economic order, warns Oxfam: worker in Bangladeshi garment factory.

SUSTAINABILITY

Modified index

Because the climate crisis is putting humankind's future at risk, the UNDP has begun to consider environmental aspects in an enhanced version of its Human Development Index. However, it is not promoting this new approach aggressively.

By Michael Steffen

The Covid-19 pandemic is holding humankind in its grip. Unless we change our approach to nature and reduce the impacts we have on ecosystems, further global crises will escalate. That is a core message of the Human Development Report 2020 (HDR), which the UN Development Programme (UNDP) recently published. The title is: "The next frontier – Human development and the Anthropocene".

Indeed, human influence on the planet has become so strong that scholars now speak of a new geological era: the Anthropocene. In our times, human action has the greatest impact on the planet we live on, and change has become so dramatic that our species' survival is at risk.

According to the UNDP, the climate crisis with its rising temperatures, melting glaciers and ever more frequent extreme weather poses the greatest danger. The social implications include worsening inequality. The UNDP experts demand a redefinition of progress, because they want the term to take into account greenhouse-gas emissions and the harm caused by consumerism. Accordingly, they have refined the well-known Human Development Index (HDI) in the most recent HDR: the Planetary-Pressures Adjusted HDI (PHDI) weighs each country's HDI by its ecological footprint.

The HDI was first compiled in 1990. It is based on indicators for not only income, but also health and education. It therefore provides a more holistic picture of a country's standard of living than mere per capita income does. The HDR 2020 includes the most latest edition of the HDI as well as the first ever edition of the PHDI.

Norway ranks first in the HDI, but because of its economy's dependence on oil

production, it drops to rank 16 in the PHDI. Australia comes in eighth in the HDI, but only 80th in the PHDI because of coal mining. Ireland is placed second in the HDI, but rises to the top slot in the PHDI.

However, the UNDP does not appear to be totally convinced by its new approach. The new ranking is not easy to find in the report, and the tables on page 241 ff do not list countries according to it, but only indicate the margin of how their position changes in the PHDI. Traditionally, the last pages of an HDR show the most important rankings, but the 2020 issue's final section omits the PHDI.

So far, no country has achieved high human development without causing significant environmental harm, the report states. For development to become sustainable, the authors argue, it must be steered in a different direction and that will require new norms and values. In their eyes, policymakers must set different goals and ensure that incentives serve the achievement of those goals. The big challenge is to take decisions in ways that serve human welfare without breaching planetary boundaries.

The HDR points out several destructive trends. For example, various countries are still subsidising fossil fuels which harm the climate. Referring to the International Monetary Fund, the UNDP notes that global carbon emissions in 2020 would have

been 28% lower had such subsidies been eliminated completely in 2015. Moreover, the number of people who died because of air pollution would have been reduced by 46%.

Afforestation and smarter forestry can contribute about a quarter to the measures humanity must implement before 2030 to limit global warming to 2° at most, the HDR 2020 states. This is considered to be one of many examples of how human and environmental health are systemically linked.

The authors write that the poorest people are particularly exposed to the impacts of environmental change. At the same time, those people have contributed least to



HDR 2020 includes the most latest edition of the HDI as well as the first ever edition of the PHDI.

making that change happen. According to the HDR, it is essential to reduce inequality both within countries and among countries. True human development must improve the lot of poor and disadvantaged people, empowering them to have a say in future developments.

DIGITAL DIVIDE

Fast and affordable internet

Creating internet connections takes time, investment and good planning. Since 2013, the Alliance for Affordable Internet (A4AI) has been doing research on how best to make it happen. Its most recent report pays particular attention to national broadband plans.

By Claudia Isabel Rittel

National broadband plans can have a significant impact on the affordability of internet connections, according to the A4AI. The Alliance links 80 public institutions, non-governmental organisations and private corporations, including well-known private-sector companies, development agencies and governments. Google and SIDA, the Swedish development agency, were the main funders of the most recent report.

According to the UN definition, internet access is considered affordable if:

- it comprises a data volume of at least one gigabyte (GB) per month and
- costs at most two percent of a country's average monthly income ("2 for 1").

One gigabyte would allow users to send approximately 200 photos, submit 4,000 requests to a search engine or watch three hours of video of medium quality. Over a billion people worldwide do not have access to a one-gigabyte connection.

The report was published in December 2020. It is based on the research team's scrutiny of 72 low and middle-income countries in Africa, Asia, Latin America and the Caribbean. They found that the cost of internet access has fallen in all countries since 2015. In Rwanda, for example, it dropped from over 20% to 3.39% of people's average income. That decline is not sufficient, however, so costs need to be reduced even further. To improve matters, Teddy Woodhouse, the lead-author, argues that an effective national broadband plan is of enormous importance. According to him, public investments are at the core of almost every national broadband plan. At the same time, such long-term strategic planning inspires private-sector companies to invest as well.

Woodhouse points out, however, that broadband plans that take people's needs into account typically succeed only if they meet three criteria:

- Many different interest groups must be involved – including from the public sector, private sector and civil society. Such inclusive settings allow all interests to be considered. They also help to identify market problems, find solutions and understand possible impacts on different stakeholders.
- Good plans set clear goals that consider a country's most significant gaps and time constraints. At least one target should relate to network coverage and one to the affordability of internet access.
- Finally, a successful broadband plan must include funding commitments, transparent assessments and a regular review process at least every two years.

According to the report, good broadband planning can give a country's poorest 20% more affordable internet access. At the moment, countries in Africa are mak-

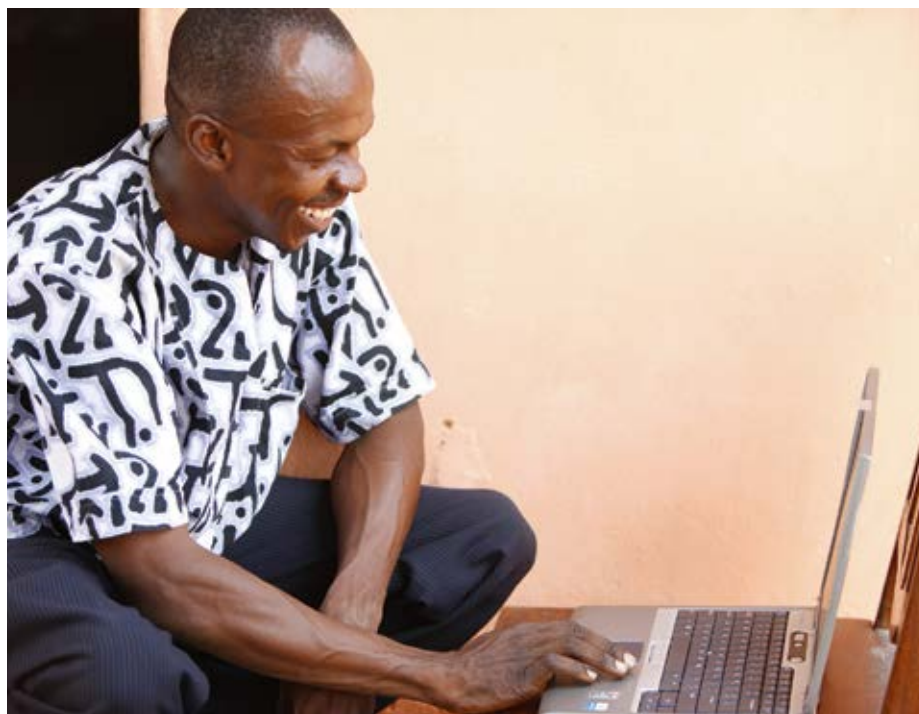
ing the greatest strides in this regard, writes Woodhouse. For example, Malawi, which has a broadband strategy for 2019 to 2023, is achieving positive developments. Kenya is making good progress as well.

According to a ranking by A4AI, Malaysia, Colombia and Costa Rica are currently the most successful middle-income countries. All of them have achieved the "2 for 1" goal. Among low-income countries, Uganda and Rwanda have done particularly well – they rank in the middle, similar to Kenya, and above China. Last placed are Ethiopia, the Democratic Republic of the Congo and Haiti.

Botswana's performance has improved in particular. The country has moved up nine positions to the 13th place since the 2019 edition of the Affordability Report. This leap can primarily be attributed to the broadband strategy that the country adopted in mid-2018. The A4AI explicitly praises the public process in which the strategy was drafted. Woodhouse is also optimistic about Nigeria, which adopted a new broadband strategy in 2020. It "met all expectations", the author says. "It will be interesting to see the next years."

LINK

2020 Affordability Report:
<https://a4ai.org/affordability-report/>



Masses of people deserve better and cheaper connections.

Full classes in spite of Covid-19

The first Covid-19 case was recorded in Burundi in early March 2020. The pandemic had thereby officially reached the small East African country. Nevertheless, schools from primary to university level have stayed open.

Burundi's government has only introduced certain protective measures, mainly focusing on thorough hand washing with soap and water. Schools provide chlorinated water, soap and other disinfectants.

After two people died from Covid-19, Burundi closed its borders. For five months no one could get in or out by plane, by boat or over land. On 8 November, the borders opened again.

Throughout this time, classrooms remained as full as ever. There are up to 100 students in a class in Burundi, with three sharing a bench. They did not have to keep their distance or wear masks. That was only compulsory in churches.

While schools and universities in neighbouring countries were closed, in Burundi they continued to run as normal. The school year that started in September 2019 ended in July 2020 without any restrictions. To date, the Corona pandemic has not affected the way classes are conducted.

The exception is some international schools. They require mask-wearing

and strict hand-washing. Spacing out of students is possible because they have few pupils per class. Some schools even shut down last school year – prompting a warning from the authorities.

At the beginning of 2021 the number of people infected with Corona increased again in Burundi. When the second term began in schools, 140 new cases were recorded in one week. Burundi again closed its borders to shipping and land transport; only goods transported by truck are still allowed in. Air travellers have to show a negative Corona test on entry and another one after six days of quarantine, which is obligatory for all arrivals.

The Ministry of Health organised free rapid mass testing at three locations in Bujumbura, by far the largest city in the country. The campaign started on 11 January and lasted 30 days. There had also been mass testing from July to September.

Classes continue, but the government is calling on people to take precautions. Wearing masks is now also recommended in schools. But it is only compulsory on public transport. The Cubahiro International School in Bujumbura recorded a Corona case in January; school administrators subsequently closed the school for two weeks.



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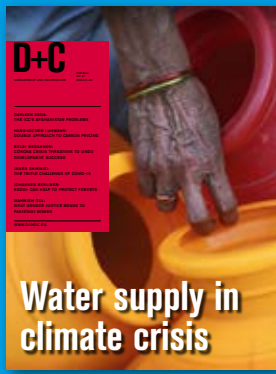
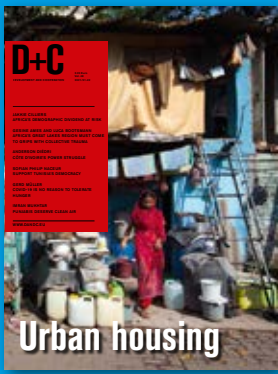
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URBANISATION

Lasting challenges

Indonesia's government is planning a new capital city. While it may itself escape the urban chaos of Jakarta, that agglomeration's many problems will still need to be tackled.

