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The ethical challenges of climate change



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Editorial

The Wide Angle section of this issue is published to mark the United Nations Climate Action Summit on 23 September 2019, and the 25th session of the Conference of the Parties on Climate Change in Santiago, Chile (COP25), 2-13 December 2019.

The 2018 Intergovernmental Panel on Climate Change (IPCC) *Special Report on Global Warming at 1.5 °C* caused quite a stir and a lot of ink to flow. To avoid catastrophic consequences, global warming should be limited to 1.5 °C above pre-industrial levels, the report warned. But, as we know, we are far from achieving this. To overcome this challenge of the century, scientists advocate a radical change in behaviour – something that cannot be achieved without a profound change in our attitudes.

“Changing minds, not the climate” is the slogan for the public awareness campaign of UNESCO’s Strategy for Action on Climate Change 2018-2021. It is in line with the 2015 Paris Agreement (COP21) and the United Nations’ 2030 Agenda for Sustainable Development (SDGs).

It sets out a wide range of actions in various fields – from Education for Sustainable Development (ESD) and responsible ocean management (through the Intergovernmental Oceanographic Commission, IOC), to water security (through the International Hydrological Programme, IHP) and the cultural and natural sites under UNESCO protection, which serve as Climate Change Observatories.

Many other projects to raise public awareness on climate change through the media, or to inform children through the UNESCO Associated Schools Network (ASPnet), are ongoing. In addition to these efforts, there are UNESCO Chairs on Climate Change and Sustainable Development; Climate Frontlines, networks of indigenous people and other vulnerable communities and the grassroots UNESCO Green Citizens: Pathfinders for Change initiatives.

Changing minds means establishing a new order of priorities in politics, the economy, industry and the daily lives of us all. But above all, it is about becoming aware of the ethical implications of climate change – which threaten not only the planet’s ecosystems, but also our fundamental rights, by creating injustices and widening inequalities.

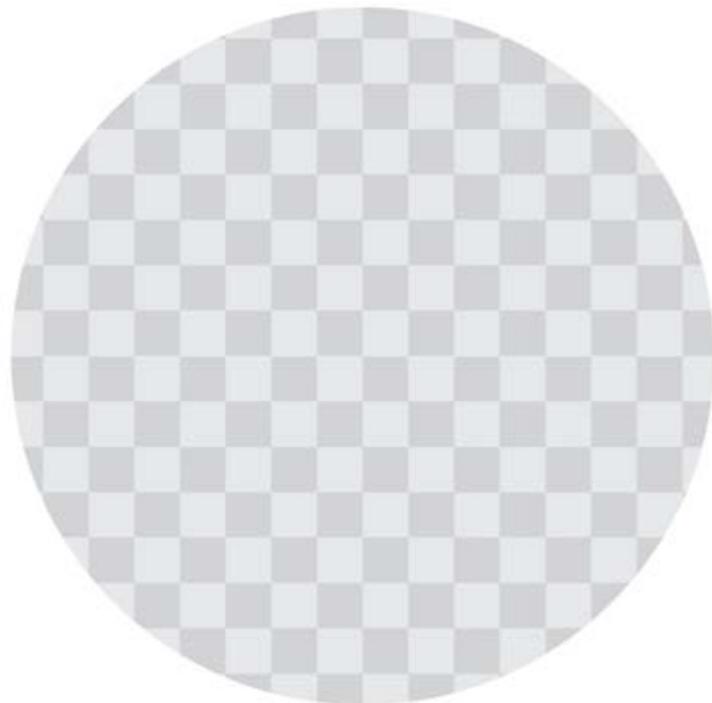
As the ethical dimensions of climate change are still relatively unexplored, UNESCO adopted, in November 2017, the *Declaration of Ethical Principles in relation to Climate Change* – a tool that is accessible to all actors in society, especially political leaders, to allow for the most appropriate decision-making.

With this special report, the *Courier* aims to open up new avenues for reflection on these lesser-known aspects of the greatest global challenge of our times. Because, in parallel to the scientific issues that hit the

media headlines, the issues of justice and equity, respect for human rights, solidarity and scientific and political integrity, and individual and collective responsibility, must be the principal cornerstones of our actions on a global scale.

But in practice, this is still not the case. Even “the human rights community, with a few notable exceptions, has been every bit as complacent as most governments in the face of the ultimate challenge to mankind represented by climate change,” asserts Australian expert Philip Alston, in his report to the UN on 25 June 2019. The Special Rapporteur on extreme poverty and human rights considers the measures taken by the majority of UN human rights bodies have been patently inadequate. “Ticking boxes will not save humanity or the planet from impending disaster,” he warns.

Vincent Defourny and Jasmina Šopova



no plan, no planet

A Planet for Tomorrow poster from the Poster for Tomorrow project.

© posterfortomorrow 2018 - homework

Contents



WIDE ANGLE

- 7** **The philosophical and ethical issues of climate change**
Bernard Feltz
- 10** **Climate crimes must be brought to justice**
Catriona McKinnon
- 13** **Climate change: A new subject for the law**
Anne-Sophie Novel
- 16** **Climate and social justice**
Thiagarajan Jayaraman,
interviewed by Shiraz Sidhva
- 19** **Pakistan: Green again**
Zofeen T. Ebrahim
- 22** **Solar energy: Changing rural lives in Kenya**
Victor Bwire
- 24** **Zero carbon, starting with cities!**
Manuel Guzmán Hennessey
- 26** **African cities in action**
Niels Boel and Finn Rasmussen,
with Hadra Ahmed
- 28** **International solidarity and climate change**
Johan Hattingh
- 31** **Climate change and education**
Laura Ortiz-Hernández
- 32** **Colonel: We must act quickly!**
Thierry Geoffroy,
interviewed by Niels Boel
- 34** **Arshak Makichyan: The lone picketer**
Interview by Jasmina Šopova

6-35



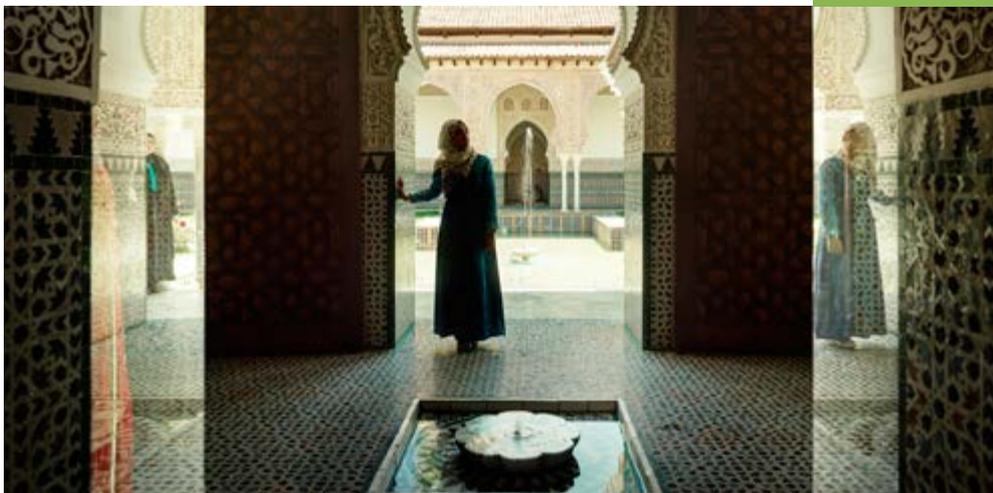
36-43

ZOOM



**Arab youth:
Architects of their future**

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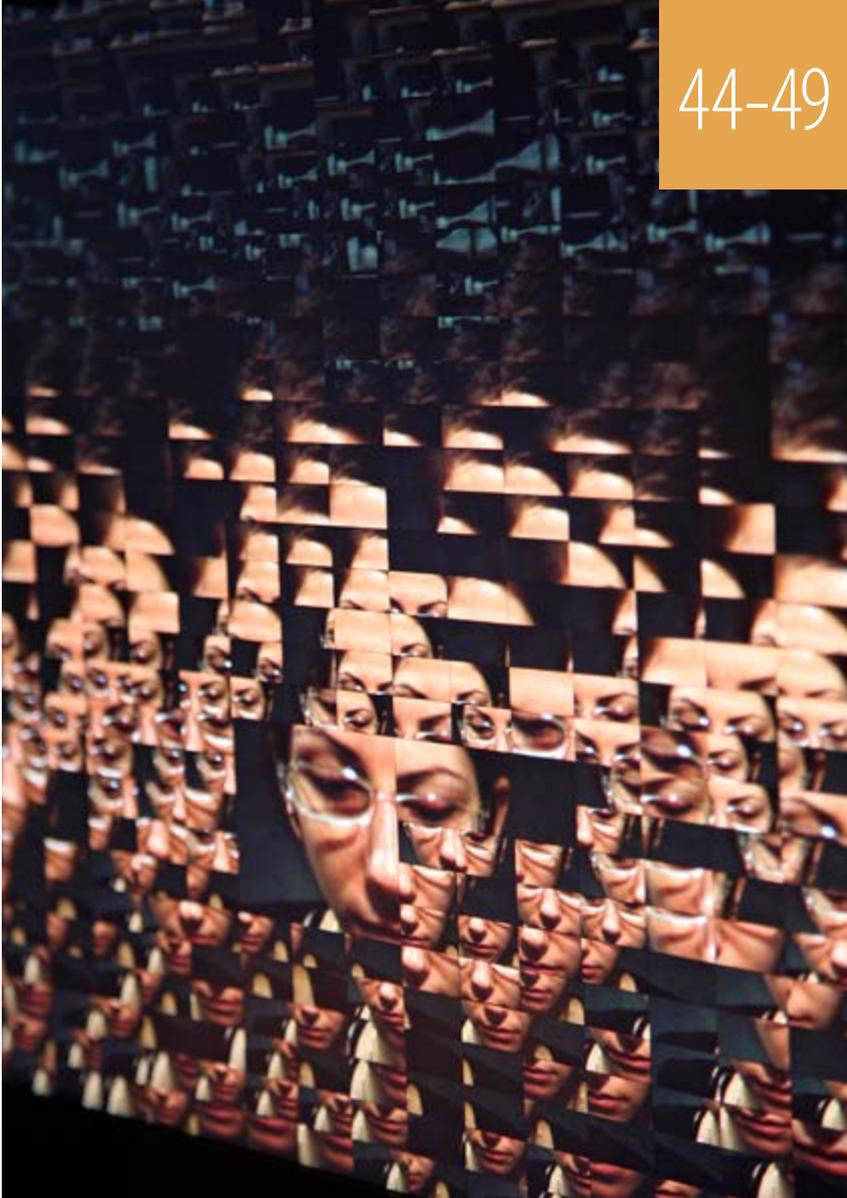


44-49

IDEAS 

A tale of two futures 45
Sandrine Cathelat and Mathilde Hervieu

AI innovations to counter social challenges 48
Dhruv Ghulati and Gil Perry,
interviewed by Shiraz Sidhva



50-53

OUR GUEST



Baku: Multicultural city
Fuad Akhundov,
interviewed by Mila Ibrahimova



CURRENT AFFAIRS

54-58

55

**Mandela's South Africa:
Reality or distant dream?**
Jody Kollapen,
interviewed by Edwin Naidu

57

**Dmitry Mendeleev:
The teachings of a prophet**
Natalia Tarasova and Dmitry Mustafin





Climate change: The ethical challenges

Wide Angle



*Poster to raise awareness
about climate change,
designed on the occasion
of COP21 by Belgian
architect Luc Schuiten.*

© Luc Schuiten

The philosophical and ethical issues of climate change

Bernard Feltz

Humanity is in a state of debit. Year after year, it consumes more resources than nature can provide. This over-consumption has a direct effect on the climate. To better understand the issues at stake, the Belgian philosopher and biologist Bernard Feltz sheds light on the complex relationships between humans and nature and then focuses on the ethical aspects of climate change management.

A major challenge for our time, climate change concerns both our daily lives and the world geopolitical order. It is one of the dimensions of a global ecological crisis, a direct consequence of the complex interactions between humans and nature. These relationships can be divided into four main approaches.

The first, that of Descartes, considers nature to be a set of objects made available to human beings. The seventeenth-century philosopher – a contemporary of Galileo and considered a great initiator of modernity – advocated establishing life sciences that were similar to the emerging physical sciences. He defends the idea of an “animal machine”. Living things are nothing more than inert matter organized in a complex way. Only the human being has a substantial soul distinct from the body, making it the only respectable species. The rest of nature, living or inert, is part of the world of objects at humanity’s disposal. Descartes has no regard for the environment, which he views in a utilitarian way, and considers an infinite resource that humans can draw upon without any qualms.

We can see to what extent such assumptions have led to the shameless exploitation of nature in all its forms: agriculture, fishing, intensive livestock farming, mineral depletion, pollution of all kinds.

Ecological science is another approach, which conveys a completely different vision of the world. In 1937, the British botanist, Arthur George Tansley, proposed the concept of the ecosystem that would revolutionize the scientific relationship with nature. This concept refers to all the interactions of the various living species among themselves, and of all living organisms with the physical environment: soil, air, climate, etc. In this context, man rediscovers himself as belonging to nature, as an element of the ecosystem. Moreover, this ecosystem is a finite environment, with limited resources, both upstream and downstream of human activities.