By Edith Koesoemawiria

Indonesia's capital, Jakarta, is a strange mix of high rises and slums. It is easy to walk through both types of neighbourhoods. They are not far apart, and in some places, crossing a single road is enough to move from where the upper middle classes reside to where the poor live. Many informal settlements, which are called *kampungs*, have existed for generations.

Surrounded by 13 rivers, Jakarta grew from a port settlement in the 4th century. About 11 million people live within the city limits today, and the agglomeration is home to 28 million. Fast population growth has generally exceeded the construction of good new housing. Several thousand new affordable formal homes are built every year, but more are needed. Infrastructure provision has not kept up either. Waste management, water supply, electric-power provision et cetera are difficult.

The climate crisis is making the problems worse. About 40% of the city sits below

sea level and is prone to flooding. Some waterfront areas are continuously inundated.

Of 20 major cities in Southeast Asia, Jakarta ranks 11th in regard to the cost of living, according to Numbeo, the collaborative online database. However, in terms of average purchasing power, it ranks 15th. Singapore tops both lists, and its purchasing power per capita is five times higher than Jakarta's.

Jakarta's lower-income people live in the *kampungs*. Many of them work as household helpers, drivers, small businesses and shop workers. The employment situation tends to be as informal as their housing. To a large extent, the more prosperous people depend on their services.

Not only Jakarta's population is growing, its economy – including the formal sector – is expanding too. Land prices, already exorbitant, keep increasing. Ever more commercial high-rises are being built to provide both offices and new apartments. There is ever less land available for *kampungs*, and people are increasingly forced to move to the urban fringes. One consequence is worse traffic congestion, making commuting more stressful for everyone. In spite of new highways and light-rail lines, transport and air pollution remain nightmares.



Singapore, which is an hour away by plane, is often considered an example of what a capital city should be like. Indonesia's government does so too. The plain truth, however, is that Singapore does not face the same problems. The city is younger, its development was better guided by urban planning and, in past decades, this tiny nation state had more control of inward migration. The authorities in Jakarta, by contrast, could not keep Indonesians from moving to Jakarta, where opportunities to earn a living were always better than in disadvantaged rural areas.

Starting from scratch thus seems attractive, and the government has indeed decided to move the capital to the border between Kutai Kartanegara Regency and Penajam North Paser Regency on Kalimantan, the Indonesian part of the island of Borneo. Kalimantan has an area the size of France and Germany combined, but a population of only 20 million. The target is to complete government buildings in the new capital by 2024. While Jakarta is on the western end of Java, Indonesia's most populous island, Kalimantan has a more central location in the vast archipelago.

Relocating to a new capital in an uncontested setting may provide some comfort to the government and its bureaucracy. The examples of Islamabad in Pakistan, Abuja in Nigeria or Brazilian Brasília show that this is feasible. The bigger challenge, of course, is to invest in making Jakarta more liveable and sustainable. Relocating the government may reduce the pressure to some extent, but it is not a simple solution. As Karachi, Lagos and Rio de Janeiro prove, megacities require attention even after a national government has moved away.



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Jakarta is a city of contrasts.

GLOBAL GOVERNANCE

Sensible utopian visions

Humankind needs global responses to global challenges, but multilateral agreements are far too often not binding.

By Hans Dembowski

The UN Framework Convention on Climate Change was adopted almost 30 years ago, but the climate crisis has kept escalating. Attempts to pass stringent emission rules failed, so the Paris Agreement of 2015 again relied on voluntary action to keep global temperatures from rising more than 2° and preferably limit the increase to only 1.5°. Good intentions are necessary, and it is welcome that US President Joe Biden is not a climate denier as his predecessor Donald Trump. There is reason to doubt that this will be enough.

Global coordination is necessary in other areas as well. The Covid-19 pandemic is causing dramatic suffering, both in terms of health and economic welfare. Thanks to innovative vaccinations, which have become available in record speed, prosperous nations are likely to achieve herd immunity in the course of this year. At the global level, however, the multilateral initiative Covax aspires to vaccinate only 20% of partner countries' populations. That is certainly not enough for herd immunity. Covax is a worthy initiative, of course. It was an important step that countries teamed up to ensure that the new pharmaceuticals become available around the world, but further steps are needed. If a credible plan to achieve global herd immunity in 12 months may not be feasible, what about 15 or 18 months? Such an explicit aspiration would boost global confidence. Moreover, it should be based on fair burden sharing. Instead, prosperous nations are pitching in as their governments seem fit.

Yet another issue of cross-border relevance is the regulation of the internet. In January, Twitter, Facebook and other online platforms finally banned US President Donald Trump after he had incited the violent riot in Washington. Moreover, the internet giants made Parler, a platform beloved by right-wing populists in the USA, unviable

by restricting its access to their digital infrastructure. These decisions of great public relevance were made by a handful of private corporations. The top managers are only accountable to shareholders. The goal is to maximise profits and minimise taxes, not to protect democracy.

Nonetheless, they control vital infrastructure of the public sphere – and their track record is not good. They have done far too little to block propaganda lies and hate speech, but often align their policies to those of the governments of the countries where people access their platforms. It is telling that Trump was only banned after losing the elections. It is true that social media served pro-democracy movements in the years before autocrats became aware of how important the internet is. More recently, however, the major platforms hardly did anything to put checks on leaders with proven anti-Democratic tendencies.

German Chancellor Angela Merkel had a point when she said that kicking Trump off social-media platforms breached his freedom of speech. The German approach is to make hateful propaganda illegal, obliging platforms to delete such entries after notification. The culprits keep access, but abuse is limited. However, the US under-

standing of freedom of speech differs from the German one. The US Constitution's 1st Amendment states that government institutions may not restrict speech, but it does not grant everyone access to every segment of the public sphere in order to express their views. If those components are owned by a private company, that company is free to decide as it pleases.

Slightly differing interpretations are not a serious problem. But it is a big problem that, whether a government respects human rights, only depends on the national constitution and how it is enforced. The Universal Declaration on Human Rights is valid, but not internationally binding. For the sake of global deliberation, we need global internet rules on free and responsible speech. This must not depend on private corporations and autocratic despots.

In the 21st century, environmental protection, public health and digital communication are of global relevance. Human welfare around the world depends on competent cooperation and sensible regulations. Unenforceable principles will not do. So far, calls for stringent global governance sound utopian. Reiterating and pondering them may help – and eventually make them self-evident.



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Covid-19 inoculation in the southern German town of Ravensburg.



Harjit Sajjan is Canada's minister of defence.

BUILDING BRIDGES

The power of diaspora

With over 272 million people living outside their countries of origin, the relevance of diaspora communities is growing. It is crucial for both the host countries and the countries of origin to engage with them.

By Richa Arora

Ijeoma Umebinyuo, the Nigerian poet, wrote a beautiful poem called *Diaspora Blues*. It goes like this:

So,
*here you are
 too foreign for home
 too foreign for here,
 never enough for both.*

The poet spells out the struggle of diaspora members, as they try to find their place in the countries they call “home”. However, leveraging the perspectives of two different worlds that the diaspora brings, they are bridge-builders and play a role in global development.

All international migrants represent cultures of their countries of origin in the way they interact with the host communities. Brick Lane in East London or Southall in West London are examples of South Asian communities’ identities becoming a part of

the host country. These neighbourhoods do not just offer special markets for the migrant community. They showcase how cultures interact with each other in the host country.

Cultural interaction also takes place in the country of origin. When diaspora members take a trip back to visit their families, they bring along a little bit of “the west”. Various sociological studies have shown that successful migrants make the host countries look attractive, inspiring young people to start their journey abroad.

The power of diaspora, however, exceeds cultural representation. Diaspora members often engage in transnational politics, in the sense of campaigning for change in either or both countries. Relevant topics include migrant rights, labour rights (trade unionism) and human rights. They have a bearing on public discourse in host countries as well as the countries of origin.

For instance, the Armenian diaspora in the USA organised itself and led the fight for the official acknowledgement of the Armenian genocide of the early 20th century. As a result, the USA adopted a policy in the matter and began to channel funds to troubled communities in Armenia. Diaspora activism thus had an impact on both countries

concerned. The contribution that diaspora members make in politics is also evident from the high-ranking positions that they hold as policymakers or ministers in countries like Canada, the USA or Britain.

Additionally, remittances are very important, for individual families as well as for national economies as a whole. One in nine people around the world depends on the money sent by migrants. In some countries, remittances amount to over 25% of GDP, for example Tonga, Tajikistan and Nepal. Especially in times of crisis, diaspora communities never fail to raise funds and send money to their families or relatives in their countries of origin. Hence, the governments must do more to make sending money home easier for migrants and meet the SDG target of reduction of transaction costs to three percent (see Dilip Ratha in the Focus section of D+C/E+Z e-Paper 2021/02).

Diaspora philanthropy is equally relevant. One of many examples is the Non-Resident Nepali Association’s fundraising for relief efforts in the current Covid-19 pandemic.

Moreover, social remittances must not be overlooked. They include skills, knowledge and personal networks. In these ways, diaspora members contribute towards the economic and social development of the countries of origin. Sectors like health care, education and infrastructure have benefited a lot from such exchange. For example, the Africa Diaspora Network is a civil-society group that links migrants in the EU and has a bearing on policymaking in both Europe and Africa.

The soft power of the diaspora is being increasingly acknowledged in development circles. Global platforms like the Global Forum on Migration and Development have facilitated discussions between multiple stakeholders. Governments, civil-society organisations, scholars and international agencies have made important contributions, but more needs to be done to fully tap the potential of the diaspora for sustainable development.



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Rallye in Yangon on 17 February.

MILITARY COUP

Where hope lies

The military in Myanmar has seized power. But civil society is clearly not prepared to accept this. The protests are huge: tens of thousands take to the streets every day across the country – despite repression, violence, arrests and threats of prosecution.

By Katja Dombrowski

“You messed with the wrong generation!” That is the message of the young people to the generals. They are numerous, they are well connected – including with other protest movements such as those in Thailand and Hong Kong – and they have enjoyed freedoms that they do not want to lose. This generation insists on being governed by politicians whom they have democratically elected.

For 20-year-olds in Myanmar today, the military dictatorship is a childhood memory. The country had been in the process of democratising for ten years. In 2012, the National League of Democracy (NLD), the party of Nobel Peace Prize laureate Aung San Suu Kyi, entered parlia-

ment, where it has had an absolute majority since 2015. However, the military never left: a quarter of the seats are reserved for the generals, which means they can block any law. The army also appointed a number of ministers.

Nonetheless, Suu Kyi, who cannot become president herself because of a constitutional clause tailor-made for her, still pulled many strings. She was considered the de facto head of government; her party ally and confidant President Win Myint was her surrogate. Now both are in custody. The new self-proclaimed rulers have also arrested hundreds of other people, including politicians, journalists, students and an Australian advisor to Suu Kyi.

Suu Kyi’s image has suffered in recent years – especially in the west – because she cooperated with the generals, and above all because she neither prevented nor condemned the crimes against the Rohingya minority (see my comment in D+C/E+Z e-Paper 2017/02, Debate section). However, she still enjoys great support among many people in Myanmar, as evidenced by the

huge number of placards with which demonstrators are demanding her release.

This is not primarily about Suu Kyi though; the current generation of protesters in Myanmar does not need an icon to fight for their rights. People from all sectors of society are revolting against the fact that a democratically elected government was not allowed to form: monks and doctors, engineers and students, railway and rubbish collectors’ workers. The NLD won the parliamentary elections on 8 November by a landslide, while the army party, the USDP, suffered a resounding defeat. The military claims electoral fraud to justify the coup. It took place on the same day that the newly elected parliament was supposed to meet for the first time.

Presumably, the generals were simply afraid that the remnants of power they still held in their hands would slip away. And the privileges and financial gains that went with it. But they hardly expected such resistance. The world is a completely different place than it was in 1988, when the last mass protests took place in Myanmar. Back then, soldiers shot thousands of peaceful demonstrators – and got away with it. In February 2021, a 20-year-old demonstrator was shot, presumably by a police officer – and the whole world knows her name and face. Photos and videos of the moment Mya Thwate Thwate Khaing took a bullet to the head circulated on social media shortly afterwards. When this e-Paper was finalised on 26 February, five more anti-regime protesters had been killed. One policeman died as well, according to the military.

“We can see that the military is losing patience, but unleashing bloodshed in front of livestreaming smartphone cameras will be difficult,” wrote Aung Zaw, editor-in-chief of the independent newspaper *The Irrawaddy*, on 16 February. The 52-year-old had taken part in the 1988 protests as a young student and paid for it with imprisonment and torture. In 1993, he founded *The Irrawaddy* in exile in Thailand. “As in the past, if the military does launch a major assault, it will be like digging their own graves.”

The hope is that a bloodbath will be avoided. But that is not certain. The demonstrators are surely afraid of bloodshed. But at the moment, another fear seems to be even greater: if the people back down now, democracy and freedom will be lost for years.

COVID-19 VACCINATION

Don't leave Africa behind

In Europe and North America, public debate focused on how fast Covid-19 vaccination programmes are progressing in recent weeks. In Africa, the question was when such programmes might begin.

By Ben Ezeamalu

In early February, that had only happened in Egypt, Mauritius and Guinea. Guinea had administered a mere 55 vaccine doses, according to the Bloomberg Vaccine Tracker. The comparative figure for Mauritius was 207. By contrast, 43 million doses of Covid-19 vaccines had been administered in the USA by 9 February. The comparative figures were 31 million in China, 12 million in Britain and 3 million in Germany.

This scenario is unacceptable. Paul Kagame, the president of Rwanda, wrote in the Guardian: "There are worrying signs of vaccine nationalism in Europe and North America." Insisting that vaccination is not a matter of charity, he warned: "Until Africans get the Covid vaccinations they need, the whole world will suffer." This is correct for several reasons. One is that virus mutations are likely in places where people are not inoculated, and those mutations can then affect other places. Another reason is that fear of the pandemic slows economic activity, and vaccination helped to fully re-establish international supply chains. Since masses of Africans depend on the tourism sector, moreover, poverty is worsening because holidaymakers from prosperous world regions are staying away.

Africa was easily swept away in the race for the coronavirus vaccines. While the rich countries succeeded in acquiring millions of doses within the first few weeks of vaccine discovery, Africa is still negotiating with the manufacturers. John Nkengasong, the director of the Africa Centres of Disease Control and Prevention (Africa CDC), described the situation as "discriminatory". The Africa CDC is an institution of the African Union and cooperates with regional centres throughout the continent. Nkengasong added: "Excluding people based on

their country of origin would defeat the vaccination programme's goal of reaching herd immunity, which is achieved when a large part of the population is immune to the virus."

The situation is not hopeless. The Covax initiative, which was started in the G20 context last year, has pledged to vaccinate 20% of the people in partner countries, and that includes Africa. As a consequence, the World Health Organization (WHO) is expected to deliver 600 million doses of the vaccine. On top of that, the Africa CDC is hoping to secure another 270 million. That

February, Nigeria's 200 million people were still waiting for vaccinations to begin.

In South Africa, President Cyril Ramaphosa announced in January that 1.5 million doses, which would have vaccinated about 750,000 people, would arrive "in the next several weeks". His policy was soon in disarray after scientists found that the AstraZeneca vaccine does not adequately protect people from the coronavirus mutant that is spreading in – and also beyond – his nation. With the J&J vaccine, the campaign was then run in mid-February. Shortly before the COVAX campaign started in Ghana on 24 February, the BBC reported that national vaccination schemes had become operational in nine other African countries.

There are several vaccines. Three are produced by multinational pharma corporations based in Western countries. All three have been approved by regulators ac-



The pandemic is slowing down economic life: taking a person's temperature in Accra, Ghana.

would be a good start, but it would certainly not suffice. Africa has a population of 1.3 billion people. Vaccines were scheduled to arrive from April on. There is reason to believe that things will not work out as planned.

In Nigeria, for instance, the first batch of 100,000 vaccines the country said it would purchase were initially billed to be delivered in the last week of January. It has since been shifted to early February. As of 24

February, Nigeria's 200 million people were still waiting for vaccinations to begin. There are also vaccines from Russia, India and China. Research suggests that they are effective, but by early February, they had not been approved by the WHO which adheres to international standards. For obvious reasons, people around the world prefer pharmaceuticals that meet the requirements of the strictest regulators. As the WHO is playing an important role in Africa, its cri-

teria are very important. Even if they want to, African policymakers will find it hard to simply opt for other vaccines than the WHO appreciates.

AFRICA'S COVID-19 TRACK RECORD

The need to protect Africans from the coronavirus must not be underestimated. That, however, is happening to some extent because Africa has been trailing behind the rest of the world in terms of Covid-19 infections and deaths. Why that is so, is not fully understood. Experts say that hot climates may play a role and that Africa's comparatively young populations may be less affected. Moreover, African societies are said to have learned to stick to hygiene rules in view of several Ebola outbreaks. The list goes on.

As of 9 February, Africa has recorded 3.7 million cases of coronavirus, with 3.2 million recoveries and not quite 96,000 deaths, according to Worldometer's global coronavirus tracker. Southern Africa accounted for nearly half of those cases, with most infections registered in South Africa.

Official statistics, however, probably do not show the full picture. Health infrastructure tends to be poor in least developed countries and in remote areas of most developing countries. Testing capacities depend on the quality of health infrastructure. Most likely, some Covid-19 patients are never professionally diagnosed with this disease in Africa. On the other hand, people know about the pandemic, and mobile-phone connectivity means that rural people can make themselves heard when an unprecedented health disaster escalates.

African countries responded to the first news of the pandemic fast. Early travel restrictions and lockdown measures have probably helped to curtail the spread of the virus. Nonetheless, there is now a second wave, and the discovery of new Covid-19 variants is a matter of concern. African infection numbers rose in the winter months.

On 28 January, Matshidiso Moeti, the WHO regional director for Africa told a virtual press conference: "In the past week, there has been a small dip in cases in South

Africa, but 22 countries continue to see their case numbers surge." According to her, the number of deaths had doubled in the four weeks.

Africa needs effective protection against the disease. Moreover, the global community needs Africa to be protected. Policymakers around the world must speed up efforts to make that happen. As the Rwandan president wrote in his newspaper comment, this is not about charity: "All we ask for is transparency and fairness in vaccine access, not the protectionism currently in play." He wants the WHO to speed up the approval processes for vaccines. Moreover, he demands that countries with small populations get the same affordable pharma prices as the EU or the US have negotiated with powerful multinational corporations.



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No time to lose

In view of the Covid-19 pandemic, India and South Africa want the World Trade Organization (WTO) to waive intellectual property rights for relevant pharmaceutical products. Many developing countries have endorsed this initiative. It makes sense in principle because the patent system does not give researchers incentives to develop the medications and vaccinations that low-income countries need. However, industry observers say that IP rights are currently hardly slowing down vaccine supply as companies are scaling up production facilities fast. Given that all vaccines are new, initial bottlenecks are inevitable.

So far, the rich world is guilty of leaving poor world

regions behind. That is set to change, however. Especially in the EU, but in other advanced nations as well, people have expressed criticism of vaccination campaigns only taking off slowly. Indeed, operations of this scale are always a serious challenge. Serious initial stumbling is normal, but once things are sorted out, scaling up should happen fast. Given that infrastructure restraints are even worse in developing countries, however, it would certainly be good to get started there as soon as possible too.

It is true that the prosperous nations have ordered more vaccine doses than they need. The good news is that most of governments concerned have promised to pass on any doses

they will not use themselves. At the end of February, the G7 increased pledges for spending on vaccine support to \$7.5 billion in total.

A big question, however, is to what extent every vaccine can be used everywhere. All need cold storage, but the most innovative RNA vaccines require temperatures of -15 to -80°C. That does not look feasible in tropical countries with weak capacities. Viability obviously matters.

Virus mutations are making the situation even more complex. New strains have emerged, and it is not clear to what extent they are making vaccines ineffective. On the other hand, new variants will develop ever more frequently the more the disease spreads, so the global community has a common interest in getting as many people vaccinated as possible, everywhere. Vaccine nationalism is not a sensible option, so G7 governments should act fast in support of less advantaged countries. D+C/E+Z



South African President Cyril Ramaphosa got his shot on 17 February.

TECHNICAL SOLUTIONS

Managing projects from afar

The Covid-19 pandemic has turned daily life – and work – upside down in most countries of the world. Accordingly, innovative solutions and new methods are in strong demand. That is true for KfW Development Bank too. The bank is using innovative tools to manage the situation. These will not only prove helpful in the current crisis, but should advance financial cooperation in the longer term.

By Jochen Harnisch and Meinhard Rögner

Since the crisis began in March 2020, KfW's work in partner countries has become more difficult. On site monitoring is only possible to a limited extent. At the same time, the pandemic and its impacts have increased the need for international support. It has therefore become more urgent than ever to scale up ongoing projects as well as to launch new ones.

Normally, KfW project managers travel to partner countries regularly, dis-

cuss with the people involved in a project, develop new projects or check whether projects are proceeding according to plan. Partially this can be done in capital cities or regional centres, particularly with regard to measures in the financial sector or national governments' reform financing.

A core task of development cooperation is expanding and rebuilding infrastructure. When it comes to projects like the construction of streets, schools, hospitals, granaries and water pipelines, KfW normally monitors progress directly onsite. KfW experts repeatedly visit the partner country to ensure that plans are being carried out successfully and achieve the desired impact. To some extent, these findings are based on random sampling. The pandemic, however, has upended this routine.