But many thinkers consider that the ecological science approach is insufficient. Deep ecologists, for example, believe that the core of the problem in the scientific approach, including the ecological one, is anthropocentrism. They advocate a philosophy of the totality that integrates humans with living organisms as a whole, without granting them any particular status. Respect for animals is the same as respect for humans.

A final understanding of human-nature relations attempts to keep a fair distance from the radicality of deep ecologists, while emphasizing the relevance of the criticism of ecological science. Nature and humans coexist and interpenetrate in a more respecting way of living. An animal can be respected for itself, without being given the same status as a human being.

A living species or a particular ecosystem are to be respected as remarkable achievements of nature, just as a work of art is a remarkable accomplishment of humanity. The aesthetic dimension of a work of art reflects a fundamental dimension of reality that only the artist is able to reveal. But such a relationship does not imply that the respected work has the status of a human. A hierarchy of values is possible. Animals, certain ecosystems and landscapes become respectable in two ways – it is the human being who decides to respect them, and it is a way of respect that does not equate with the respect due to humans.

“ A living species or a particular ecosystem are to be respected as remarkable achievements of nature, just as a work of art is a remarkable accomplishment of humanity ”

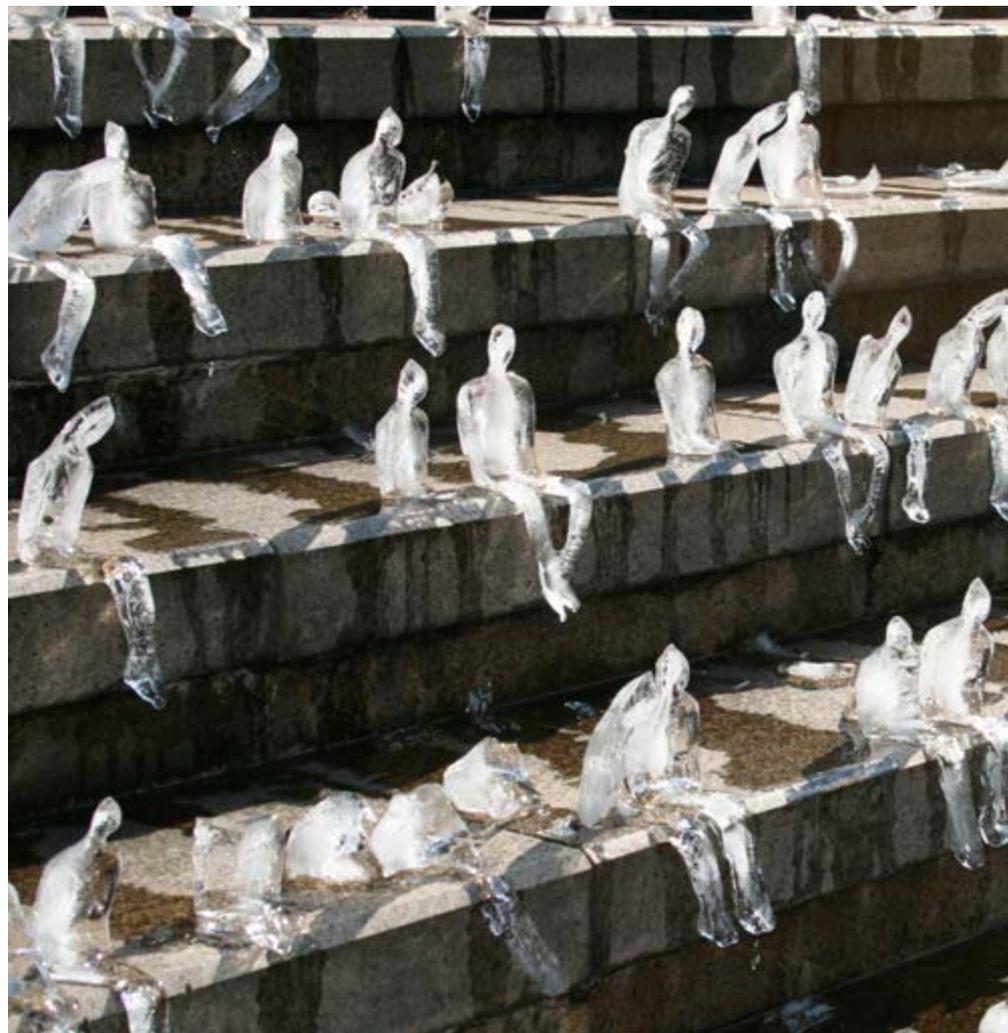
At the crossroads of science and politics

A dimension of the ecological crisis, climate change paves the way for a more specific reflection on the relationship between science and politics.

Science bears a heavy responsibility for the emergence of the climate problem. It is largely because of the impressive power developed by new technologies and their unlimited use by economic powers that we have entered the Anthropocene. For the first time in history, human activities are leading to changes in certain environmental characteristics that affect all of humanity.

But science also makes us aware of the problems related to the ecological crisis. It plays a decisive role in the development of scenarios that could lead to the rational management of the climate crisis. Science can destroy us, but it can also save us. Integrated into a broader understanding of reality, the scientific approach remains decisive in controlling climate change.

However, democracy is not technocracy. In a democracy, it is the politician who makes the decisions. The German sociologist Max Weber (1864-1920) distinguished between the factual realm and the realm of values. On the knowledge side, scientists are specialists in facts. They are responsible for analysing situations and proposing various scenarios that are compatible with ecological constraints.



Politicians, on the other hand, act according to the values they are committed to upholding. In a democratic system, they derive their legitimacy from their election.

They are elected to choose precisely the scenario that fits their value system. Climate change involves highly complex technical analyses, which are not always in line with policy directions.

Environmental ethics

Nevertheless, it must be acknowledged that we have begun a transition towards a society shaped decisively by ecological constraints. The involvement of everyone in their daily lives, the work of the various economic actors in their respective activities – from small and medium-sized enterprises to the most powerful multinational trusts and the involvement of state structures and intermediary structures, trade unions, business federations, non-governmental organizations (NGOs), etc. – are essential conditions for effective action.

Because the fundamental issue is the future of humanity. What pushes us to act is this realization that uncontrolled climate change can cause human life on Earth to become much more difficult, if not impossible.

We know the “imperative of human responsibility” principle that the German philosopher Hans Jonas developed in the late 1970s, thinking precisely of ecological issues: “Act so that the effects of your actions are compatible with the permanence of genuine human life on Earth.”

From now on, it is a question of conceiving contemporary social life by integrating into it the concern for the sustainability of the system in the very long term, by including future generations in the scope of our responsibilities.

These environmental concerns must be consistent with contemporary ethical requirements, namely respect for human rights and equal consideration for all human beings. Not all human populations are equal in the face of the climate challenge. Paradoxically, the poorest countries are often those most affected by uncontrolled global warming. Respect for human rights must therefore lead to a principle of international solidarity that alone can guarantee both the global management of climate change and that specific measures for particularly complex situations will be taken.



© Minimum Monument by Néle Azevedo / photo Fanca Cortez, 2016

Minimum Monument, an ephemeral public art project by Brazilian artist Néle Azevedo. Hundreds of tiny human ice figures thaw in high temperatures the moment they are installed. São Paulo, Brazil, 2016.

The principle of responsibility for future generations and the principle of solidarity of all towards all, are essential for an equitable management of the ecological crisis.



A Belgian biologist and philosopher, **Bernard Feltz** is Professor Emeritus at the Catholic University of Louvain. His research focuses on the philosophy of ecology, bioethical issues and science-society relations. He is currently Belgium's representative on UNESCO's Intergovernmental Bioethics Committee (IGBC).

The ethical principles of climate change

Climate change not only threatens our ecosystems, it undermines the foundation of our fundamental rights, deepens inequalities and creates new forms of injustice. Adapting to climate change and trying to mitigate its impacts are not just a matter of scientific knowledge and political will; they also demand a broader view of a complex situation.

In order to help Member States and other stakeholders to make appropriate decisions and implement effective policies for sustainable development, adaptation to climate change and the mitigation of its negative effects, UNESCO adopted a *Declaration of Ethical Principles in relation to Climate Change* in November 2017.

Ethics constitute the substantial core of any commitment. As a mobilizing force, ethics can steer action, facilitate arbitration, resolve conflicting interests, and establish priorities. Ethics have the capacity to connect theory with practice, general principles with political will, and global awareness with local actions.

The Declaration adopted by UNESCO is based on six ethical principles:

Prevention of harm: To better anticipate the consequences of climate change and implement responsible and effective policies to mitigate and adapt to climate change, including through low greenhouse gas emissions development and initiatives to foster climate resilience.

Precautionary approach: Do not postpone the adoption of measures to prevent or mitigate the adverse effects of climate change on the grounds of a lack of definitive scientific evidence.

Equity and justice: Respond to climate change in a way that benefits all, in a spirit of justice and equity. Allow those who are unjustly affected by climate change (due to insufficient measures or inadequate policies) to access judicial and administrative proceedings, including redress and remedy.

Sustainable development: Adopt new paths for development that make it possible to sustainably preserve our ecosystems, while building a more just and responsible society that is more resilient to climate change. Special attention must be paid to areas where the humanitarian consequences of climate change can be dramatic, such as food, energy, water insecurity, the oceans, desertification, land degradation and natural disasters.

Solidarity: Support, individually and collectively, the people and groups most vulnerable to climate change and natural disasters, particularly in the Least Developed Countries (LDCs) and Small Island Developing States (SIDS). Strengthen timely co-operative action in various areas, including technology development and transfer, knowledge-sharing and capacity-building.

Scientific knowledge and integrity in decision-making: Strengthen the interface between science and policy to optimally aid decision-making and the implementation of relevant long-term strategies, including risk prediction. Promote the independence of science and widely disseminate its findings to as many people as possible, for the benefit of all.

UNESCO has long-standing experience in environmental ethics, supported by the World Commission on the Ethics of Scientific Knowledge and Technology (COMEST), created in 1998. As an advisory body and a forum for reflection, COMEST has published a series of reports over the past decade, that have helped to inform public debate. Its 2015 report served as the basis for the *Declaration of Ethical Principles in relation to Climate Change*.

“ A dimension of the ecological crisis, climate change paves the way for a more specific reflection on the relationship between science and politics ”

Climate crimes

must be brought to justice

Catriona McKinnon

Climate denial has increased the risk of catastrophic global change. Should international criminal law be used against those who promote this dangerous trend? Economic and political leaders can no longer pretend it is business as usual. Whether they actively induce environmental harm or just ignore the existential threat against the survival of the human species, states and corporations must be held accountable for their actions or inaction regarding climate change.

A fire has started in the theatre, from which there are no exits. Unchecked, the fire will kill and injure many in the theatre, starting with those in the cheapest seats. Many people can smell the smoke, but some others have not noticed it yet. Some people are trying to warn everyone so that the fire can be contained before it spreads out of control. Another group – sitting mainly in the most expensive seats – is trying to shout loudly that there is no fire, or that it is not serious, or that there is plenty of time left to put it out. This group uses emotive language and insists that the other group is not to be trusted.

Many people in the theatre are confused by these conflicting messages or convinced by the fire deniers. There are enough people in this combined set to significantly slow down the efforts of those listening to the accurate warnings, those who are trying to put out the fire. In this scenario, those shouting “No fire!” ought to be silenced, because there is a fire that requires urgent and immediate action to prevent it from spreading and becoming uncontrollable. But the fire is not being tackled properly because many of the people in the theatre do not know whom to believe.

Can we compare those who deny the reality of climate change to the group that occupies the best seats in the theatre? The answer seems obvious: yes.

Accelerating the extinction of humanity

Criminal sanctions are the most potent tools we have to mark out conduct that lies beyond all limits of toleration. Criminal conduct violates basic rights and destroys human security.

We reserve the hard treatment of punishment for conduct that damages the things we hold most fundamentally valuable. Climate change is causing precisely such damage.

Over the last 250 years or so, we have burned fossil fuels for cheap energy, destroyed carbon sinks, grown the global population, and failed to halt the malign



© Cynthia Carvalho / Greenpeace

“The scope of international criminal law makes it the right site to address the existential threats created by climate change”

influence of corporate interests on political action that could have made mitigation manageable. Now, we have a window of just ten years or less to avoid using up the carbon budget for 1.5 °C, according to the 2018 Special Report of the Intergovernmental Panel on Climate Change (IPCC). If we continue on our current trajectory of emissions without aggressive mitigation, we could see warming in the range of 4–6.1 °C above pre-industrial averages by 2100. Even if all countries meet their current mitigation targets under the Paris Agreement 2015 (COP21), we are likely to see warming of at least 2.6 °C by 2100.

A 4–6.1 °C rise in temperature by 2100 would be catastrophic. Large areas of the earth would become uninhabitable as sea levels rise and temperatures soar. Severe weather events, crop failure, and conflict in the face of mass migration never before seen in human history, would place intense pressure on remaining habitable places.

“Climate denial has benefited from the generosity of the fossil fuel industry.”



In these fragile and febrile conditions, positive feedback from warming could put humanity at risk of extinction, according to the journal, *Futures*, September 2018. This feedback occurs when tipping points are passed in the climate system, causing processes to be unleashed that exacerbate warming. For example, the transformation of the Amazon forest from the world's largest carbon sink to a carbon source; or, the massive retreat of polar ice, which reduces the planet's reflectivity, leading it to warm at a greater speed. These tipping points are described in the IPCC's Fifth Assessment Report (AR5) as a critical threshold at which global or regional climate changes from a stable state to another stable state.