Long before the Covid-19 crisis, KfW has built up experience in regions where onsite checks were not possible for some time. The reason then was not Corona virus,

however. Travelling to the hinterland has often been too dangerous, for example in Afghanistan and Pakistan, but also in parts of Africa.

From a European perspective, the Sahel is a strategically important region, but potential instability haunts countries like Mali, Burkina Faso, Niger and Chad. Therefore, Germany's federal government is pursuing the goals of pacifying and stabilising critical countries and creating development prospects for their people. Development cooperation strongly contributes to this process.

REMOTE MANAGEMENT

Ever more often, however, KfW supports projects in this region from afar due to the tense security situation. The bank relies on remote management, monitoring and verification (RMMV). Technology is helpful of course. Photos taken from satellites, airplanes or drones, geo-referenced databases and digital applications for project management are essential.

Nonetheless, local staff of KfW in the partner country are still very important. They are either citizens of the country concerned or expat consultants who still have access to the project region. They have increasingly become "eyes and ears" of KfW onsite. Both visual and audio information is relevant. Online dialogue, image transmission and virtual-reality applications have become indispensable.

MALI, FOR EXAMPLE

In northern Mali, KfW is primarily monitoring projects by remote means, because violent unrest is common. Though areas along the Niger river are well-suited to agriculture, only about 20% of an estimated 2.2 million hectares is cultivated. With appropriate irrigation, the cultivated area could be increased many times over. Small perimeters (demarcated areas), reservoirs, pumps, canals, wells and measures to prevent erosion could make a big impact. To tap the potential even in adverse circumstances, KfW is managing its irrigation programmes there from afar.

Drones are useful for monitoring smaller areas with a radius of a few square kilometres. The devices are battery-operated and directly connected to a computer of



The image, taken with a surveying drone, allows KfW to evaluate an irrigation project in the Sikasso region of Mali. The colours indicate the different crops: cabbage is blue, lettuce light green, onions dark green.

the implementation consultant on site. The picture material can then be further processed and passed on by phone. The images are so clear that it is easy to identify details of individual buildings. Differences from previous pictures become clearly visible

Satellite images are used as well. They are well-suited to observe larger areas. They help to answer questions like:

- Has the cultivated area grown overall?
- Has erosion occurred?
- Have canals been built or perimeters established?

Satellite imaging even helps to distinguish between individual crop species, such as maize, rice or vegetables. Pictures taken by satellite can be obtained – generally for a fee – from the owner of data rights. KfW uses satellite imagery mostly for targeted comparisons over long intervals and in fixed cycles.

THE LIMITS OF TECHNICAL SOLUTIONS

In West Africa, some 50 KfW projects are already underway in which remote management methods are being used. Previous experience shows that in specific circumstances they can be a substitute for onsite inspections. There are limits however. A downside, for instance, is that contact with the target group and responsible parties is

lost. In-person monitoring typically means that project experts talk to beneficiaries, asking parents whether they are truly satisfied with a new school, for example, or visiting local farmers and checking whether a scheme is really working.

Project experts thus gather impressions to the left and right of the beaten path. Their insights are unfiltered and often go beyond the standard mandate. Remote monitoring does not facilitate that. Perceptions remain limited, despite excellent high-resolution imagery.

There are further limitations. In order to work well over the longer term, approaches must fit the situation used onsite. Ensuring that costs money. Moreover, partners in the target countries have to be brought on board, trained and made familiar with the procedures. For these reasons, remote management often saves neither time nor money. It is frequently wrong to believe that simply avoiding travel saves money. Follow-up expenses are often incurred elsewhere.

TECHNOLOGICAL OPPORTUNITIES

Once innovative monitoring systems are in place, however, they can make work noticeably easier, facilitating infrastructure projects in areas where development cooperation would otherwise not be possible.

Therefore, remote management has proven useful even in “normal” times. That is particularly so when a programme consists of small-scale interventions spread over many locations. A single visit will allow a KfW expert to monitor the construction of a hospital with comparative ease and efficiency. Things are more difficult when it comes to many small infrastructure projects that are dispersed over an entire area or even an entire country.

Whereas project experts had to make do with random samples in the past, nowadays high-tech applications make more extensive reviews possible. Larger areas, like cultivated fields, a nature reserve or a forest belt, are also easier to cover and assess than before. The same is true for the evaluation of projects once they are completed.



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KoBoToolbox in use

In Burkina Faso, KfW Development Bank has been managing projects for many years. For instance, it is financing the construction of municipal buildings, including schools, health centres and markets. These buildings must meet the needs of the local people and support the local economy. However, since the sites are dispersed widely throughout the country, the progress of construction work is difficult to track.

The tense security situation adds to the problems.

Therefore, KfW uses a remote management information system called KoBoToolbox in Burkina Faso. It is an open-source programme that helps to digitally collect and manage a broad variety of data. Different kinds of information, including photographs, are entered into the programme.

In West Africa, KfW is also using Fieldbuzz, a similar programme which is not open source, but developed and tailored to the specific situation by a private-sector company. The collected imagery is geo-

referenced and date- and time-stamped. It can be assigned to the specific location on a map. Fraudulent use of pictures from other construction sites is prevented.

Simply put, the entire process currently functions as follows: a consultant or local project manager takes pictures of the construction site with a commercially available smartphone. Then they write a report about the status of the project that conforms to fixed criteria and a predetermined structure and deposit both in the KoBoToolbox.

Next, the material is reviewed and then released by the project office in the coun-

try. From that point on, the responsible party at the KfW headquarters in Frankfurt can retrieve and review the information.

The staff members use a map of the country or project area, click on a marker for each site and call up the latest information. Thus, they can precisely determine whether a building has a roof yet or if a new street has become longer since the last inspection. If there are doubts or questions, it is discussed with the implementing entity what needs to be clarified or improved. Further progress must then be documented with new pictures and reports.

jh/mr



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Rinsing artisanal textiles after dyeing in Bangladesh.



Chemicals management

Thanks to chemicals, many products of daily use have the traits desired. Also many of them, however, threaten human and/or environmental health. To the extent possible, the application of toxic substances must stop. Moreover, the trend towards using ever more chemicals must be reversed. Internationally coordinated regulations are urgently needed. The transition to sustainability

clearly requires global cooperation in this field.



This focus section relates directly to the UN Sustainable Development Goals, and in particular to SDG 8 (Decent work and economic growth) and SDG 12 (Ensure sustainable consumption and production patterns).



Destitute woman sorting plastic waste on a Karachi street.

these localities have no underground sewerage system. Municipal services tend to ignore them. Often they are close to polluting industries. Cooking fires, locally generated garbage and insufficient sanitation add to the problems.

Microparticles and other residues of plastic waste contaminate fresh ground water in many places (see Sabine Balk on p. 33). Other chemicals, stemming from paints, for example, can be harmful too.

PLASTIC WASTE

At the same time, plastic garbage – including bags, bottles and packaging – seems to be omnipresent. Large items clog open drains and block underground sewerage lines. On landfills, such waste is often burned. The smoke inevitable contains a broad mix of different poisonous substances. Such fires occur in other places too. Sometimes, they result from accidents, but some are started on purpose. In rare cases, poor people do that if they cannot afford other fuels. One quarter of Pakistan's people live below the poverty line.

The Pakistan chapter of the World Wide Fund for Nature (WWF) reckons that Pakistanis use an annual 55 billion plastic bags. The international non-governmental organisation expects the number to rise by 15% per year. So far, even the urban areas have no formal system for targeted collection of plastic waste and recycling. Scavengers pick plastic waste from garbage heaps and sell usable items on the scrap market. The rest is either burned or permanently litters the environment.

According to the national government's Economic Survey of Pakistan 2019–2020, most of the plastic items that consumers use are discarded permanently within a year of being manufactured. Related pollution was said to have hazardous impacts on oceans, human life, wild life and the overall environment. The national and provincial governments have enacted specific laws and rules, but effective implementation is lacking. On the upside, behavioural change is seen in upscale markets, where well-to-do consumers have begun to prefer biodegradable bags to plastic items. Plastic bags are cheaper, however, so they stay prevalent in poor neighbourhoods.

Industrial pollution is a huge problem. There are different kinds of industrial

HEALTH HAZARDS

Chemical pollution

Laws to control pollution in Pakistan exist, but are hardly enforced. Chemical health hazards abound.

By Imran Mukhtar

The South Asian country faces numerous adverse impacts of chemical pollution as its industrial activity and consumer market surge. Negative impacts affect air, water and soil. Especially the localities where poor people live are exposed.

Sometimes the impacts are in plain sight. An accident killed at least 14 people in Karachi, Pakistan's most populous city, in February 2020. Dozens who survived were admitted to local hospitals. Because of the chemically polluted air, they suffered chest pain, burning eyes and breathing difficulties. The neighbourhood concerned was Keamari, which is close to the South Asian nation's major commercial port.

Chemicals-related health hazards are not always that obvious. Those who become sick because of urban air pollution, for example, cannot trace their suffering back to a single explosion or event, even though it is well understood that urban air contains various toxins. According to the World Health Organization (WHO), they cause 22,000 pre-

mature adult deaths every year in Pakistan. In a country of over 220 million people, this UN agency reckons that there are an annual 40 million cases of acute respiratory infections.

The ever-increasing number of motor vehicles is part of the problem. According to the World Bank, it rose more than fivefold to 10.6 million in the two decades up to 2012, and it has kept growing since. Harmful farming practices (see my comment in Debate section of D+C/E+Z e-Paper 2021/01) and coal-fired power plants matter as well. Industrial air pollution, including from small-scale manufacturing adds to the problems, and so does the burning of plastic waste. Government authorities are overburdened, unable – and perhaps also unwilling – to keep track of all pollution sources.

Water and soils are all too contaminated as well, given that plastic waste, industrial effluents and landfills are not monitored properly. The use of pesticides and chemical fertilisers in agriculture is worrisome too.

While every person in Pakistan is exposed to the related risks to some extent, it is safe to say that the poor suffer in particular. More than half of major cities' people live in informal settlements. The infrastructure of the slum areas is inadequate. Typically,

zones, with large, medium and small-scale production sites. Large facilities are formally registered, but the small-scale sector is largely beyond government supervision. Either way, many industrial processes involve a multitude of different chemicals, many of which are dangerous. Smoke and effluents tend to be contaminated accordingly, but remain unchecked by government agencies.

Nutrient-rich municipal waste-water, moreover, is used for agricultural purposes, in particular for vegetable farming on the outskirts of cities. What neither farmers nor consumers see, is that the sewage is contaminated with heavy metals and other toxic substances. Healthy looking vegetables may therefore actually be a health hazard. Moreover, waste-water farming often contaminates groundwater.

According to the law, industries must use air filters and effluent treatment plants. In theory, there are stiff penalties. In practice, however, enforcement is lacking, and so far, government agencies have not shown much concern. In 2019, a group of environ-

mental researchers (Mahmood, 2019) stated: “No serious effort has been put forth by any agency in Pakistan to characterise the exact nature and concentration of contaminants found in wastewaters originating from various industrial zones.”

Many small tanning units continue to work in eastern Punjab’s industrial city of Sialkot without any sewage treatment. Most of these are situated in low-income localities. The situation is similar in Faisalabad, the country’s textile-industry hub. Many production facilities operate in residential areas, but without treatment plants.

To some extent, official neglect of chemical pollution may be related to the fact that a biological kind of pollution is even more prevalent. According to researchers (Ali et al, 2017), 80% of Pakistanis depend on unsafe drinking water because of faecal pollution, which results from inadequate sanitation. Pakistan has made international commitments, including in the context of the Sustainable Development Goals (SDGs). Sanitation and clean

drinking water are on the agenda – plus much more. To get there, governments must muster more political will than they have done in the past and make their agencies work more effectively.

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ENVIRONMENTAL HAZARDS

Stop global trend of chemical intensification

Around the world, the use of chemicals is intensifying. Most products that people use daily now include artificial substances. The substances improve the products, but all too often they put people and the environment at risk. Prudent regulation is urgently needed, and international cooperation is a precondition for making it happen. It would be helpful to define stringent goals – similar to the one of keeping global warming below 1.5 degrees.

By Hans-Christian Stolzenberg

Chemicals permeate our lives. Most daily-use products contain them – ranging from

cosmetics to clothing to computers (see Olga Speranskaya on p. 29 of this e-Paper). Consider an up-to-date smartphone. It will include some 60 different raw materials. Plastics will account for about half of its weight. These plastics are made of basic bulk chemicals plus special ingredients that ensure desired characteristics such as colour, rigidity, resistance to sunlight or low flammability, for example. Another quarter of the weight is contributed by about 30 different metals including rare earths. The smartphone also includes glass, ceramics and other raw materials.

A growing share of humankind, moreover, consumes food that is produced

by industrial-scale, chemicals-dependent agriculture. People live and work in buildings that contain a multitude of chemical substances. They commute by bus, train or car, all of which require lots of energy, the generation of which again requires many different chemicals and chemical reactions. Quite obviously, we need renewable energy supply to achieve sustainability, but it too will require chemicals. That is equally true of sustainable architecture or sustainable mobility.

CROSS-CUTTING ISSUE

Since chemicals are omnipresent in our daily lives, they are relevant for achieving the Sustainable Development Goals (SDGs). That applies to every single SDG. Several tens of thousands of chemicals are being marketed internationally, and more are being invented fast. Each and every one serves some kind of purpose, but the problem is that two thirds of the chemicals are hazardous in one or more ways. Many even have to be hazardous to fulfil their function. The



Recycling digital devices in India in 2017.

multitude of substances combined with the multitude of substance applications results in huge regulatory challenges. We need rules to prevent harm to human beings and, more generally, the natural environment.

This issue has been on the international agenda since 1992, when the UN Conference on Environment and Development (UNCED) in Rio de Janeiro adopted the Agenda 21. It included what was later called the 2020 target for sound management of chemicals. The guiding ideas have since been confirmed several times and figure in the SDG target 12.4: “By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimise their adverse impacts on human health and the environment.”

HOW TO BRING ABOUT CHEMICAL SAFETY

Experts from science, business and government agencies are working on minimising chemical risks during products’ life cycles. The underlying principle is actually quite simple. First of all, it is important to know all – and especially the problematic – properties of a chemical. Extensive testing serves to understand, for example:

- whether it has toxic impact on people or animals,

- whether it causes cancer,
- whether it is explosive,
- to what extent it is decomposed by microorganisms, radiation or other forces in the natural environment, and / or in treatment plants.

It is also important to understand what concentrations and doses lead to what impacts, and what kind of usage leads to what kind of pollution that may harm humans or nature. Put in simple terms, chemical safety is basically about ensuring that neither people nor the natural environment are exposed to hazardous contamination. Of course, accidents – including explosions – at production facilities must be prevented too.

At the global level, the UN Environment Programme (UNEP) and the World Health Organization (WHO) are among the leading agencies involved in the Inter-Organization Programme for the Sound Management of Chemicals (IOMC). The IOMC’s mission is “sound management of chemicals and waste” (SMCW). Other international agencies are involved as well. Most, though not all sovereign nations contribute by implementing several internationally binding conventions, for instance those that bear the names of the cities where they were concluded – Basel, Rotterdam, Stockholm (BRS) und Minamata.

The voluntary Strategic Approach to International Chemicals Management (SAICM) was launched at a summit in Dubai in

2006. It unfortunately lacks teeth and is underfunded. On the upside, its multi-stakeholder and multi-sector approaches make sense. Both are needed to facilitate effective, cross-cutting cooperation (for future of SAICM and SMCW see box next page).

Environment and health agencies are similarly in charge of chemical-safety issues at the level of regional organisations and nation states. The EU regulations concerning the classification, labelling and packaging (CLP) of substances and mixtures are an example, and so are EU rules on registration, evaluation, authorisation and restriction of chemicals (REACH regulation) (see Katja Dombrowski on p. 26 of this e-Paper). Other government departments regrettably do not so far consider sound chemicals management something they must pay attention. That must change.

GLOBAL MEGATRENDS

Chemical safety must not be understood only in a narrow sense. Several disturbing global trends add to the challenges. One major problem is that, for most practical purposes, the huge variety and volumes of several tens of thousands of chemicals make it hard, if not impossible, to manage them appropriately in each and every setting.

From 2000 to 2017, the chemical industry’s global production capacity (excluding pharmaceuticals) almost doubled from 1.2 billion to 2.3 billion tons. It is expected to double again by 2030. Sales figures basically tell the same story. Global turnover is expected to increase from €3.5 billion in 2017 to €6.6 billion in 2030. At the same time, the chemical industry is setting up facilities in new places and expanding its marketing to new countries. With those shifts, it is responding to different rates of population growth, globalisation, digitalisation and the impacts of the climate crisis.

The sad truth is that humankind is wide off the mark in regard to the 2020 target. That is what the UNEP concluded 2019 in the second edition of its Global Chemicals Outlook (GCO II). Indeed, vast amounts of hazardous chemicals keep polluting our environment. Pollution occurs during the production of chemicals but also during products’ life cycle and through waste.

Manufacturing 1 kg of pharmaceuticals causes anything between 25 and 100 kg

of waste and emissions. Adding to the worries, the chemical industry is energy-intensive and responsible for huge volumes of greenhouse-gas emissions. Some extremely toxic chemicals have been banned internationally for a long time, PCB (polychlorinated biphenyls) for example. Nonetheless, these chemicals can be found in the most remote places, including in polar ice, Himalayan glaciers or even 10 km below the ocean surface in the Mariana trench. The concentrations found in the organisms of deep-sea crustaceans and polar bears are sometimes higher than those in animals living in industrialised regions.

In the 1950s, oil-based plastics began to conquer the world. Back then, the annual production volume was about 2 million tons. The comparative figure was 400 million tons in 2015, and experts reckon that it will rise further to 1.1 billion tons by 2050. From the 1950s to 2015, a total of 8.3 billion tons were produced, of which almost 5 billion have already been “disposed of”. In many cases, that was done without any kind of systematic waste management. The

results include ocean pollution with plastic and micro plastic waste (see Sabine Balk on p. 33 of this e-Paper). Many plastics contain dangerous softeners or flame retardants. The concentrations tend to be so low, that these plastics are not poisonous in a narrow sense. However, the substances are long-lasting and have been discarded in huge quantities. Thus, they can indeed cause harm and affect people.

The growth trends outlined above are incompatible with sustainable development and staying within the planetary boundaries. Chemicals management and chemical safety are therefore issues of great relevance. They concern the international community. In view of daunting global challenges, we must tackle important questions:

- What level of per-capita chemicals use serves the welfare of society?
- For what purposes is the use of hazardous chemicals (still) needed?
- How do we recycle better and more effectively, in the full knowledge of our resources being limited?

- How do we generate the massive volume of renewable energies needed for recycling purposes?

INTERNATIONAL COOPERATION

The questions of which uses and what volumes are indispensable to society are becoming ever more urgent. We need global cooperation. Otherwise, it will be impossible to recycle precious raw materials of the kind that smartphones contain, minimising losses in the process. Currently, electronic devices and electric goods tend to be recycled by informal-sector workers in the global South. The people doing the work are exposed to health hazards, and the recycling rates are low.

Progress is possible. We have concepts for using chemicals in a sustainable way. Everyone involved in designing, producing, using, recycling and disposing relevant goods must apply those concepts. Yes, it is true that the debate has not been concluded on what exactly constitutes sustainable chemical use and how to measure progress.

Trailblazing UN conference

Great hopes are pinned on the fifth session of the International Conference on Chemicals Management (ICCM5). It is the setting in which decisions are taken regarding the Strategic Approach to International Chemicals Management (SAICM).

In Geneva in 2015, the previous session (ICCM4) launched an Intersessional Process (IP). The IP has prepared the ground for far-reaching decisions at ICCM5. They concern “SAICM and the sound management of chemicals and waste beyond 2020”.

Germany was supposed to host ICCM5 in Bonn in October 2020, but the event had to be postponed because of the

Covid-19 pandemic. There were plans to do so in July 2021, but the situation had to be reassessed and the conference will probably only take place in 2023.

Germany’s Federal Government remains determined to host the conference and assume the presidency accordingly. It is working on staging a high-level event planned on 8 July 2021. The idea is to raise awareness of the need for crosscutting action in spite of the UN process having had to be postponed.

ICCM5 is supposed to pave the way for decisions at the UN General Assembly, where the heads of state and government would be involved. Cooperation across sectors is needed to manage chemicals properly. This is a core issue of sustainable development. Humankind needs affordable chemical products and related services in order to facilitate broad-based and fairly shared prosperity without breaching planetary boundaries. hcs



Plastic waste in Dakar, Senegal, in 2005: humankind needs global solutions to global chemicals problems.

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Residues of agrochemicals end up in the food chain and people's drinking water.

However, that does not mean we cannot act responsibly yet. The key to success is targeted innovation, with innovation understood not only in a narrow technological sense. We also need social innovation including in regard to international cooperation – transcending borders and spanning world regions.

The core problem is that many countries lack the needed expertise and institutional capacities. This must change fast. The toolkit for ensuring chemical safety must be made use of everywhere. However, the gap between advanced nations on the one hand and developing countries and emerging markets on the other appears to have widened in the past 10 years. In many countries, more – and more intensive – use of chemicals is making capacity shortfalls ever more obvious.

While a growing number of countries in the global South has been passing legislation on chemicals, they still tend to lack the personnel and organisations they would need to enforce those laws. By 2017, more than 120 nations had not implemented the Globally Harmonized System (GHS) for classifying chemicals. According to SAICM's Global Plan of Action (GPA), moreover, all countries were supposed to implement the GHS by 2010. It is, after all, an important precondition for ensuring chemical safety. In 2018, more than 135 countries still did not have a pollutant register. According to the

GPA, they were supposed to establish one by 2015. Quite evidently, capacity development must become a top priority.