Temperature rises of 4–6.1 °C are not likely, but they are not science fiction either. Each year that passes without aggressive mitigation to reach net-zero emissions by 2050 makes this existential threat more real. Even if the Paris Agreement aggressively ratchets up mitigation ambition to close the emissions gap by 2030, it remains the case that we have already reached 1 °C of warming. Given the time lag between emissions and the warming they induce – due to the long lifetime of carbon molecules in the atmosphere – further increases are to be expected.

Between irresponsible behaviour ...

Should we use criminal law to tackle climate change? The current generation of people alive in the Anthropocene is capable of damaging and degrading the environment in ways that could make humanity go extinct. Postericide is a morally required response to humanity's changed circumstances in the Anthropocene. The scope of international criminal law makes it the right site to address the existential threats created by climate change. International criminal law aims to protect the entire human community irrespective of national borders, now and into the future.

International criminal law expresses the values that bind the human community together across time. It asserts the condemnation of “unimaginable atrocities that deeply shock the conscience of humanity” – as stipulated in the Rome Statute of the International Criminal Court (ICC) of 17 July 1998, which defines, *inter alia*, the international crimes over which the ICC has jurisdiction.

For there to be a crime, there must be a criminal. The death and suffering caused by climate impacts is deeply shocking, but this is not enough to prompt prosecution under international criminal law. Death and suffering are caused by volcanic eruptions, yet there are no culpable agents in these cases.

The current climate crisis has been caused by human activity over the last two and a half centuries or so, leading to the accumulation of greenhouse gases in the atmosphere. The crisis is in large part an unintended consequence of action across history that has led to the destruction of carbon sinks, increased carbon flows, and concentrated carbon stocks.

Most of this conduct is beyond the legitimate reach of international criminal law, not least because the relevant people are dead. Most, but not all.

... and postericide

I have proposed that international criminal law should be expanded to include a new criminal offence that I call postericide. It is committed by intentional or reckless conduct fit to bring about the extinction of humanity. Postericide is committed when humanity is put at risk of extinction by conduct performed either with the intention of making humanity go extinct, or with the knowledge that the conduct is fit to have this effect. When a person knows that their conduct will impose an impermissible risk on another and acts anyway, they are reckless. It is in the domain of reckless conduct, making climate change worse, that we should look for postericidal conduct.

No one person's emissions are fit to bring about human extinction as a result of climate impacts – the many private jets and oil wells they own can do so, however. But individual people in their roles as political and corporate leaders can exert extensive control over how much worse climate change becomes as a result of their executive action. A country's president can withdraw an entire state from a global agreement on mitigation; a Chief Executive Officer can authorize the withholding of information about the progress and impacts of climate change because it threatens the corporation's bottom line.

Individuals often have control over conduct they do not perform themselves – for example, by giving direct orders to subordinates, or by virtue of the special relationship in which they stand to others whose conduct causes harm. This means that we can assign vicarious liability to individuals of power, authority and influence within groups that, as collectives, worsen climate change in ways fit to make humanity go extinct. Just as international criminal law holds military leaders to account for genocide committed by their troops, it should hold political and economic leaders to account for postergicide committed under their authority. These leaders should go to trial at the ICC and be held to account at the bar of the human community's fundamental shared values.

Who should be prosecuted for postergicide? We could start by examining the established international network of well-funded organizations devoted to organized climate denial (For more on this subject, read "Text-mining the signals of climate change doubt", in the journal *Global Environmental Change*, Volume 36, January 2016). The epicentre of this activity is in the United States. A set of Conservative think-tanks has deliberately deceived the public and policymakers about the realities of climate change. Their ideologically-driven climate denial has been heavily funded by the fossil fuel industry; which includes, for example, Koch Industries and ExxonMobil. This climate denial has had a significant impact on public opinion and has impeded legislation to tackle climate change.

Vicarious criminal liability

Should Rex Tillerson [the former CEO of ExxonMobil, who also served as US Secretary of State from February 2017 to March 2018], Charles Koch and David Koch [the owners of Koch Industries] be tried for the crime of postergicide at the ICC? Their vicarious criminal liability would be generated by their authorization of multiple acts of climate denial by others, without which early aggressive political action on climate change would have been more likely.

Climate denial has seriously impeded aggressive mitigation efforts that could have averted our present climate emergency. It has magnified the risk that humanity locks in to catastrophic global climate change. The people in positions of authority in states, or industrial groups whose lies have put us and our descendants in peril, should be held accountable. The damage that climate deniers do is heinous, and they have no excuses. The time has come to prosecute them for postergicide.



Professor of Political Theory at the University of Exeter, United Kingdom, **Catriona McKinnon** has published numerous articles and books on climate justice, and on toleration and liberal political ideals. She is currently completing a monograph defending postergicide (*Endangering Humanity: An International Crime*), writing an introductory book on climate justice, and researching the ethical questions raised by geoengineering.

Hummingbird Rising, a mandala for climate justice in San Francisco, United States, by American artist John Quigley, 2018. It is a message to world leaders that the climate has changed and so must we.



© Josh Edelson / Greenpeace

Climate change:

A new subject for the law

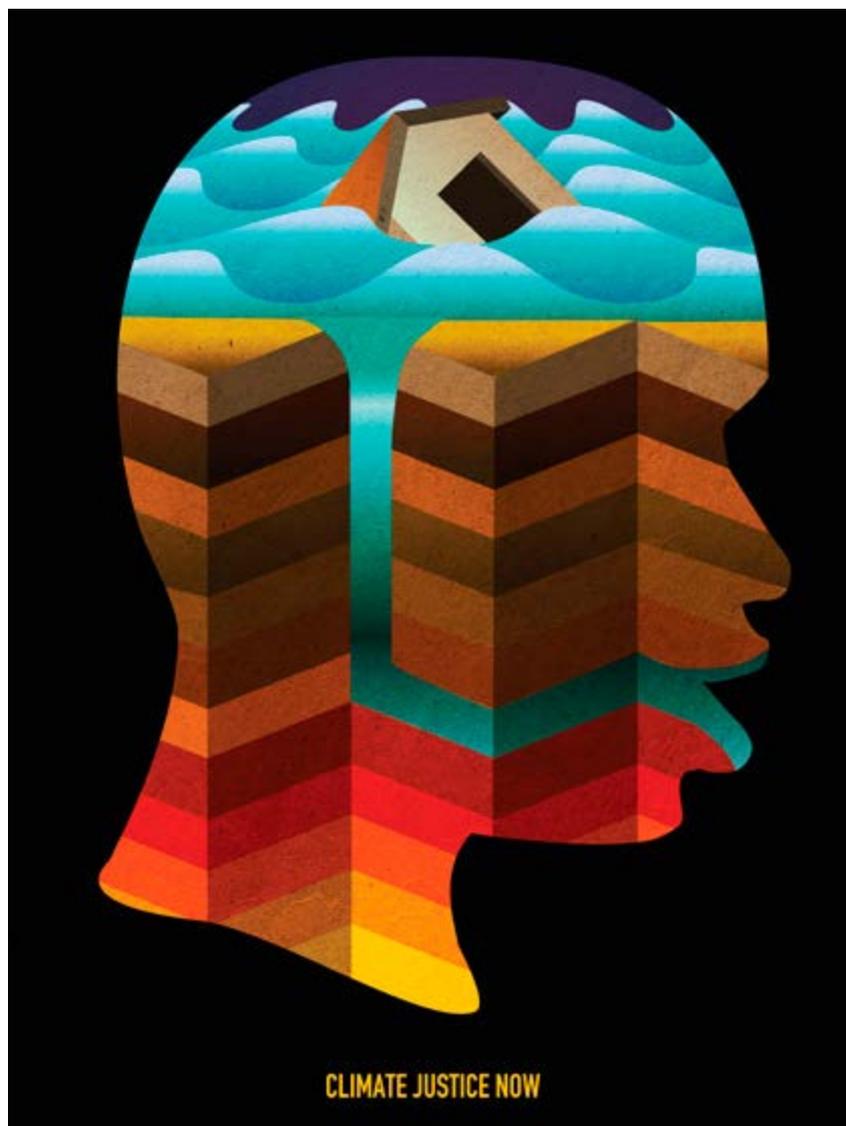
Anne-Sophie Novel

More and more citizens and non-governmental organizations around the world are going to court to seek climate change justice. The unprecedented extent of these disputes deserves to be highlighted. This relatively recent type of litigation is forging public opinion, and constitutes a form of pressure on states and industries that is forcing them out of their inertia.

The years go by and new records are set for rising temperatures. Greenhouse gases (GHG) continue to increase, and populations the world over are more and more concerned and discontented about the lack of responsiveness of states to the climate change crisis. As a result, the number of lawsuits against climate change inaction is rising sharply.

The first case of this kind in the world was filed in 2013, in the Netherlands. The Urgenda Foundation, a Dutch environmental group, sued the government for “the failure of the Dutch state to take sufficient actions to prevent dangerous climate change”. At the time, the Netherlands was one of the most polluting countries in the European Union, and the Foundation demanded it take action to reduce the country’s emissions by twenty-five per cent to forty per cent by 2020 (compared to 1990 levels).

On 24 June 2015, the District Court of The Hague ruled in favour of Urgenda – a judgement confirmed on 9 October 2018 by the Hague Court of Appeal, based on scientifically established facts and in line with the traditional principle of a government’s duty of care. The court ruled that Dutch GHG emissions must be reduced by at least twenty-five per cent. Recognized as the world’s first climate liability lawsuit, this ruling sets a precedent that has since inspired other legal actions around the world.



© Peter Pa

Poster by Cambodian-American illustrator Peter Pa, commissioned by amplifier.org.

On 5 April 2018, the Supreme Court in Colombia ruled in favour of twenty-five young people who had sued the government for failing to guarantee their fundamental rights to life and the environment. With the support of Dejusticia, a Bogota-based human rights non-governmental organization (NGO), they obtained a court ruling ordering the government, provincial governors and municipalities to draw up an action plan to preserve the forest – recalling their duty to protect nature and the climate on behalf of present and future generations.

Earlier in the same year in Norway, a verdict that was less favourable for the plaintiffs was delivered. In 2015, two NGOs, Greenpeace Nordic and Nature and Youth, had opposed the opening of new oil and gas drilling areas in the Barents Sea in the Arctic Ocean, one of the most fragile ecosystems in the world. But the Oslo Court ruled that these new drilling efforts were not in violation of the Norwegian Constitution. The NGOs were required to reimburse 580,000 Norwegian kroner (\$66,100) in legal costs to the government.

“Going to court is an effective means to compel action”

Also in 2015, in the United States, twenty-one youth represented by the non-profit Our Children's Trust, filed an appeal in an Oregon court, demanding that the US federal government reduce carbon dioxide (CO₂) emissions significantly. Their plaint asserted that the government, through affirmative actions that cause climate change, has violated the youngest generation's constitutional rights to life, liberty and property and failed to protect essential public trust resources. Known as the Juliana v. United States Youth Climate Lawsuit, this trial has yet to be admitted to the US Supreme Court, in spite of the support of thousands of people – including members of the US Congress, legal scholars, businessmen, historians, medical doctors, international lawyers, environmentalists – and more than 32,000 youth under the age of 25.

At a hearing in the case held by the Ninth Circuit Court of Appeals [a US federal court preceding the Supreme Court] on 4 June 2019, a three-judge panel remained sceptical of whether the court had any role to play in dealing with the landmark case. Their decision could have important implications on whether or not the courts can be used to pursue climate action in the US.

By contrast, in Pakistan in 2015, a farmer successfully petitioned judges to force the government of this country – which is particularly affected by global warming – to adopt climate legislation to protect his farm and guarantee his right to food and access to water.

In France, the first lawsuit related to climate change was initiated in December 2018 by Notre Affaire à Tous, a climate justice association, with three other NGOs (Oxfam France, Greenpeace France and the Fondation Nicolas Hulot pour la nature et l'homme).



PROTECT OUR FUTURE



© Chip Thomas

Poster by American artist and activist Chip Thomas, commissioned by *amplifier.org*, a design lab that creates art to amplify the voices of grassroots movements.

Dubbed the “case of the century”, it presented six demands to the government: the inclusion of climate in the constitution; the recognition of climate change as a crime of ecocide; the possibility for citizens to defend climate well-being in court; the reduction of GHG emissions; the regulation of multinational companies' activities, and an end to subsidies for fossil fuels.

Aided by numerous influencers, the petition was an unprecedented success, with more than two million signatures obtained in a few weeks. In March 2019, when there was still no response from the government, the NGOs filed an appeal.

They are aware that the procedure will drag on, but hope to raise public awareness and promote the idea that going to court is an effective means to compel action.

At the European level, the first litigation was initiated by a group of ten families from eight countries – France, Portugal, Romania, Italy, Germany, Sweden, and also Kenya and Fiji – in May 2018. The plaintiffs of the People’s Climate Case took the European Parliament and the Council of the European Union to the European General Court (EGC) for having allowed too high a level of GHG emissions. According to a press release from the People’s Climate Case in April 2019, the plaintiffs called on EU leaders to reduce GHG emissions by fifty-five per cent by 2030 (compared to 1990), instead of the target of forty per cent. According to them, the currently set target is “inadequate with respect to the real need to prevent dangerous climate change and far from what is needed to protect our fundamental rights of life, health, occupation and property.”