SETTING A TARGET

In this decade, the international community must set the course towards making the use of chemicals sustainable. Part of this agenda is to ensure that the benefits chemicals offer are shared fairly. Obviously, the costs to prevent harm and clean up legacies must be shared fairly as well. Existing risks must be reduced and ultimately avoided. A global bargain must be negotiated. At the technical level, the notion of essential uses is once again gaining traction. It is currently a hot topic in the context of the European initiative to radically restrict per- and polyfluoroalkyl substances (PFAS). Developments of this kind show that our species must come to grips with the basic question of what level of “chemical intensity” is appropriate.

Quite obviously, the trend towards ever greater chemical intensity cannot continue. Finally, for every application of a chemical, we must determine what intensity is SDG compatible and also serves society's well-being. We must understand what the maximum level is that human beings and nature can tolerate.

For many chemicals, the maximum levels are already obvious, so appropriate

sharing and distribution is the main issue to gain sustainability. Around the world, the use of hazardous substances must be reduced and managed responsibly. Strict safety standards must be observed. The European chemicals strategy for sustainability, that has introduced a toxic-free hierarchy, delineates a tangible approach which sets international standards.

The Paris agreement on climate change includes the aspiration to limit global warming to 1.5°. It would be most helpful if the international community could reach consensus on a similar figure for chemical intensity. To judge by the analysis of the GCO II, chemical intensity is likely to increase by a factor of 2.3 per capita in the four decades from 1990 to 2030. We need to learn fast whether that factor is too big. Perhaps 1.5 would be more fitting in this context, as in climate matters. Setting such a target would help the international community achieve results. So far, we have an Intergovernmental Panel on Climate Change, but not on chemicals. Let us hope establishing one will be among the far-reaching decisions that ICCM5 (see box, p. 24) will take.

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ENVIRONMENTAL SUSTAINABILITY

First steps towards keeping environment toxin free

The European Union has adopted a policy to ensure that future production or application of chemicals will neither harm human beings nor the natural environment. That is the objective of the Chemicals Strategy for Sustainability that the EU adopted in 2020. New safety and sustainability standards will set global standards.

By Katja Dombrowski

In October 2020, the EU formally adopted the strategy. It is intended to be a first step towards a toxin-free environment. This goal is in line with the European Green Deal which the EU approved one year earlier (see D+C/E+Z e-Paper 2020/01, Debate).

Chemicals are playing an ever greater role in all spheres of our lives (see Olga Speranskaya on page 29 and Hans-Christian Stolzenberg on page 22 of this e-Paper). The EU expects the chemical industry's global production to double in the course of this decade and the application of chemicals to increase accordingly. Given that many chemicals have potentially harmful impacts

on human health and the environment, the EU drafted the sustainability strategy.

The current state of affairs is that the EU already has the world's most stringent chemicals regulations. Various directives are in force. The most important ones are called REACH (which stands for "registration, evaluation, authorisation and restriction of chemicals") and CLP ("classification, labelling and packaging"). The new strategy stipulates a revision of those directives in order to ensure comprehensive information concerning all chemicals produced in – or imported to – the EU. The idea is to identify problematic substances fast and to eliminate them gradually from consumer products.

Specific chemicals will thus be banned from toys, baby products, cosmetics, cleaners and clothing. Particularly vulnerable people such as children, pregnant women or the elderly are to be protected. In the context of the strategy, the most important initiatives are the following.

- First of all, the most dangerous substances are to be banned gradually. They in-

clude endocrine disruptors, which interfere with the natural effectiveness of hormones. Chemicals that affect the immune system and the respiratory tract will also be phased out. Moreover, the use of persistent chemicals such as PFAS (per- and polyfluoralkyl substances) will be discontinued for all purposes that are not indispensable for the common good.

- The application of problematic substances will be minimised. On the one hand, regulators will focus on products that are likely to harm particularly vulnerable population groups. On the other hand, they will prioritise goods of high relevance for the "circular economy". This term stands for maximising the recycling of raw materials.

- Attention will be paid to so-called "cocktail effects". The point is that specific risks arise when people or ecosystems are exposed to many interacting chemicals from different sources.

- Finally, new duties to declare the chemical content of products will be introduced. The point is that consumers and private sector enterprises deserve comprehensive information. Otherwise, they cannot ensure safe use.

EU policymakers expect the strategy to have global impacts. In regard to chemicals, the European Commission intends to set international safety and sustainability standards. After all, norms that apply to the EU market are likely to be observed beyond Europe. At the very least, they will serve as points of reference. It also matters that there will be no permissions to produce for export purposes dangerous substances that are banned from the EU market. China is currently the global leader in chemicals production, and the EU ranks second.

According to the European Commission's action plan for implementing the strategy, the relevant reforms will be implemented in the years 2021 to 2024. Further steps are to follow, for example in UN contexts.

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In terms of sales, BASF, the Ludwigshafen-based multinational, is the chemical industry's global leader.

GLOBAL ENVIRONMENT

Inundated by plastic

The general public does not have a clear understanding of just how dangerous plastic waste is. Social entrepreneurs in the Indian state of Tamil Nadu are raising awareness – with a special focus on children and teenagers.

By Mukta Martens

WasteLess is a non-governmental initiative based in the South Indian town of Auroville. As our name indicates, we specialise in teaching people about the issue of waste and emphasise the need to close the tap and reduce the amount of waste we produce.

In particular, we focus on educating children and teenagers. They are an inspiring demographic to work with because they are optimistic, eager to learn and willing to change their ways. In our experience, many of them become drivers of change both at the household and the school level. For example, in one government school in Tamil Nadu, after completing one of our programmes all of the students changed their drinking water bottles from plastic to stainless steel.

In our experience, many people do not understand just how problematic plastic waste is. Plastics are without a doubt one of – if not the – biggest environmental disaster that our planet is facing. Nature does not decompose most of these substances. Long-lasting plastic items thus litter areas that are settled by people. Even worse, the oceans and other wildlife areas are affected too. Over the years, plastic items break down, and as a result, microplastics have been found in the water we drink and the air that we breathe. These tiny particles cause health hazards, some of which have not been thoroughly researched so far.

Around the world, environmentalists are sounding the alarm. For example, social movements have been demanding that single-use plastics be banned. Moreover, they are promoting the use of non-plastic consumer items such as bamboo toothbrushes, jute shopping bags or re-usable drinking straws. Young people are particularly active.

Since the next generation will inherit this planet, it is essential to provide them with the knowledge they need to rise up to the environmental challenges they will certainly face. They are, after all, tomorrow's leaders.

ON THE PRECIPICE

We do our best to educate youth in creative and innovative ways. We believe that the kNOW PLASTICS programme that Waste-

Less called Trash Concentration in cooperation with students. It quickly became apparent that students saw “plastic as plastic”. In their eyes, it was all the same type of material. They could not tell the difference between the plastics used for bags, bottles or toys, for example.

We think it is important for people to know that there are different types of plastics with different impacts on our health and the environment. First invented in 1907, plastic was soon hailed as a wonder material which in fact turned out to be as advertised: indestructible. Ever since, scientists have developed an ever-growing variety of different plastics for different purposes. In recent decades, scientists have also been working on innovative ways to deal with vast quan-



Learning about resin codes on plastic bottles in a Tamil Nadu government school.

Less has designed sets international standards in terms of reaching out to schools (see box next page). Our intention is to help to bring about a global awakening. People need to become aware of the precipice we are standing on. A seemingly endless wave of plastic waste is engulfing our planet and threatening the health of human beings, animals and the natural environment in general.

Despite plastics being an essential item for our lifestyles, most of us know surprisingly little about this material. In 2011, WasteLess developed an educational game

of toxic plastic waste being generated. Consumerism pretends that everything is disposable, but the truth is that humankind still lacks an affordable, effective and reliable technology to handle every kind of plastic waste.

There are, of course, many sensational headlines. Again and again, media outlets have reported that bacteria eat plastic. It has not been proven, however, that these microorganisms really do break down plastics completely rather than excreting microplastics. Celebrities like David Attenborough, the British director of nature documenta-

ries, therefore insist that we need to act fast in order to get a grip on the plastics problem.

MANY DIFFERENT RISKS

Indestructibility is not the only reason why plastic waste is so difficult to manage. Another reason is that plastics are extremely diverse. They gain their versatile properties such as transparency, flexibility, strength and colour from additives. These additives include highly toxic substances such as bisphenol A, phthalates, brominated flame retardants, polyfluorinated chemicals and vinyl chloride. All endanger the health of people and other organisms. However, the risk is different for different kinds of plastic. Knowledge of the differences helps people to control the risks – not all plastics contain toxic chemical additives.

However, it is not common knowledge that there are seven main categories of plas-

tic. Nor is it generally known that consumers can actually tell one from the other quite easily. The international standard is that plastic items must be marked with a number in a chasing-arrow triangle. This code was initiated by a plastic lobby group in 1988 to help recyclers tell plastic apart. Resin code #1-#6 mark individual types of plastic while those in the “catch all” category of resin code #7 are new types of plastic that do not fit in the first six categories.

WasteLess, through its testing and participatory design processes, has chosen to use these resin codes and teach children how to avoid “unsafe” plastics: beware of resin codes #3, #6 and #7! Children want to understand the world they live in, and curiosity is a powerful driver for self-motivated learning. Once kids understand the resin code, they start checking plastic items on their own, without teachers having to tell them to do so. The code also helps

them to figure out whether a plastic object was designed for one time use or if it is of longer-term value. The science is clear. Consumption habits must change, and the throw-away mentality must end. Young students are eager to follow the science.

Unfortunately, the resin code is not marked on plastic items consistently in all countries. Inter-governmental cooperation on issues of this kind must improve (see Hans-Christian Stolzenberg on p. 22 in this e-Paper). At the same time, environmental education is critical for the future of our planet. We can no longer ignore the warning signs – and we at WasteLess are doing our best to sound the alarm.



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kNOw PLASTICS

In the global battle against plastics, WasteLess, a South Indian non-governmental organisation, is using educational programmes to teach children about waste. We have been refining our methods over the past ten years.

Our most recent programme is called kNOw PLASTICS. It was rolled out across 106 schools, targeting nearly 12,000 students mostly across India, but also in Sri Lanka and Romania. The programme and insights from the research also formed the basis for chapters on plastics that are included in textbooks that the state government of Tamil Nadu has approved for government schools. The target group is students of the ages six to 15 years.

kNOw PLASTICS is an eight-week programme. We take a playful approach that includes songs and hands-

on learning methods. Among other things, we developed a memory card game. Each of the 50 cards in the game represents a specific key concept about plastics. An accompanying booklet contains scientific information for each card. It also proposes activities that are not only fun, but also serve to reduce participants’ use of plastic. Emphasis was placed

on single-use plastics and reusable alternatives, such as jute bags, for example.

kNOw PLASTICS is based on information we gathered from activists and scientists around the world. We did interviews by Skype for this purpose. The idea was to make sure our programme covers the most important issues when it comes to plastic waste.

We involved students and teachers in the development of the programme. This approach helped to make the

programme more effective. Embedding assessment into a programme, moreover, helps teachers to monitor their students’ progress – both in terms of learning and behavioural change. Obviously, WasteLess benefits from such information too. The feedback participants gave us through questionnaires was used to improve the programme further.

After completing the kNOw PLASTICS programme, 80% of the students could tell unsafe resin codes from safer ones (see main essay). The share of those who discussed plastics with their families was an astonishing 97% so far. We are also happy that 97% of the teachers said that the programme was enjoyable, with 93% saying they would recommend it to colleagues. In short, we feel that this programme is a promising step forward in our battle against plastic waste by educating the youth to become active changemakers.



Children are curious and want to learn.

SERIOUS HEALTH HAZARDS

Toxic consumer items

Common consumer goods contain dangerous substances that are known to harm human health. Examples include clothes and toys. The public is not informed properly as companies are not legally bound to disclose risks in full.

By Olga Speranskaya

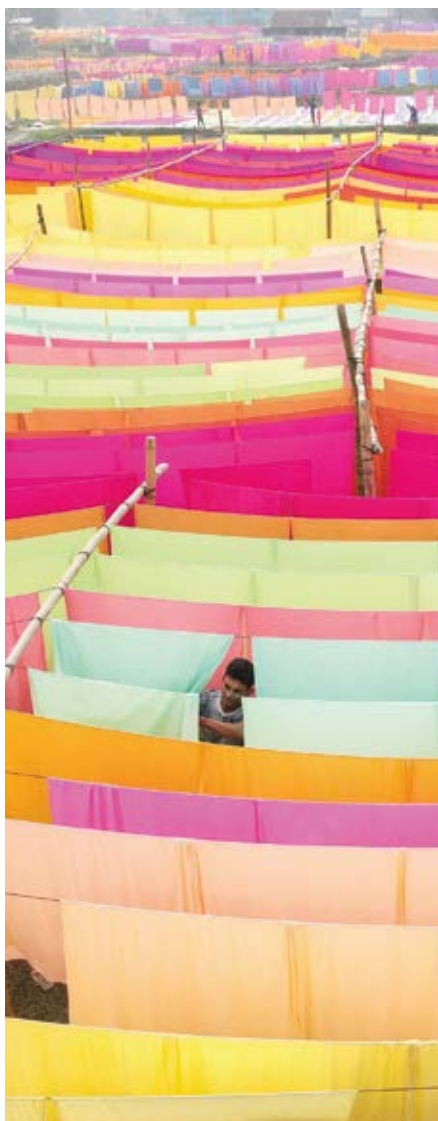
Let us talk about clothes first. It is important to understand what clothes you should buy and what clothes you should stay away from. Synthetic fabrics are popular, but they cause a lot of problems. People appreciate polyester, nylon and acrylic in garments because those garments do not wrinkle. They are also cheap, light and have many other characteristics that consumers love. Around the world, these fabrics form about 60% of the material that makes up our clothes.

Synthetic fabrics are nothing more than different forms of plastic however. For instance, polyester is made from polyethylene terephthalate (PET), very common type of plastic. It is also used to make water bottles, food containers and many other products. This material has a 10% global market share of all plastics and is the third most popular after polyethylene (33.5%) and polypropylene (19.5%).

Plastic fibers are difficult to dispose. Typically, nature does not decompose them, so they are persistent. They can be ground down to micro-plastics which poison living organisms. When plastic is burnt, it is reduced to a hard plastic bead while black smoke and dangerous fumes are emitted. The full truth is that many toxic chemicals are used to make synthetic fibres.

PERSISTENT POLLUTANTS

It takes approximately 0.58 kilogrammes of various chemicals to produce a kilogramme of fabric. Dyeing processes alone typically involve over 1,600 different chemicals, including formaldehyde, phthalates, perfluorinated and polyfluorinated compounds (PFCs). Some of these substances are persistent organic pollutants and endocrine



Dyeing processes typically involve over 1,600 different chemicals: drying textiles at a factory in Bangladesh.

disrupting chemicals. Dyes can also contain heavy metals. These substances can cause nerve damage, kidney damage or cancer.

Various chemicals are used to impart certain properties to our clothing. For example, brominated and chlorinated flame retardants make clothing more fire-resistant. They can be found even in children's clothes, furniture upholstery and

children's car seats. Flame retardants can cause thyroid disorders, memory and learning problems, delayed mental and physical development, reduced IQ, early puberty and reduced fertility.

Another example is formaldehyde, a known respiratory irritant and carcinogen. It is used to keep clothes in shape and less creased. It is even found in some baby diapers.

Perfluorinated chemicals make clothing waterproof and stain-resistant. They can be found in jackets and waterproof overalls, including baby clothes. These chemicals can affect the health of the liver and disrupt the body's hormonal functions.

Consumers who wish to reduce the risk of negative health effects of clothing should give preference to natural materials such as cotton or linen. They should also forgo bright colours. This is especially important for children, whose health can be seriously affected by exposure to hazardous chemicals.

NON-GOVERNMENTAL ACTIVISM

Consumers must know about these risks. So far, however, manufacturers have been slow to provide related information, denying people the opportunity to protect themselves.

On the upside, more and more buyers are interested in understanding the toxic contents of textiles. Six out of ten consumers worldwide want to know whether the clothes or home textiles they buy contain harmful substances. They also showed interest in whether goods are produced in an environmentally and socially responsible way. That is what a recent study by Oeko-Tex revealed. Oeko-Tex is an international association of 18 independent research institutes and specialises in product certification and labels.

Health and Environment Justice Support (HEJSupport), the international non-governmental organisation which I co-direct, is also involved in these matters. In 2020, we published a report that assessed what well-known brands such as H&M, Zara, Tommy Hilfiger or Adidas are doing to inform consumers. The truth is that important companies are far from fully disclosing vitally important information. Our report includes recommendations on how to improve corporate performance.



Consumers are not told about hazardous substances contained in plastic toys.

still contain the dangerous substances. The secondary raw material is then used to make new products which are distributed internationally and once more put people's health at risk.

In an IPEN survey of recycled plastic in children's products from 26 countries, 90% of the samples contained three toxic brominated flame retardants. In the context of the multilateral Stockholm Convention on Persistent Organic Pollutants, these chemicals are listed as substances that must be eliminated. Nonetheless, they are common in recycled plastics, and consumers are not even made aware of the risks.

WE NEED FULL DISCLOSURE

Consumers deserve to be told the truth. There is a need for mandatory full disclosure of the presence of toxic substances in products. That applies especially to products for children because children are the most vulnerable to exposure to hazardous chemicals.

Good news is that the European Chemical Agency (ECHA) has started collecting related information. Producers, importers or suppliers of articles based in the EU must now register products in a database. This is a good start to make sure that toxic substances have no place in products sold in the EU.

The sad truth is that regulations for protecting people and the environment tend to be weakest in least-developed countries. Obviously, consumers there are increasingly exposed to plastic-related health hazards too.

LINK

HEJSupport, 2020: Sustainable fashion? How companies provide sustainability information to consumers.

https://hej-support.org/wp-content/uploads/2020/03/hejSupport_SustainableFashion_March2020_Web_with-active-links.pdf



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Clothes are not the only source of toxic chemicals in our daily lives. Other consumer goods can also be hazardous – and that includes toys.

DANGEROUS TOYS

The International Pollutants Elimination Network (IPEN) is an international network of NGOs. Since 2012, it has been conducting research on the toxic-substance content of toys, including toys for the very young. The focus is on toxic substances such as heavy metals, endocrine disruptors and persistent organic pollutants. So far, more than 30% of the samples analysed contained concerning levels of one or more toxic metals (such as arsenic, cadmium, chromium, lead and mercury). The presence of such dangerous substances in toys is unacceptable.

Phthalates are another cause for concern. They are endocrine-disrupting substances and can be released from an item when heated or even just stored. That can happen throughout a product's lifecycle, from production through use, recycling and disposal. Many toy samples contained these chemicals which can cause infertility, contribute to childhood obesity, asthma, cardiovascular disease and even cancer.

In some countries, the use of some phthalates has been banned, but they may still be used in others. That shows that national legislation is not always up-to-date. The EU has restricted the use of many phthalates. However, they may still appear in toys. It is most irritating, moreover, that the labels of the toys affected did not in-

clude any pertinent consumer information. Companies do not warn buyers of the potential danger to children's health.

Plastic is, of course, not only contained in clothing and toys. Ever more products include some kind of plastic. More than 140 different chemicals can be used in the production of plastic. These substances have different functions, make plastic flexible, soft, hard, flame-retardant, transparent or matte. Many of them threaten human health.

For example, Bisphenol A (BPA) serves to harden plastic. It is found in food and drink containers, baby bottles and cups made from polycarbonate plastic. Scientists have linked BPA to heart disease, diabetes, and liver abnormalities. It is also a known endocrine disruptor that leads to reproductive problems, early puberty and obesity in children. Consumers who buy plastic water bottles or baby feeding bottles, are well advised to check the plastic codes on the products. BPA is usually absent in plastic with codes 1, 2, or 5. By contrast, plastic with codes 3 and 7 are more likely to include BPA or phthalates.

WHY RECYCLING IS PROBLEMATIC

Environmentalists generally appreciate recycling, but plastic recycling can be most problematic. Typically, recycling means melting and reforming for future use. The trouble is that recycled plastics have been shown to contain many banned or restricted hazardous chemicals. Waste plastic is converted into secondary raw materials, which

AGRICULTURE

Taking aim at pests

Africa is starting to catch up with other regions in the use of chemical pesticides to protect crops. The continent still has a long way to go to ensure that pesticides are used safely and effectively.

By Patrick Ajwang

Massive swarms of desert locusts invaded eastern Africa in the summer of 2019, destroying hundreds of thousands of hectares of crops and worsening food shortages in at least eight countries. In some cases, the swarms were the size of cities, big enough to darken the sky. Making matters worse, heavy rainfall in 2020 meant the pests stayed in the region, breeding more locusts and deepening the food crisis. The climate crisis is compounding problems (see Mahwish Gul in Focus section of D+C/E+Z e-Paper 2020/11).

Another pest – the armyworm – has been hitting Africa hard since 2016 (see Nowadays column by Humphrey Nkonde in D+C/E+Z e-Paper 2017/04). These caterpillars appear in “armies” that consume everything in their path, devastating cereal crops and pastures. According to the UN, this insect invasion has caused \$3 billion in crop damage across the continent so far. Some farmers lost their entire harvest. Asia is increasingly affected as well.

When pests invade a region, farmers typically try to prevent them from landing on the fields. Some farmers light fires or create clouds of smoke by burning refuse. Some even throw stones or wave sticks at the invading swarms or make noise with various objects to scare them off.