While recognizing that climate change affects all Europeans in different ways, the EGC dismissed the case on procedural grounds in May 2019, saying the plaintiffs did not have a right to go to court to challenge the EU’s 2030 climate target. The families who initiated the lawsuit plan to appeal to the European Court of Justice – it is a case to be followed.

Suing corporations for climate change

Legal action for climate crime is also being taken against the private sector. The nature of the claims differs according to the target. From states, plaintiffs demand more urgent, proactive and binding mobilization and action. From the private sector, they increasingly litigate for compensation for losses (crops, infrastructure) in the event of climate change hazards (heat waves, droughts, floods, etc.) or the management of upstream developments, in coastal areas in particular.

One of the most significant lawsuits in the private sector was filed in Germany in November 2017. After two years of proceedings, the court agreed to hear the case of Saúl Luciano Lliuya, a Peruvian peasant and mountain guide from the city of Huaraz (100,000 inhabitants). Lliuya is suing German energy giant RWE, Europe’s largest carbon emitter, to force it to pay for the damages caused by climate change in the Andes. Once his lawsuit was deemed admissible, the case entered the expert appraisal phase. It was a symbolic step forward to commit states and corporations to global climate justice.

In the Philippines, in 2015, survivors of the Haiyan super-typhoon and a coalition of NGOs filed a petition with the country’s Human Rights Commission for action against forty-seven multinationals, including Shell, ExxonMobil and Chevron. They demanded an investigation into human rights violations related to the effects of climate change and ocean acidification, and the possible failure of the most polluting companies to meet their responsibilities to the Filipino people. Another legal case to be followed.

In the US, lawsuits against the oil industry are multiplying. Big Oil [as the clutch of the world’s largest publicly-traded oil and gas companies are known] has been accused of being responsible for climate change and its effects (rising water levels and coastal erosion) and of deliberately “discrediting” climate science.

The United Nations Environment Programme (UNEP) recorded nearly 900 climate cases worldwide, as of May 2017. The figure is increasing daily: in May 2018, the database of the Sabin Center for Climate Change Law at Columbia University in New York counted 1,440 court cases related to climate worldwide, including 1,151 in the US.

“Sometimes plaintiffs know very well that the trial has no chance of success, but it’s the media coverage that counts, and the way the lawsuit is orchestrated,” explains Sandrine Maljean-Dubois, CNRS (National Centre for Scientific Research) Research Director at the University of Aix-Marseille, France. According to her, “the main issue is to establish that the state has failed, that it is responsible for this deficiency and that it must remedy this and choose the means to comply with its obligations.” It is therefore a question of obtaining action rather than compensation and of exerting political pressure through lawsuits, but also through marches or strikes for the climate, and ultimately of seeing civil society adopting this type of approach to other subjects – air pollution, biodiversity, the environment, etc. “Even losing a lawsuit can be positive, to show the inadequacy of the law,” concludes Maljean-Dubois.



A French journalist, author and film director who focuses on environmental, economic and social issues, **Anne-Sophie Novel** works for *Le Monde*, *Le 1*, *Public Sénat* and specialized French publications. She directed the documentary *Les médias, le monde et moi* (*The Media, the World and Me*), a preview of which was held at UNESCO on 28 March 2019.

“Even losing a lawsuit can be positive, to show the inadequacy of the law”

UNESCO Green Citizens

Learning about and sharing initiatives aimed at providing sustainable solutions to the challenges of everyday life is the objective of UNESCO’s Green Citizens project. It was launched following the success of a travelling exhibition of the same name in 2015, which presented projects started by twenty-five citizens committed to transforming their lives and those of their generation – in Egypt, France, India, Japan, Morocco, Nicaragua, Senegal, United States, Vanuatu, and other countries.

Discover the stories of Fatou Aidara, Elizabeth Salomon, Alberto Lopez, Ezzat Guindy, Syo Ogasawara, Janaki, Claudia Valle and other Pathfinders for Change on UNESCO’s Green Citizens website (<https://en.unesco.org/greencitizens/green-citizens>).

Climate and social justice

Thiagarajan Jayaraman,
interviewed by Shiraz Sidhva

There is a tendency in the public debate on climate change to present the use and development of green technologies as a miracle solution or panacea. We often forget one aspect: it is crucial to ensure that their development goes hand in hand with social justice. “The realization that it is not just global warming that we are dealing with, but global warming in an unequal and unjust world, has yet to sink in,” according to Thiagarajan Jayaraman. Without equality and equity – in other words, without peace and security – we cannot effectively fight climate change, the Indian climate policy expert insists.

Maskbook, an international participatory and artistic project by Art of Change 21, an association which raises public awareness on the climate issue.

Does the current push towards green technologies overshadow the need to focus on equality and social justice in the fight against climate change?

This is definitely an issue that needs to be explored. I think there is a general recognition that you could hardly fight what is the most prominent environmental threat to humanity while you ignore issues of equality and social justice. The natural tendency is to argue that fighting climate change must go hand in hand with social justice. Unfortunately, the term social justice gets diluted in the usual international agency-speak in which this subject is sometimes being dealt with, and then you lose a specific understanding of what social justice means – it means very different things to different people.

For me, at least one reading of social justice is having a regime or social economic order that leads to the enhancement, the extension and the development of human capabilities.

Obviously, one cannot speak of saving humanity while talking about tolerating injustices in the social and economic world. But in practice what happens is that there is a tendency in a section of the polity – especially among those who are environmentalists – to argue that the one is so important, that the other has to be put on the back burner. For instance, you shut down factories that are polluting before you worry about what is going to happen to those who are employed there. That kind of issue is where the question of equity and justice becomes really sharp.

So how do you avoid these pitfalls of social inequity while undertaking the development of green infrastructure?

This is not just an issue about the development of green infrastructure, but in all varieties of climate action, and there is no easy solution to it. To pretend otherwise is to fool ourselves. For instance, people talk of adaptation, of vulnerability or dealing with the needs of the vulnerable in a certain way as part of adaptation. This is the same jargon, slightly displaced, that comes from earlier talk about poverty eradication, like sustainable livelihoods. It's not as if such talk does much to push poverty eradication along. There is no easy route to ensuring social equity as part of climate action. Like all other developmental agendas, the fight for an equitable and just world is an ongoing fight, and it will continue. The important thing is to be very clear that climate is no exception.

There is a tendency, which has become prominent recently, since the publication of the Intergovernmental Panel on Climate Change (IPCC) *Special Report on Global Warming of 1.5 °C*, wherein it is sought to be argued that a 1.5 °C world is naturally equitable. I think this is completely bogus – it's not as if you can completely conflate social justice, equity and development with keeping the world average temperature increase at 1.5 °C. It amounts to saying that all problems of injustice are environmental in origin, which is obviously an absurd statement.



Preserving biodiversity with solidarity

One million species are at risk of extinction if we don't act to save them, is the stark warning of the 2019 Global Assessment Report on Biodiversity and Ecosystem Services. Human activity has caused a biodiversity crisis that threatens every ecosystem in the world, according to a sweeping 1,500-page report published by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), an independent intergovernmental environmental organization based in Bonn, Germany.

"The health of ecosystems on which we and all other species depend is deteriorating more rapidly than ever. We are eroding the very foundations of our economies, livelihoods, food security, health and quality of life worldwide," Robert Watson, environmental scientist and former IPBES chair, said.

"Protecting biodiversity is as vital as fighting climate change," Audrey Azoulay, Director-General of UNESCO, an institutional partner of IPBES, said. A summary of the report for policymakers and the media, approved by 132 governments, was released in May 2019 at UNESCO Headquarters.

Compiled by 145 authors from fifty countries, the intergovernmental report, to be released in late 2019, is the first global biodiversity assessment since 2005.

Human action has already severely altered about seventy-five per cent of the land environment and sixty-six per cent of the marine environment, the report finds. Protecting biodiversity and nature is the key to progressing towards the attainment of the global Sustainable Development Goals (SDGs).

The report stresses that nation states have a responsibility towards future generations to act in solidarity to ensure that the planet remains inhabitable. The scope of "transformative changes across economic, social, political and technological factors" to correct the alarming trends of degradation are explored. It dismisses the notion that degradation of biodiversity is only an environmental issue. It is, in reality, an economic, development, security, social, ethical and moral issue, and everyone is a stakeholder.

<https://en.unesco.org/links/biodiversity/ipbes>

Politicians who are aware of the threat of climate change and its scope have been trying to get businesses to back green industries, saying they will create millions of new jobs and fresh opportunities for growth. Is social justice a part of this equation?

So far, there has been a tendency to mollycoddle businesses and hope that they will do right by climate change and social justice. But this is a strategy doomed to failure.

Developed countries have reached a stalemate on this in climate talks. They go back and forth on carbon taxes, on carbon trading, but why can't they mandate certain targets to be reached by certain industries? There have to be tighter regulations. Otherwise they should be made to pay the penalty, and that hardly seems to be on the agenda. To believe that somehow you can sweet-talk businesses into acting morally, or scare them into taking the right steps, seems to me a little absurd. I don't think it's a very useful point of view either – economics doesn't work like that. Companies like Shell and ExxonMobil make polite noises about investing in green technologies, and then continue their business as usual.

I think that you need a two-pronged strategy on technology for the world: in developed countries, push very hard to convert rapidly to green technologies, which is not happening fast enough. For instance, many developed countries are still thinking of substituting gas for coal – both are fossil fuels – instead of going for renewables.

The other leg of the strategy is that developing countries must leapfrog in moderate amounts. This has to be done in a sensible way. They cannot be expected to leapfrog from centuries-old biomass burning to state-of-the-art solar power. To move an economy from one level of energy use and efficiency to a completely different level is not simply a matter of saying, 'If you try hard enough, it can be done'. It's more complicated than that.

Are the developed countries willing to help out to achieve this leapfrogging of developing countries to help fight climate change?

The effort is very patchy. Where developed countries sense opportunities, they are keen to bring their technologies to developing countries, as in electric vehicles. The other problem is that they want all-or-nothing solutions, which will not work. For instance, they want India not to invest in coal. My point is, when developed countries are unable to implement the coal-to-renewables transition, and in effect doing only coal-to-gas, why are they asking developing countries to do this?

Why are developed countries so slow in reforming the transport sector? Why is there not a push for electric mobility in developed countries, comparable to the push that is happening in countries like India and China? China has entire cities, like Shenzhen, which are run on electric transport. There's nothing of the kind in the West. Forget electric mobility – even the most stringent norms on emissions have been deferred for a few more years in the European Union. Transport is a sector where developed countries have been getting away with doing very little.



© Maskbook - Art of Change 21

“There is no easy route to ensuring social equity as part of climate action”

In a wide variety of other sectors, the urgency which emerges in the talks of climate scientists is not reflected in policy and real climate action. Even in the official documents of the developed countries themselves, they are clear they will be hard-put to meet their Nationally Determined Contributions (NDC) targets at the rate at which they are moving today. There is hardly any real furore over this in climate policy circles.

If climate change escalates, the consequences and indirect consequences – an increase in migration, for example – will also affect the wealthy countries. Do you think self-interest – like mitigating migration – can motivate wealthy countries to support social justice?

There are two kinds of self-interest: one is the self-interest in a stable global order, and the other is self-interest in one's own country. But when it comes to the US, unfortunately there is not even self-interest with regard to the conditions of life in the US itself. A recent study has suggested that the higher rate of warming in the higher latitudes will create a lot of extra storm activity and this especially refers to Canada, the US, the EU and Russia.

These are the countries – except perhaps for the EU, which is not in the same league – that hardly discuss their own countries as the sites of the most demanding adaptation requirements, when in fact they should be doing so. Australia is now a huge burden of adaptation – all those forest fires contribute a lot to climate change.

This idea that adaptation is a problem of the third world – and not of their own (developed) countries – which has gained ground in some of the policy discourse, is, I think, unfortunate. In fact, if you compare sea-level rise at 1.5 °C to that at 2 °C – in terms of the number of people affected by it, North America has the highest absolute numbers of people who will be affected, even more than the island states. The idea that self-interest should make them worry about the environmental conditions of human life in the developed world itself, is not quite there. It has come home, to some extent I believe, in Europe, though it doesn't seem to affect all their behaviour. But I think in many other places, this realization has not really sunk in.

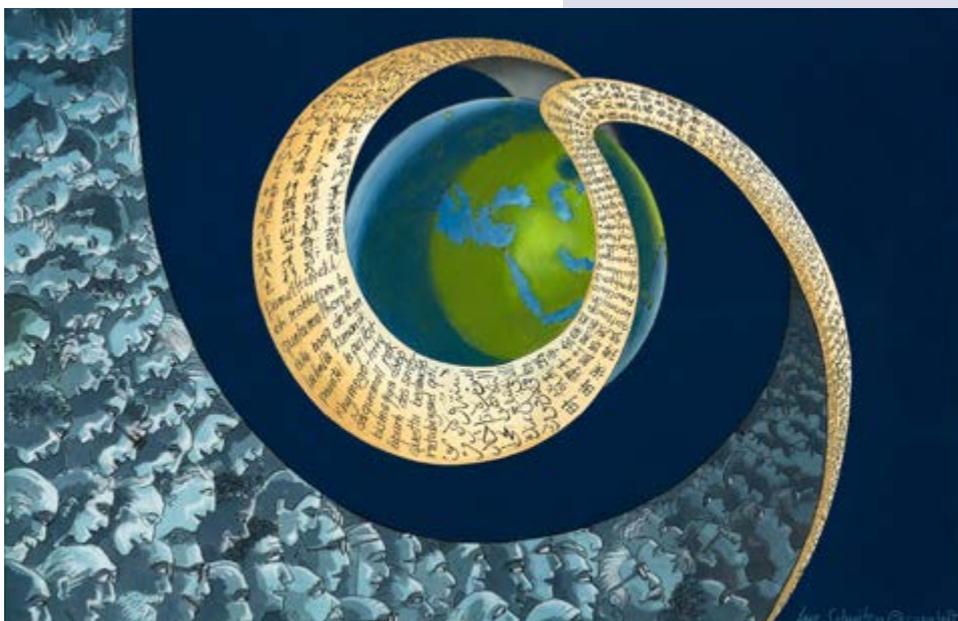
“A peaceful and secure world is a precondition for dealing effectively with climate change.”
© Luc Schuiten

There is this new wave of thinking which attributes all migration and conflicts to climate or environmental conditions. Some of it seems to be an effort to awaken the self-interest of developed countries, but from the global security perspective. But war or armed conflicts – which have a lot to do with migration – are very much problems of social and political conditions and are not simply climate-driven. For instance, the North African migration to Europe has a great deal to do with the huge destabilization and overthrow of regimes that provided some basic welfare, so obviously people are fleeing in the tens of thousands. The conflation of this with the impact of climate change is quite unwarranted.

A peaceful and secure world is a precondition for dealing effectively with climate change. But that does not mean peace and security will arise because you take effective climate action.



An Indian academic who has focused on climate action and climate justice for more than a decade, **Thiagarajan Jayaraman** is a professor at the School of Habitat Studies at the Tata Institute of Social Sciences, Mumbai, India. He is also a member of the Planning Board of the government of Kerala state and has worked with the Government of India on climate policy issues.



Pakistan: Green again

Zofeen T. Ebrahim

A billion trees have been planted in recent years in the Pakistani province of Khyber Pakhtunkhwa, about fifty kilometres from Islamabad, the country's capital. The landscape has been transformed, and so has society. The fight against global warming and the fight against poverty are one and the same.

Sitting comfortably on a footstool in her backyard under a tree providing her ample shade, Farzana Bibi puts a fistful of earth from the mound next to her into a black elongated rubber pocket. The clucking of hens and the lone rooster prancing around her tiny green backyard make for a perfect pastoral backdrop. Once filled to the top, she deftly makes a dip in the middle of the tube, lodges a seed in it and covers it with soil.

Idyllic and surrounded by mountains, Bibi's village of Najafpur, in Khyber Pakhtunkhwa (KP) province, is some fifty kilometres from Islamabad, the capital of Pakistan.

She is among the 400 women who have been trained in modern ways to prepare and propagate plant nurseries in their backyards and sell the saplings to the provincial government's forest department. It is part of the government's Green Growth Initiative's (GGI) Billion Tree Tsunami Afforestation Project (BTTAP), to fight climate change and pollution by planting trees.

Pakistan's total forest cover ranges between two per cent and five per cent of the land area – making it a country with one of the lowest forest cover in the region and well below the twelve per cent recommended by the United Nations.



Farzana Bibi puts a fistful of earth into a rubber pocket.

© Zofeen T. Ebrahim

In 2014, the Pakistan Tehreek-e-Insaf (the movement for the restoration of justice, PTI) the political party which governed KP between 2014-2018, jumped into the global fray and joined the Bonn Challenge – which aims to restore 150 million hectares of the world's degraded and deforested lands by 2020. Headed by former cricketer-turned-politician Imran Khan, the PTI ambitiously pledged to restore 350,000 hectares of forest and degraded land from 2014 to 2018.

More than a billion trees

In the short time it had, the forest department could not have completed or done what the political party had pledged, all on its own.

The model adopted for the BTTAP became a business involving local communities. "We were able to complete the project in August 2017, ahead of time!" said Malik Amin Aslam, who is currently federal minister and Climate Change Advisor to Imran Khan, who became the country's prime minister in 2018.

"The cost was estimated to be 22 billion Pakistani rupees (\$155 million), and it was completed at Rs14 billion (\$99 million), an anomaly for a government-funded project, which usually go over budget," pointed out Aslam, who was the force behind the initiative. In less than three years, 1.18 billion trees were grown.

The four-pronged strategy employed included planting new trees and regenerating existing forests; ensuring a high level of transparency; making this a people-centred programme; and taking on the powerful timber "mafia" or the illegal loggers.

According to Aslam, who also serves as Global Vice President of the International Union for Conservation of Nature (IUCN), sixty per cent of the billion-tree target was reached by "natural regeneration through community-managed protection of the forests." These forests were divided into about 4,000 enclosures, with the communities given the incentive of collecting dead wood.

They also benefited from green jobs as forest *nigehbans*, or community-assigned guards, who protected the enclosures from grazing, fire and the illegal felling of trees.

The remaining forty per cent target was achieved by employing a public-private model of shared revenues and growth – like the nurseries being tended by Bibi and others. The government was also able to extricate nearly 3,000 hectares of its land from encroachers.

The project was lauded both nationally and internationally. The World Wildlife Fund for Nature- Pakistan (WWF-Pakistan) was tasked with carrying out an independent annual performance audit of the BTTAP. Hammad Naqi Khan, Director General of WWF-Pakistan, said the project was “a good step in the right direction”.

Tackling unemployment

Meanwhile in Najafpur, Bibi’s husband, Shaukat Zaman, joins in to fill the pockets. His poultry business folded two years ago, after a deadly virus annihilated the entire lot of chickens. He has been unable to recover the loss and start anew. Between them, they are able to fill a thousand tubes with soil and seeds in a day. The completed tubes are stacked neatly at the back of the courtyard.

“We provide the seed and the pockets, they get the soil, mix it with organic fertilizer and put in the labour,” explained Mohammad Tehmasip, BTTAP’s project director.

Over the next few weeks, Bibi and Zaman have to fill as many as 25,000 pockets. In about six to eight months, the saplings that survive will be bought by the government’s forest department for Rs6 per sapling.

“There’s lots of unemployment in our village, so every little bit helps,” Bibi says. Her three sons, all graduates, are out of work and help tend her nursery.

“In less than a year, they earn about Rs150,000 (\$1,060) for running these one-unit (with 25,000 saplings) nurseries and we pay them in three installments,” said Tehmasip. The first thing Bibi plans to do with the money she gets from selling the saplings is to make a proper grave with a tombstone for her 20-year-old daughter Anam, who died suddenly a few months ago.



© Zofeen T. Ebrahim

“Last year, Anam had made her dowry from the money she earned from preparing a nursery,” she says, her eyes welling up.

“I’d never seen so much money in my life; my life has changed completely, and all that without leaving home!” says 30-year-old Rubina Gul, bursting with enthusiasm. “My son goes to a private school now,” she smiles. She and her husband, Sajjid Zaman, have been preparing and tending to nurseries since 2015. “The first year we used our front yard to grow the saplings,” Gul recalls, adding that from the profits, they were able to set up a bigger nursery in an empty plot they owned, and also to convert part of it into a shop, which they rent for a monthly income. They were also able to buy a second-hand van. “We are now able to visit the adjoining valleys,” Gul beamed.

...and now the 10 billion challenge

When the PTI formed the federal government in August 2018, the party decided to expand the project nationwide by planting 10 billion trees.

Terming it an “upscaled” version of the BTTAP, Aslam said it was, by nature, quite different, as it dealt with more diverse ecological zones, different terrains and different managerial models for tree plantations.

“The 10-billion-tree tsunami (BTT) is a much more complex endeavour, as it traverses diverse landscapes and forestry models across six regions – from mangroves to plantation blocks to natural reserves and urban forestation,” he explained. Having battled and won against illegal loggers in KP, the authorities are ready to confront the land “mafia” in Punjab “to make space for forests to thrive,” Aslam said.



Women working in a government-owned nursery in Pakistan's Khyber Pakhtunkhwa province

And they are already walking the talk. An hour's drive from Lahore, at Balloki, in Punjab province, the government has succeeded in extricating state-owned land from those illegally occupying it. They have turned it into a nature reserve covering 1,011 hectares. Using legal channels, the government aims to recover twenty years of rent arrears for illegal use of the land from eighty politicians and landlords. It also plans to drive out encroachers from the riverine forests and wetlands along the River Indus, soon.

Changing mindsets

For those who got this once-in-a-lifetime chance to ride the BTTAP wave, it was a huge learning experience. "The forest department, once considered the most corrupt department, went through a thorough cleansing.

“If you give nature some space and a chance to rebound, it does so beyond your expectations and calculations”

The working improved manifold too. Earlier there was no monitoring, no accountability and the forest officers hardly ever even went into plantation sites. All that has changed. We may not have had the most trained team, but it became, by far, the most dedicated and motivated," KP's environment secretary, Nazar Shah, claimed.

Next, violators – often from the most influential segment of society, and who considered themselves invincible – were dealt with using an iron hand and penalized. All this was only possible because of political commitment at the top.

Many in the forest department said it brought about a change in the way people in KP started looking at trees. The traditional wisdom of conserving and preserving forests was revived. "Today we see a strong ownership in the communities," said Ubaidur Rehman, community development officer with the KP forest department. "Without the community on board, this project would not have succeeded."

"What makes the BTT special is that it is not just about planting trees but about changing mindsets and making people think differently about the role of trees, nature and valuing their conservation. The billion trees project helped us change the behaviour of people, especially the children and youth of KP province, and made them value the trees as a natural asset. It did that not just within the province, but also catalyzed a green political movement across the country – which is now more sensitized to ecological conservation," Aslam added.

And though it looked like an "impossible" task, especially for a province where the timber "mafia" rule was so well-entrenched, today, in retrospect, the two most important lessons for Aslam were: "Firstly, that if you give nature some space and a chance to rebound, it does so beyond your expectations and calculations; and secondly, that nothing is impossible if you wholeheartedly commit to it and are willing to work hard."



A Pakistani journalist who covers development issues for national and international media outlets, **Zofeen T. Ebrahim** is Pakistan editor for *The Third Pole*, a multilingual platform dedicated to promoting discussion about the Himalayan watershed and the rivers that originate there.

Solar energy:

Changing rural lives in Kenya

Victor Bwire

The availability of solar-powered water pumps and solar lamps have had a life-changing effect on rural communities in Kenya, providing clean drinking water and lighting while eliminating hardships, health hazards and habits that contribute to climate change. The government's commitment to invest in clean energy has been bolstered by private companies to bring about real change, especially for those who need it most.

"I have nothing more to say than thank God for remembering us, and the people who have made the completion of this water project here possible" Jane Akinyi, a resident of Nyandiwa in Homa Bay county, says. Even though the area is not far from Lake Victoria, one of the largest fresh-water lakes in the world, access to clean drinking water has remained unattainable here for decades.

"Women used to walk several kilometres to the rivers to seek water, and often, the long queues at the only water points in the region would mean you could waste the whole day waiting. This meant chores at home would remain undone, resulting in other challenges," Akinyi explains.

The recent commissioning of five solar-powered water pumps in the region has made these hardships a thing of the past. Currently serving 700 households in seven villages, the new water project, launched on 11 February 2019, gives residents access to clean water for drinking and cooking, while protecting the water catchment areas around the Rangwe and Riana rivers. Its water pump at Nyandiwa produces 3,000 litres of water per hour – the 2.2 kilowatt pump has been reinforced by a five kilowatt solar structure, to ensure that it works even when sunshine levels are low.

Previously, the people of Rangwe constituency were forced to boil their water to avoid contracting waterborne diseases such as cholera. This was especially important after water pipes burst and clean water was contaminated by raw water. Boiling water requires firewood and the burst pipes meant that people had to fetch water from the catchment areas – both these actions contribute to climate change. It took the intervention of the Kenya Red Cross Society (KRCS) and the area's Member of Parliament to rehabilitate an old water supply project that was conceptualized in 1979 to run using diesel power, but was never completed.

Eliminating pollution

The work involved the KRCS – which manages the new project – undertaking the fresh protection of the old water spring and fencing it, designing and constructing a new sump tank, and installing solar energy-based pumps. The use of solar energy, instead of diesel, to pump the water has not only saved the community from the high costs associated with using petroleum products, but has also ensured a steady supply of clean power – all without adding any air pollution.

The private sector has viewed solar energy as a business opportunity, while providing climate-friendly energy to poor communities. In addition to government investment in the development of solar energy in the country, the private sector – both businesses and non-profits – have been instrumental in the growth of the sector. Through such initiatives as highly subsidized prices, social marketing and loan schemes, a number of entities have aggressively expanded the use of solar systems across the country.

Targeting women's networks

Solibrum, a local company, provides solar power at affordable prices. It sells solar panels, solar systems and solar lamps to communities through women's groups, offering loans or a subsidized price system. Residents have access to the solar systems and can pay in installments. Incentives are extended to those who pay promptly and some existing users are made sales representatives to recruit more users.

Solibrum has recruited nearly 200 members through women's communities, who actively promote the sales of solar products in six counties in Kenya. More than 50,000 households have been equipped by the company so far.