None of these methods helps much. Spraying pesticides from aircraft, on the other hand, produces results. In the case of the locust invasion in the Horn of Africa, spraying involved a coordinated international effort. The UN Food and Agriculture Organization (FAO) and the Desert Locust Control Organization for Eastern Africa (DLCO-EA), a regional organisation, have been actively involved. According to an article in the monthly magazine Africa Report,

the DLCO-EA trained hundreds of agents to transmit the coordinates of locust swarms. When a swarm exceeded 500 hectares in size, the authorities deployed light aircraft at low altitudes to kill the pests with chemicals.

HANDLE WITH CARE

Spraying operations of this type are controversial. The chemicals that kill pests can

and the chemicals involved – can include birth defects, tumours, genetic changes, blood and nerve disorders, endocrine disruption, coma or death, according to scientific studies.

In the Horn of Africa operations, however, officials used about one litre of active pesticide ingredients per hectare of cropland – a level they say kills the pests without harming people and animals.

That may be, but Africa as a whole still has a long way to go before it handles pesticides safely. Widespread mishandling of pesticides in Africa was documented by Feed the Future, a US government programme. Its report (2019) stated: “Without regulation and adequate training/capacity building of farmers, Africa is at risk of wide-



Worker on a Kenyan cut-flower farm: those who spray pesticides should wear protective gear.

also kill beneficial insects such as bees and beetles, which are needed for a functioning ecosystem. Moreover, if chemicals are over-used – leaving residues that exceed recommended amounts – the result could be a contaminated harvest that sickens or even kills humans and animals. When excess amounts of pesticide accumulate in the body, the effects – depending on the dosage

spread pesticide poisoning.” The authors warned that “increased reliance on pesticides has led to the contamination of African freshwater sources and has threatened wildlife, including many endangered species.”

These dangers are present even though Africa, in comparison to other regions of the world, so far uses pesticides sparingly. The

FAO's most recent statistics comparing the use of pesticides in different regions show that Africa uses the smallest quantities per hectare (see graph).

According to the FAO, in 2018 Africa used an average of 0.3 kilogrammes (kg) of active pesticides per hectare of crop land, compared to 3.5 kg in the Americas (where average use in South and Central America was higher than in North America), and 3.7 kg in Asia. The worldwide average was 2.7 kg per hectare.

DISCOVERING THE CONTINENT

Africa's relatively light use of pesticides, however, is starting to change, as suppliers of chemicals for agriculture – insecticides, fungicides and herbicides, but also fertilisers – “discover” the continent. Market Data Forecast, a consulting firm, estimates the market for crop protection in the Middle East and Africa at \$8.7 billion in 2020. It projects that figure to rise to \$10.4 billion by 2025, implying a compound annual growth rate of 3.1% in the five-year period.

Indeed, Africa is a strong candidate for increased use of pesticides. Aside from its dependence on agriculture to feed its population and generate export revenues, Africa needs pesticides because of the nature of its agriculture. As in other developing regions, African agriculture relies heavily on growing plants in open fields rather than in greenhouses, making its crops more vulnerable to pests.

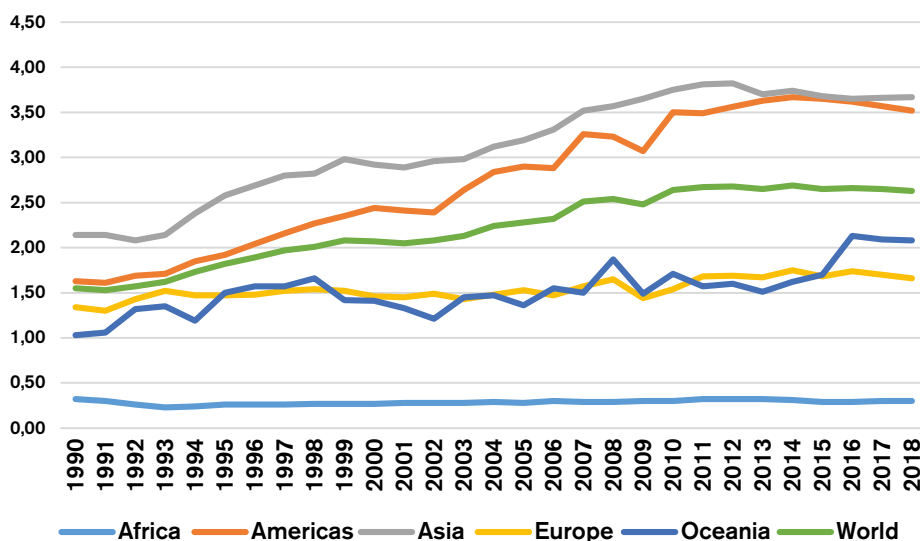
Moreover, the increasingly important horticultural sector in Africa is focused on plants with relatively short life spans from harvest to spoilage, which consumers prefer in their fresh state. An attack by pests at the wrong time can wipe out an entire harvest. In addition, the plants face a range of threats beyond invading insects, including viruses and even some types of birds.

That said, synthetic pesticides are not the only way to protect Africa's crops. Some “good” bugs in nature are natural enemies of predator insects; deploying them in a well-considered and sustainable way can achieve some of the same results obtained by spraying chemicals.

Where pesticides are the only quick and effective solution – for example during a pest invasion – spraying should still occur. That should be part of broader and predefined Integrated Production and Protection

Give pests no chance

Average use of pesticides, in kilogrammes of active ingredients per hectare of crop land



(IPP) plans. They must be designed before a crisis occurs. Spraying should also be done with strict adherence to safety protocols concerning amounts and delivery methods.

IPP plans serve to keep costs and environmental impacts low, while maximising crop yields and quality. An IPP begins with using high-quality seeds and other planting materials such as bulbs and potato tubers. An IPP also includes ensuring the use of safe and effective fertilisers and good cultivation and breeding of crops. Where possible, an IPP should consider where greenhouses can be used to control the plants' environments.

Synthetic pesticides, herbicides and fertilisers can be valuable tools in the context of an IPP, helping to ensure that high-quality crops are produced cost-effectively and delivered reliably to global markets. However, these chemicals are not a panacea. Regulators in both producing and consuming countries must guard against excessive or improper use of these chemicals.

INSPECT THE SUPPLY CHAIN

In producing countries, regulators must inspect plants – from the farm level along the supply chain all the way to the point of export. They must decertify produce that exceeds the allowed level of pesticide traces, thereby preventing contaminated crops from being used. Importing countries' regulators must also ensure that safety standards

are met at all stages along the supply chain to the point of sale to consumers.

In producing countries, total quality control means ensuring that everyone who has a role in the supply chain is aware of that role. Better training of farmers – and of the agriculture-extension advisers that inform farmers about best practices – serves this purpose. At the same time, governments and other organisations should focus on developing technological alternatives to pesticides, including deploying biological pesticides.

Yet when locusts or armyworms swarm into an area, officials and farmers need a fast way to manage the crisis. That solution is likely to involve spraying synthetic pesticides. With the proper policy focus and training, that spraying can be done safely and responsibly.

REFERENCE

Feed the Future, 2019: Synthetic pesticides in Africa: The good, the bad and the ugly. <https://www.agrilinks.org/post/synthetic-pesticides-africa-good-bad-and-ugly>



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MICROPLASTICS

Invisible danger

Around the world, plastic waste is found in water bodies and the sea, but increasingly also in soils and our drinking water. What impact so-called micro and nano plastics have on human beings and the natural environment is controversial. The issues are complex, and research has only just begun. It is quite obvious, however, that these particles, which organisms cannot decompose, are serious health hazards.

By Sabine Balk

Plastic particles and fibres are called microplastics by scientists if their length is less than 5 millimeters (mm) and at least 1 µm (0,0001 mm). The smallest pieces are called nanoparticles and are invisible to the human eye. They enter human bodies via air, water, food and cosmetics.

Some microplastics are intentionally manufactured in granular and pellet form. These chemicals are used in cleaners and polishes, as well as in fertilisers, paints and coatings. Some medical products and cosmetics contain them too.

Another kind of microplastics results from products of daily use being ground down after being discarded or during their lifecycle. Such secondary microplastics, for example, occur when people wear or wash synthetic textiles or by abrasion from tires.

Wastewater-treatment plants do not remove such particles completely. Accordingly, these substances pollute rivers and lakes. When sludge is used to fertilise field, moreover, microplastics are spread there too.

Germany's Federal Institute for Risk Assessment (Bundesinstitut für Risikobewertung – BfR) says that, according to current scientific knowledge, microplastics do not affect human health. Oral consumption, the BfR reports, has so far not been shown to affect bowel tissue. However, the BfR admits that much more research needs to be done and that it is impossible to conclusively assess either the impacts microplastics have on the human body or the risks those impacts imply.

Other agencies, by contrast, argue that there is evidence of health risks. They include the World Health Organization (WHO) and the World Wide Fund for Nature (WWF), an environmental NGO. Both report that drinking water is the most prevalent way for microplastics to enter human bodies. Indeed, every kind of drinking water (groundwater, surface water, pipe water and bottled water) around the world is said to contain microplastics nowadays. The WWF concedes that the long-term impacts on human health are not yet understood. It insists, however, that maritime organisms suffer premature death due to excessive concentrations of microplastics in their digestive systems or their respiratory tracts.

Research done in laboratories, moreover, has revealed microplastics' toxic impact on lung, liver and brain cells. Moreover, many kinds of plastic contain additives that are harmful to human health. According to the WWF, researchers have proven that, in certain concentrations, microplastics can cause inflammations of the respiratory tract. Recent studies have shown that human organs and fat tissue often contain micro and nano particles, and that suggests that these particles may penetrate cells. Sci-

entists assume that the particles harm the immune system, most likely causing both inflammations and cancer.

Both the WWF and the WHO call for more research. The WWF, moreover, wants policymakers to respond internationally by

- establishing a global panel of scientists to survey and compile the best available research results concerning the impacts of plastics and micro plastics on nature,
- concluding an international agreement on protecting the seas from all kinds of plastic waste, and
- defining national goals for reducing, recycling and managing plastics in line with commitments made in international agreements.

LINKS

WWF, 2019: Assessing plastic ingestion from nature to people

https://wwfint.awsassets.panda.org/downloads/plastic_ingestion_web_spreads.pdf

Bundesamt für Risikobewertung, 2019:

Mikroplastics

<https://www.bfr.bund.de/cm/349/microplastics-facts-research-and-open-questions.pdf>

WHO, 2019: Microplastics in drinking-water

<https://apps.who.int/iris/bitstream/handle/10665/326499/9789241516198-eng.pdf?ua=1>



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Washed up microplastic debris in Depoe Bay in Oregon on the US West Coast.



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At the current rate, the international chemical industry is doubling its production every 10 to 12 years. Scientists agree that this cannot continue without planetary boundaries being breached.



Only global cooperation can bring about sound chemicals management and sustainability

12

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