The solar lamps have been life-changing for the communities. "The solar systems have reduced the health burden and air pollution related to using diesel engines within the communities. For example, for generators at water pumps and hospitals, the solar lanterns have eliminated the use of kerosene, which was not only expensive, but caused eyesight problems for users. It has reduced the destruction of forests by eliminating the need for charcoal, and the availability of power also enables children to do their homework after nightfall, without hurdles," Anton Espira, the company's founder and chief of operations explains.



Kenya's Masai women walk house-to-house with their donkeys, which carry solar panels on their backs.

Benefiting small landowners

The solar systems, which include lamps and chargers, play a significant role in the economic empowerment of the farmer communities they are working in, affirms John Ohaga of One Acre Fund, an international non-profit working in East Africa. "These lanterns have helped some of the farmers do business late into the night, thus growing their businesses. They are able to charge their phones, thus fully utilizing the online payment platforms, and use the torches to continue some work on the farms after dark," he says.

Farmers are also increasingly using solar irrigation systems to deal with the unpredictable seasons brought about by Kenya's climate. Unlike before, when irrigation farming and predictable farm produce was mainly associated with the rich who could afford them, things have changed for the better for these formerly poor farmers, who were unable to invest in their crops and land. A better harvest also means food security for these farmers.

Optimizing solar energy

According to estimates by the International Energy Agency (IEA), solar photovoltaic energy will contribute the largest share (forty-seven per cent) of the technology mix for mini-grids and off-the-grid systems power generation in Sub-Saharan Africa by 2040. M-KOPA Solar, a privately-held Kenyan solar energy company has installed 225,000 solar energy products in the country so far, a 2016 study by the World Resources Institute indicated.

Kenya has committed to reducing its carbon dioxide emissions by 30 per cent by 2030. Decreasing the use of diesel and petrol machines and easing pressure on forests by using less charcoal, the solar power systems are a major intervention that not only alleviate the problems faced by women and children in communities, but also play a big role in mitigating the adverse effects of climate change in Kenya.

The climate change interventions in Kenya are guided by governmental decisions as reflected in the National Climate Change Response Strategy (NCCRS 2010) and the National Climate Change Action Plan (NCCAP 2013). Meanwhile, a National Climate Change Framework Policy and legislation are in their final stages of enactment to facilitate an effective response to climate change. In addition, the Government of Kenya has developed Energy (Solar Photovoltaic Systems) Regulations, which require the registration and licensing of players in the sector.

The Government Master Plan for the energy sector notes that due to its position on the equator, Kenya is endowed with very high solar resources, among the highest ten of Sub-Saharan African countries. Given the challenges posed by conventional energy sources and poverty levels in Kenya, solar energy has high potential – the government, through its energy regulatory framework, is working to ensure the maximizing of this resource. Electricity consumption is forecast to grow in the medium term by an annual average of 7.2 per cent per year, a 140 per cent increase over the 2015 level, by 2020. This makes it imperative to find renewable energy solutions to benefit marginalized groups and small-scale users.



Head of Media Development and Strategy at the Media Council of Kenya, **Victor Bwire** is an environmental journalist. He also trains journalists on environment, health and related issues.

Zero carbon, starting with cities!

Manuel Guzmán Hennessey

Non-state actors, with cities at the forefront, must be the first to sow the seeds of a carbon-free society. To avoid the nightmare of climate change, we must reduce our carbon emissions further than called for by the Paris Agreement of 2015. This requires coordinated actions at the international level and concrete initiatives such as electric transport, the decarbonization of housing and a large-scale transition of energy.

Before the publication of the Special Report of the Intergovernmental Panel on Climate Change in October 2018, the tipping point (the critical threshold at which the climate changes from one stable state to another) of the increase in the earth's average temperature was thought to be 2 °C. As we have learnt since, it is now at 1.5 °C. If this threshold is crossed, IPCC scientists note, society will face devastating consequences.

These include the loss of entire ecosystems and species, melting polar ice caps and rising sea levels, intense heat waves and droughts, and an increased intensity and frequency of extreme weather events.

The Paris Agreement of 2015 (COP21) is not enough to stop this catastrophe. Scientists have explained that in order to limit global warming to 1.5 °C instead of 2 °C, as set out in this Agreement, it would be necessary to reduce net global carbon dioxide (CO₂)

emissions by about forty-five per cent of 2010 levels by 2030, and to achieve net-zero carbon emissions by 2050. The emission reduction targets set by COP21 average around twenty-five per cent.

What is to be done? The IPCC has called for “rapid, far-reaching and unprecedented changes in all aspects of society”, which essentially involves reducing our carbon emissions. Accumulated CO₂ emissions and the average increase in the earth's temperature are directly related to the production and consumption of fossil fuels. The consequence is unprecedented global warming – the last three years have been the hottest in history.

Future city, a drawing by Wang Boya, 7, for The Future World in My Eyes, an art activity launched by the UNESCO Courier on its WeChat platform, in 2019.



© Wang Boya

“ The education of citizens, especially the youngest, is essential, because it will enable them to implement transitions in an orderly and accelerated manner ”

Glimmers of hope

So what explains the certainty of scientists who say that it is possible to lay the foundations of a carbon-free society by 2030? According to them, a net-zero emissions society is entirely possible. And it is not an “alternative” society or an experimental social model: decarbonization is the new condition for the viability of life on the planet.

Among the most authoritative sources on the subject is the International Energy Agency (IEA), which has published its flagship publication, *World Energy Outlook* (WEO), every year since 1977. From its analysis, it can be concluded that the new actors in the fight against climate change – non-state groups made up of citizens, entrepreneurs, city governments and universities – have taken the lead in decarbonization efforts. Multiple platforms demonstrate the climate actions undertaken by these new actors. They are a daily illustration of a transition that is making advances, which are sometimes faster than the fulfillment of the goals set by their own countries. Here are some examples of these new certainties that encourage hope.

First, in 2016, the growth rate of installed capacity of solar photovoltaic systems exceeded that of all other energy sources. Since 2010, the cost of new installations has fallen by seventy per cent for solar photovoltaic and twenty-five per cent for wind energy. The cost of photovoltaic batteries has fallen by forty per cent, in addition. Between 2020 and 2050, wind and solar energy will together account for forty-eight per cent of total electricity. And the European Council has set new targets to be achieved by 2030, which include a forty per cent reduction in carbon emissions, twenty-seven per cent renewable energy in the energy mix, and a twenty-seven per cent improvement in energy efficiency.

The climate action of cities

I start from the premise that a decarbonized society is possible on the condition that we concentrate transitional climate actions in the management of cities, and if we undertake these actions in an articulated and collaborative manner on an international scale between 2020 and 2030.

Why start with cities? Because they account for three-quarters of greenhouse gas (GHG) emissions and two-thirds of the world's energy consumption. About seventy per cent of the world's cities already face the consequences of climate change, and almost all are at risk. By 2060, more than a billion people – projected at ten per cent of the world's population at that time – will live in low-lying urban coastal areas, with the majority of them in developing countries.

These figures – taken from Bahareh Seyedi, climate and energy advisor at the United Nations Development Programme (UNDP) – provide an overview of the vulnerability of cities to climate change, and stimulate reflection.

It is clear that cities will have to develop climate action plans by the end of 2020 – that is, tomorrow! – to limit global warming to 1.5 °C and to adapt to the repercussions of climate change. These action plans can be structured around three pillars: reducing CO2 emissions, increasing resilience, and education.

Reducing CO2 emissions includes the transition of transport systems; energy efficiency; integrated waste management and the promotion of recycling, and the renewal of urban infrastructure to achieve sustainable patterns. Increasing resilience must start from the recognition that cities are complex systems and must therefore respond in complex ways to the effects of climate change.

This approach includes the adaptation of territories to climate change; risk management and prevention; the strengthening of circular and local economy systems; and the implementation of decentralized energy systems (for the production, distribution and marketing of renewable energy surpluses). The education of citizens, especially the youngest, is essential, because it will enable them to

implement transitions in an orderly and accelerated manner.

The cities that follow the net-zero carbon route will need to combine the best of urban design and cutting-edge digital technologies to meet these challenges.

They will have to get rid of fossil fuels in their streets by purchasing only zero-emission buses starting in 2025, to ensure that large parts of their cities have no more carbon emissions by 2030.

It will also be important to decarbonize buildings, by adopting regulations or designing policies to ensure that new buildings reduce their carbon emissions to net-zero by 2030 – with the measure applying to all buildings by 2050.

Another key measure would be to reduce the amount of waste generated by at least fifteen per cent per capita by 2030, and to reduce the volume of municipal solid waste sent to landfills or incinerators by at least half.

Finally, cities will have to implement climate actions with high social impact, that deliver significant environmental, social, economic and health benefits, especially to vulnerable and low-income communities.



Founder of the *Klimaforum Latinoamérica* Network (KLN), **Manuel Guzmán Hennessey** (Colombia) is a professor at the *Universidad del Rosario* in Bogotá, Colombia. KLN is an independent organization dedicated to promoting climate actions that contribute to the decarbonization of society. It works in partnership with universities, companies and civic groups, and consists of an advisory board and a team of recognized environmental advocates.

African cities in action

Niels Boel and Finn Rasmussen, with Hadra Ahmed

Ninety-four megacities around the world have come together to form the C40 network. Their aim is to share their experiences of combating climate change and its effects, and to set ambitious goals for the reduction of carbon emissions.

The inhabitants of Addis Ababa have the impression that they live in the middle of a construction site. As they say, “Head out on one road in the morning and you might find it blocked off for a development project by the evening!” The Ethiopian capital is a massive continental hub with an exploding population of people fleeing from unrest and the lack of opportunities in the country’s poverty-stricken provinces. At the current growth rate, the number of inhabitants is expected to double in thirty years.

Some economists have called Ethiopia an “African lion”, for mimicking the success stories of Asia’s economic tigers. But this economic success and the accompanying population growth – one of the highest in the world – come at a price.

Although its carbon (CO₂) emissions are still modest, Ethiopia is one of the countries in the world that is most vulnerable to climate change. The variable rainfall and rising temperatures cause recurrent droughts and famine. The problems related to climate change are exacerbated by rapid urbanization, as multinational clothing-retail companies like Calvin Klein and H&M establish garment factories here, taking advantage of some of the lowest wages in the world.

In May 2018, Addis Ababa – along with seven other African cities – made a commitment to reduce its CO₂ emissions. This means it will have to rethink its transport, energy production and waste management strategies.

Meanwhile, Ethiopians complain that concrete progress in the fight against pollution and traffic congestion remains elusive. “The pollution is increasing and people are getting sick,” says Biniam Getaneh, 30, one of the 3.5 million inhabitants of the capital.

Leading the way on climate action

Addis Ababa is a member of C40, a network of cities representing over 700 million people and a quarter of the global economy, which have been working together since 2005 to reduce greenhouse gas (GHG) emissions.

For Hastings Chikoko, the Regional Director for Africa at C40’s Cities Climate Leadership Group, it is clear that cities have an important role to play in producing innovative solutions and technologies to address the climate crisis. “As cities have private sector and research institutions within their boundaries, we see them coming up with innovation, being able to demonstrate to national governments that climate change mitigation and adaptation work, and can be upscaled to the national level.”

Chikoko, a Malawian economist with long experience in climate change, points to positive experiences in Accra (Ghana) and Tshwane (South Africa), where traffic congestion has been eased by transportation initiatives, while significantly reducing CO₂ emissions.

While acknowledging the difficulties faced by the capitals of many of the world’s poorest countries in particular, Chikoko says he remains optimistic – pointing out that some cities have decided to exceed the goals of the Paris Agreement 2015 (COP21).

The C40 Cities network is working to promote local climate initiatives at the national level, such as facilitating municipal representatives to integrate with government teams participating in international platforms. “We have ensured that some C40 mayors take part in delegations whenever possible,” explains Chikoko. “That way, they can use their best practices from the local level and raise their voices in decision-making processes.”

“Ethiopia is one of the countries in the world that is most vulnerable to climate change”



© Eduardo Soteras / AFP

Also, in the context of the scarcity of local finances, municipalities are struggling to allocate budgets in the fight against climate change. C40 provides support for capacity-building, to enable city officials to access alternative financing.

“During the Paris climate summit, we launched the C40 Cities Finance Facility. We identify big projects and help cities to identify the challenges and to transform these challenges to bankable projects that can be financed, for example, by the World Bank,” Chikoko adds.

Technology transfer is another central aspect facilitated by the network. “Some solutions really depend on cities being innovative. This could be green buses, or it could be technology for water efficiency. This is an area where African cities are lagging behind. There is also a value in identifying cities that are advanced in terms of cleaning technology, for example. We are then able to facilitate knowledge transfer as well as technology transfer from those cities to other cities in Africa, for instance.”

Another obstacle to climate change at the city level is often the lack of adequate plans. A fundamental objective of the C40 network is to ensure that the cities involved have common data references and measurements, enabling them to assess and compare their progress.

Accra’s mayor, Mohammed Adjei Sowa, was supported by the C40 network to gather credible data on which to base decisions for the city’s waste management plan. Waste generation plays a significant and growing role in carbon emissions.

“The mayor is now collaborating with the private sector to establish an efficient waste collection service,” explains Chikoko. “Other African cities can learn from this: first, illegal dump-sites must be banned. Secondly, you must make sure you have an efficient system that gives residents an incentive to abide by the rules.”

Street scene of the third edition of Car-Free Day, 3 February 2019, in Addis Ababa, the Ethiopian capital.



Sharing lessons learned

Transportation is another major source of carbon emissions – it is in this sector that global GHG emissions are rising the fastest.

The city of Tshwane – created in 2000 by the merger of thirteen municipal entities, including Pretoria, the administrative capital of South Africa – is part of C40’s Mass Transit Network, which brings together member cities that have shown innovation in this field.

“This metropolis of more than three million people has worked to improve its public transport network, making it comfortable enough to encourage car owners to use it. It has improved its transport infrastructure to include dedicated bus lanes. This is also one of the cities that have completely changed the source of energy of their buses from oil to gas.”

The lessons learned in areas of transportation or waste management in C40 cities, including Tshwane, Accra or Chicago, can inspire action in an overpopulated and congested city like Addis Ababa. When the Ethiopian capital launched its plan for a bus rapid transit system, it sent a delegation to Tshwane to learn from its experience.

Improving the public transport in Addis Ababa is part of the national Ethiopian Green Economy Strategy, launched in 2011. The Ethiopian government is currently revising its environmental policies, taking climate change into account, according to Chikoko. “It will contain measures for cities in different parts of the country to be climate-change resilient and to minimize their carbon emissions while developing.”

“The role of C40,” concludes Chikoko, “is essentially to connect cities that are trying to implement solutions to reduce carbon emissions and to help cities to inspire each other.”



Niels Boel, Danish political scientist, journalist and author, and **Finn Rasmussen**, Danish sociologist and culture specialist, are consultants for the Wide Angle section in this issue of the *UNESCO Courier*. Ethiopian journalist **Hadra Ahmed** contributed to this article from Addis Ababa.

A question of international solidarity

Johan Hattingh

If rich countries can adapt to rising temperatures “with the flick of a thermostat” – to use the metaphor of the South African Nobel Peace Prize winner Desmond Tutu – developing countries face far more dramatic challenges. A reflection on a shared solidarity informed by an ethical consciousness.

Facing the challenges of climate change, the world today is more in need of a framework of ethics and an ethically informed practice of international solidarity than ever before.

This need arises, in the first place, from the stark reality that the global challenges and mega-trends of our time – climate change, the movement of people, geopolitical tensions, security, and international terrorism – become more and more integrated, but our responses to them are more and more fragmented. This was the core message of António Guterres, United Nations Secretary-General, in his speech to the World Economic Forum at Davos, Switzerland, in January 2019.

In the second place, and perhaps more importantly, the need for international solidarity also springs from the causes and effects of climate change itself. Climate change is the product of a world that is already deeply divided, and in its effects and impacts, intensifies and multiplies divisions and vulnerabilities that already exist.

This also applies on a subnational level to marginalized social groups and communities. These are undeniable political and social facts, experienced by many as injustices. Poorer nations and groups, for example, are much more vulnerable to the risks and burdens of climate change, while they have contributed much less, if anything at all, to its causes.

Similarly, poorer nations and groups already need to adapt to climate change, while they have the least resources to do so. Developing nations and groups are thus dependent on assistance for adaptation, while the urgency for such assistance is not very high in more affluent parts of the world. The rich are not directly affected by climate change for now, or if they are, they can adapt to it fairly easily.

This asymmetry has been captured neatly by Desmond Tutu, former Archbishop of Cape Town, South Africa, when he pointed out in the United Nations Development Programme (UNDP) Human Development Report 2007/2008 (p. 166) that those in more affluent parts of the world can – at least for now – adapt to rising temperatures by merely adjusting their air conditioning “with the flick of a thermostat”. But for countless women in developing nations, adaptation would entail walking ever-longer distances to fetch clean drinking water for their households.

The range of possibilities

The need for standing together and co-operating with one another in response to climate change is clearly there, but the world is divided, and the prospects for overcoming these divisions are very dim.

So, what, if anything, can we do about this? There are three obvious things we could do for a start: expand our conceptual understanding of the notion of solidarity; remove two of the stumbling blocks – human development and jobs – that are often used as excuses for not addressing climate change; and move the conversation about solidarity from political and social facts to that of ethical principles.

Let us tackle the major themes in broad outline, noting how ethical considerations already start to emerge in the conversation about the concept of solidarity.

Expanding and deepening the notion of solidarity

Popularly, solidarity has been understood in recent times as a call for unity in trade union or political circles in the fight against labour exploitation or oppression. In both contexts, solidarity as a concept is linked to compassion with, and lending support – materially or otherwise – to victims of unfair labour practices or political injustice.

All these connotations are also present when solidarity is evoked as a basis for the fight against climate change: unity, identification, compassion, support and assistance. But in this context, its meaning is shifted to wider target audiences and contexts than that of labour movements or liberation struggles.

In the fight against climate change, victims are usually associated with those suffering directly – and often very dramatically and visibly – from extreme weather events (for example, floods, hurricanes, droughts, fires). In such cases, humanitarian aid is usually mobilized fairly quickly, within states or internationally, to provide for the immediate needs of victims.

Our motivation for such acts of solidarity is usually referred to as *human solidarity*, based on a recognition of those that suffer as fellow human beings, sharing the same fate as we do – their fate is our fate, and we cannot ignore it. This is often captured by metaphors of society as an *organism*, or the whole of humanity as one *family*.

“ The need for international solidarity also springs from the causes and effects of climate change itself ”



Balancing Bamboo #3, Vanuatu, 2015. With the island of Malekula in the background, a girl balances a long bamboo stick on her head. Will this become the new horizon one day? "Every year, the sea level is rising at an accelerating pace," observes Dutch photographer Scarlett Hooft Graafland.

© Scarlett Hooft Graafland

Climate change, however, confronts us with the interdependence of us humans on one another and on ecosystems for our survival and flourishing, embedded as these ecosystems are in the biosphere, earth and planetary systems – all unfolding in processes of natural evolution over time. Accordingly, notions of *earth solidarity*, *planetary solidarity*, and *intergenerational solidarity* can be envisaged to elaborate on the reality that all life on earth is part, as it were, of the same community – the community of life sharing the same fate together.

Human development versus climate?

In the international community, the fight against climate change is often framed as a dilemma. States often say they cannot engage in this fight because they first have to make sure that their citizens have development opportunities to move out of poverty. The same excuse is often made about jobs: if the fight against climate change puts workers at a disadvantage, then they cannot join in.

The argument about jobs was precisely the excuse used by the United States to justify its withdrawal from the Paris Agreement (COP21). But are poverty alleviation and job retention really so diametrically opposed to taking action on climate change? This was exactly the conundrum addressed in the 2007/2008 Human Development Report, with the telling title: *Fighting climate change: Human solidarity in a divided world*.

In this comprehensive report, two core messages are communicated. First, that climate change will definitely have a negative effect on human development in the long run, making it more difficult to achieve the Sustainable Development Goals (called the Millennium Development Goals when the report was written), and eventually, even reversing many of the gains that have been made in human development thus far in history. This is an alarming message, putting a big question mark on the argument that responses to climate change can be put on the back burner while we first eradicate poverty in the world.

In response to the serious and highly urgent need for human development and poverty alleviation, the second core message of the 2007/2008 report is that human development and the fight against climate change are not two separate agendas. They are two dimensions of the same agenda that are inseparably linked and need to be pursued together.

In policy and project terms, this means that measures adopted to respond to climate change should at the same time also contribute to human development, and have a beneficial impact in both areas. In ethical terms, solidarity in the fight against climate change conversely means that the poor and the vulnerable cannot be left behind. Their interests need to be addressed as well, and indeed as a matter of priority, in ways so smart and intelligent that the human development agenda and the climate change agenda fully merge.



Cut off from the world, these villagers watch helplessly as the dam breaks and waters rise in the upazila (sub-district) of Raomari, in Bangladesh. "It all happened in half an hour," recalls Bangladeshi photographer Rasel Chowdhury.

The same argument applies to the retention of jobs. If workers are left behind in the fight against climate change, the ethical imperatives of solidarity are betrayed. Clearly, if jobs are lost in the fight against climate change, then we haven't applied our minds as intelligently and smartly as we should have done.

An ethical debate

This is why we need to shift the debate on solidarity from the field of socio-political facts to that of ethical principles. In this regard, UNESCO's *Declaration of Ethical Principles in Relation to Climate Change* (2017) is a good place to start. Solidarity features there as one of six ethical principles that should guide all decision-makers in their responses to climate change (see p. 9).

In the context of social and political facts, the conversation is usually about a lack of solidarity, or the impossibility of achieving it – turning this into a convenient excuse to do nothing, rather than something, about climate change. In the ethical sphere, the conversation shifts to solidarity as a form of conscience and a source of inspiration for action – that is, as a commitment and point of departure, rather than a technical prerequisite for action.

Given the ethical demands of solidarity in the fight against climate change, huge uncertainties remain in an increasingly divided world. A radically expanded notion of solidarity may not facilitate international cooperation. But it could be an invaluable source of inspiration and motivation to undertake the mammoth task of tackling climate change together.



A professor of philosophy at South Africa's Stellenbosch University, **Johan Hattingh** (South Africa) specializes in the areas of applied ethics, environmental ethics and climate change ethics. He served two terms as a member of UNESCO's World Commission on the Ethics of Scientific Knowledge and Technology (COMEST). He was also President of the Ad Hoc Expert Group convened by UNESCO in 2016 to prepare the first draft of the *Declaration of Ethical Principles in Relation to Climate Change*.

Climate Frontlines

Many of those most vulnerable to the effects of climate change – like those living in the Arctic, on small islands or at high altitudes – are unsure what kind of future to expect. That is why UNESCO, in collaboration with various other organizations, launched Climate Frontlines.

The global forum allows these communities to connect with each other, and to share local and indigenous knowledge and findings from scientific research. It contributes to the strengthening of solidarity and helps communities to feel less isolated in the face of climate risk.

www.climatefrontlines.org

Climate change and education

Laura Ortiz-Hernández

Educating on climate change and sustainable development issues is a necessity. In Latin America, there are some promising experiments being carried out that deserve to be replicated, both in the entire region and on other continents. There are some aspects, however, that are being neglected.

In recent years, the environmental crisis and climate change have highlighted the need to transform our ways of thinking and acting. Education for Sustainable Development (ESD) is therefore, a key factor in the search for alternative methods to build a different kind of society that is fair, participatory and open to diversity.

In Latin America and the Caribbean (LAC), ESD has advanced through the application of different strategies, adapted to the conditions of each country. In Mexico for example, ESD is being implemented at all levels of the school system: educational games in preschool education, biodiversity activities and programmes in primary or basic education, and the integration of environmental protection studies into the secondary school curricula.

In countries such as Bolivia, Brazil, Chile, Costa Rica, Ecuador, Guatemala and Peru, ad hoc ESD strategies are being developed – book publications, television and radio programmes, visits to protected natural areas, and teacher training on these issues – to comply with established regulations.

In addition to the formal system, civil society organizations are also working to impart knowledge on different environmental issues and to support the work of teachers in schools.



© Tagma / Lorena Presno

Children playing at the Mar Chiquita primary school, Argentina's first sustainable public school.

According to the RISU Project (2015), which defines indicators for the evaluation of sustainability policies in Latin American universities, seventy per cent of these institutions have a university authority to apply environmental measures; eighty-six per cent engage in extra-curricular communication and awareness-raising activities on environmental and sustainability issues, and forty-six per cent conduct research in these two areas.

The report also reveals that forty-six per cent of universities have an energy sustainability plan, and thirty-five per cent conduct awareness-raising activities on energy conservation. Lastly, thirty-three per cent of these universities monitor the quality of water intended for human consumption, and 61.5 per cent have a unit to handle hazardous waste management. Half of the universities have an information and monitoring system for solid waste, classifying it by type and quantity.

These figures are rather encouraging. But it must be noted that in the education sector, the emphasis has been mainly on environmental aspects – the social aspects that complement the efforts being made to achieve the Sustainable Development Goals (SDGs) that the 193 United Nations Member States have a duty to achieve by 2030, have yet to be included. This is the next stage that will have to be undertaken.



An environmental consultant and research director at the Misión Sustentabilidad México A.C., **Laura Ortiz-Hernández** is a member of the Coordination Committee of the Alliance of Ibero-American University Networks for Sustainability and the Environment (ARIUSA). She was the UNESCO Chair in Climate Change and Sustainable Development in Latin America, 2016-2017.

Colonel: We must act quickly!

Thierry Geoffroy, interviewed by Niels Boel, Danish journalist

Apathetic and soporific. These words describe the state of public opinion and the media's attitude to climate change, according to French-Danish conceptual artist Thierry Geoffroy, alias Colonel. Little by little, his slogans – that wavered between “Before it's too late” and “Tomorrow is too late” – were reduced to a simple “Too late”. Paradoxically, it is in despair that he finds some consolation.

One of your most recent works consists of red neon letters that say “I give up”. Have you lost hope that we will win the race against climate change?

The answer is yes. I don't know if it's because I'm getting older or because the situation is getting worse. We no longer live in fear, we live in “it's too late”. But I don't think that means we're giving up. For it is perhaps precisely this despair that will finally rouse sleeping consciences! Almost everybody is aware of climate change and the responsibility of human activity. And yet nobody, almost nobody, does anything.

The problem isn't ignorance, it's apathy. I have the impression we live in a world where planes fly across the sky day and night, spraying sleep-inducing substances that atrophy our consciousness. The media has a lot to do with this – they ignore the real causes of the extreme weather phenomena we are witnessing, so that we don't question the system of production and consumption on which the power of the elites is based. Knowing that the same media is part of these same elites.

I think that artists have a role to play in raising awareness. They can detect the workings of media propaganda. They can show the public the real face of the problems.

That's the purpose of your Emergency Room project, isn't it?

Indeed, the essence of my work on climate change is to ask the question: “What's the emergency?” Just as in hospital emergency wards, it isn't possible to treat all emergencies at the same time – it's necessary to identify those that need to be treated as soon as possible. It's clear that climate change is the priority of all priorities. It is – and will be – the cause of many other emergencies: massive population movements, ecological problems, wars, etc.

So I imagined a project – or rather, a format that allows contemporary artists to urgently express themselves on the news transmitted by the media. They're on the lookout, observing what's happening around them and reacting almost in real time – creating a work that they display in the *Emergency Room* the next day, to discuss it with the public.

To give you an example, for the first *Emergency Room* installed at MOMA PS1 in New York, the Danish artist Søren Dahlgaard had produced – in the aftermath of very heavy snowstorms – fake copies of the world's most influential newspapers to draw public attention to climate change. The headlines announced disasters everywhere.

“Critical run is a metaphor: either we run to save the world, as long as it's not too late, or we run to save ourselves, because it's too late”

Critical Run, an art format first created by Colonel in Italy, during the Venice Biennale 2011.



© Emergency Rooms



Now before it is too late,
an *Emergency Rooms* installation
by Thierry Joffroy/Colonel in Morocco,
during the Casablanca Biennale, 2018.

That was in 2007, and the public was really shaken by it. Today, no one would bat an eye seeing such topical headlines! But, as I was saying, that does not mean we should give up. I continue to set up *Emergency Rooms* all over the world. I'm counting on the fact that the debates taking place there will eventually win over and raise awareness among new audiences.

You use recyclable materials for your works. Is this a deliberate choice?

It's the fact of working in the present that imposes this choice. I'll go find a box in the street and write on it. I will spend more time trying to understand what's going on and communicating with the audience than on polishing my work alone in my workshop or studio. There's no time for perfecting. We must act quickly.

Critical Run is another art format you have created. What does it entail, and what's the objective?

Critical Runs are in fact conferences on current topics, particularly climate change. But instead of participants sitting in a warm, comfortable conference room, drowsy from the heat and the whirring of projectors, they're invited to debate while running!

Critical Run is a metaphor: either we run to save the world, as long as it's not too late, or we run to save ourselves, because it's too late. If it's really too late, we're not going to sit on chairs and leaf through the history of art.

In May 2019, you organized a Critical Run at the Venice Biennale to reflect upon the title of the 58th edition of this major international art exhibition: May You Live in Interesting Times.

Yes. And some good questions were asked during this race-debate. One of the participants discussed the main work of this year's Biennale, *Barca Nostra* (Our boat) by Christoph Büchel. This Icelandic-Swiss artist is exhibiting the wreck of a fishing vessel that sank in the Mediterranean in 2015, killing about a thousand migrants. Our participant suggested it would have been better to exhibit one of those cruise ships – which, through a chain reaction, causes entire populations to be condemned to migrate for climatic reasons – instead.

The Biennale should exhibit works that evoke the causes of problems and encourage us to try to solve them in time, not works that ironically embody our attitudes that it is "too late" and of us turning our backs.



The son of a soldier, French-Danish artist **Thierry Geoffroy** has adopted the nom de guerre, Colonel, to indicate that he is fighting a battle: to raise public awareness of climate change. Originally a photographer, Geoffroy has been touring art fairs, galleries and museums in many countries for over a decade. He invites himself, even when not invited, to communicate his messages. Author of several books and manifestos, he has produced more than twenty films for Danish television and as many solo performances in museums.

Arshak Makichyan:

The lone picketer

Interview by Jasmina Šopova

Every Friday since March 2019, Arshak Makichyan has been demonstrating alone in Moscow's Pushkin Square. His placard displays slogans like "Global warming equals hunger, war and death". This young violinist in Russia's capital is leading a solitary and tenacious fight on behalf of the entire planet.

How did you end up demonstrating alone on the street?

I have been interested in environmental issues for a long time. But it was only towards the end of 2018 that I was really struck by the problem of global warming, when I discovered, through Greenpeace International, what Greta Thunberg is doing. At the time, the idea of demonstrating in the streets, like this young Swedish schoolgirl, had not yet crossed my mind, because we don't really have a culture of protest here.

Then, in February 2019, I participated in a demonstration for the first time – the march in memory of Boris Nemtsov, the former Russian minister and deputy, who was murdered in 2015. This experience made me realize that I was an adult who was capable of doing something similar myself.

When I learned – quite by chance – that a demonstration was being organized in Moscow on 15 March as part of the Global Climate Strike, I went along. It was being held in "Hyde Park", a space in Sokolniki Park specially designated by the authorities as a zone for free speech and protests. There were about seventy participants, but as the site is surrounded by a fence and not many people go through there, no one really noticed us.

That's when I decided to take action. Since solitary pickets or single-person protests are permitted in Russia, I thought I would demonstrate alone every Friday, to show my support for the Fridays for Future movement launched by Greta. I chose Pushkin Square because it is always teeming with people.

According to some sources, the first Global Climate Strike on 15 March 2019 mobilized about 1.8 million people worldwide. Why did only seventy people turn up for the march in Moscow?

This was not at all surprising. A large part of the population in Russia does not understand what global warming is. Many people think that the weather will become milder, that the winters will be less severe. People have nowhere to go for information.

We do not have a single well-known political figure who talks about ecological catastrophes and global warming, and the media do not report on these issues. Some believe that the public is not interested in climate change; others avoid the subject in order not to offend the oil and gas companies that hold the reins of economic power in this country – which is one of the world's largest producers of these commodities. As a result, we keep quiet about Russia's lack of action to implement the 2015 Paris Agreement (COP21), which it has signed but not yet ratified. In my opinion, the silence on climate is no different from the silence on the Chernobyl disaster.

Even on the internet, the March 15 strike went almost unnoticed, for example, because people are afraid to mention youth demonstrations. Here, people are not allowed to organize demonstrations or hold a solitary picket if they are under 18 – involving minors in such actions is a punishable offence.

Yet, across the world, it is mainly young people who are mobilizing against climate change.

Yes, and it is precisely for this reason that I organized a flash mob on the web last May – with the idea of obtaining the right for schoolchildren and youth under 18 to fight for their future.

Photographs of young people holding placards saying: "Let Russia Strike for Climate" (my flash mob's slogan) in different countries were sent to me. Like one of a 9-year-old girl demonstrating in New York. Greta is 16 and she can demonstrate on the streets without fear of any consequences. She also responded to my flash mob and follows me on Twitter, where I write in English. That made me so happy. It's really rewarding when someone like Greta Thunberg, who has done so many positive things for the world, takes an interest in what you are doing.

And this is even more important because, to my knowledge, there were only three of us staging solitary pickets before the second World Climate Strike on 24 May 2019 – one girl in Yaroslavl, in the central region of Russia, and another in Saratov, about 850 kilometres from Moscow.

And what did you do for this second strike? It is reported to have mobilized more than a million people around the world and even influenced the European Parliament elections on 26 May, putting green parties in the lead in several countries.

Along with the Uchenik student's union, we applied for authorization to hold a gathering of 500 people in Museon Park, in the city centre. But we were refused permission on the grounds that the space was not large enough – even though, according to the union, the park could hold up to 850 people. After several unsuccessful negotiations, about ten one-person demonstrations took place in Moscow. During the day, I held a solitary picket in front of the Pushkin statue, and in the evening, the union members took over.

On that day, Greenpeace International let me use their Twitter account. For an hour, I reported on the various actions being staged in Russia. Then, for the rest of the day, I wrote the tweets for their Russian section.

There were demonstrations in about ten cities in total, but they were always quite small.

Where do you get the inspiration for the slogans on your placards?

For the first one, I referred to the Paris Agreement, but I quickly realized that people did not know what that was. So I started writing about simpler things – about sorting waste [for recycling], for example, which is still not done in Moscow, and against the oligarchic system of waste management. We pay for waste collection, but there is no infrastructure in place. Of course there are a few sorting bins, but the rubbish gets mixed together as soon as it is loaded into the garbage truck and arrives jumbled up at the landfill site – under the pretext that so few people sort their rubbish that it is not worth the effort!

And how do passers-by react to your slogans?

I usually stand in front of the Pushkin statue and stay there for about two hours. In this time, I am usually photographed approvingly and supported by about ten people. Many others come up to me and ask strange questions, referring to lies invented by Russia's enemies or international conspiracy theories. I don't argue with them. I have also been approached by police officers who photographed my passport and told me they would report me to their superiors. As for other passers-by who don't show any particular interest, I have no idea what the effect is on them. They read what is written on my placard and it probably makes them think.

Have you thought about what to do next in your fight against climate change?

Before I started all these actions, I planned to continue my music studies in Germany. But last May, I decided to stay in Moscow. I realized that my solitary picket was more important than my violin bow. Because what's the point of having an education and starting a career if you have no future?

As my actions seem to be finding some resonance in society, I have decided to continue going out on the street every Friday. I am in contact with people who share the same concerns as me and we plan to meet to discuss how we should develop our projects. I believe we will make a difference. If until 15 March 2019, the problem of global warming had been ignored, everything is beginning to change now.



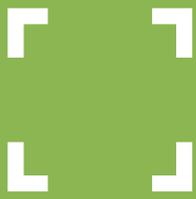
A Russian environmental activist and violinist of Armenian origin, **Arshak Makichyan**, 25, recently graduated from the Moscow Tchaikovsky Conservatory.

“ I realized that my solitary picket was more important than my violin bow ”



© Anna Antanyan / Greenpeace

“Global warming equals hunger, war and death”. Arshak Makichyan has been picketing alone every Friday since 15 March 2019 in Moscow's Pushkin Square.



Zoom

Arab youth, architects of their future

Photos: Yan Bighetti de Flogny (Al Safar Project) / MiSK Art Institute

Text: Katerina Markelova



*The old and the new,
Beirut, Lebanon, 2018.*

French photographer Yan Bighetti de Flogny was in Pakistan when, in the course of a conversation with a hotel owner, he learned of the existence of Ibn Battuta, the fourteenth-century Moroccan explorer. Unfairly little-known, Ibn Battuta is “perhaps the greatest traveller who has ever lived”, as an article in the *Courier* of August-September 1981 tells us.

“At the age of 21, he started his travels by undertaking a pilgrimage to Mecca. This was the start of thirty years of wandering, during which he would travel

almost 120,000 kilometres and visit all the Muslim countries. In the course of this great journey, comparable only to that of Marco Polo, he visited Mecca four times, became a judge in Delhi and in the Maldivic Islands, accompanied a Greek princess to Constantinople, sailed to Sumatra and Java, and journeyed to China as ambassador of the Sultan of India. Then, in 1349, he returned briefly to his own country (“the best land in the world”) before setting off immediately to the kingdom of Granada and after that on a journey through Africa to the Niger basin. The diary which Ibn Battuta

dictated to a scribe during his travels is a source of the first importance for the history of the Muslim world of his time, especially for the history of India, Asia Minor and West Africa.”

The story inspired our photographer, whose reporting project on the fight against cultural prejudices had been maturing for years, but lacked a common thread. Which he had now found: Yan decided that he would embark on a long journey, in the footsteps of Ibn Battuta! The project was launched in March 2018. It will take three



Football game in the heart of the historic city of Jeddah, Saudi Arabia (2019), inscribed on UNESCO's World Heritage List.





Sunset over the Hassan II Mosque in Casablanca, Morocco, 2018. In the foreground are dancers of the Lhiba Kingzoo hip-hop group, founded in the city in 2005.

years and cover more than twenty countries, from Morocco to China, following a similar itinerary to the one undertaken by the Moroccan explorer seven centuries earlier.

Yan and his team are currently halfway through, trying to “restore some accuracy and a little bit of colour to this Muslim world, wrongly disparaged in the West”. Every time he comes home, he is disturbed by the gap between the way the people around him look at this unknown world and the reality he witnesses during his travels: “the warmth, the hospitality, the deep generosity, and especially the people, who have the same dreams and the same sorrows that we have.”

The ardour of youth

Arab youth, with their unwavering determination to choose their own destiny, have emerged as one of the pillars of the project. It is to them that the *Courier* dedicates this photo reportage, published on the occasion of International Youth Day, 12 August.

The desire to live and to change their lives is what unites young people from the Middle East and North Africa (MENA). “Wherever you are, you really feel a common energy. I found a lot of similarities in their way of life, in their vision of the future,” explains Yan. “Sometimes I think it’s the elders who have remained stuck on certain disagreements that young people only want to forget.”

Faced with the highest youth unemployment rate in the world, forty-nine per cent for women and twenty-seven per cent for men, the region’s youth are not giving up. “I didn’t sense any negativity or lack of hope,” says the photographer. “The problem of unemployment is worrying, but many of the other challenges facing the region until twenty years ago – such as access to education, clean water and sanitation – are less prevalent today.”

According to the World Bank, two out of three people in the MENA region are under the age of 24. The demographic weight of Arab youth makes them a living force and gives them a central place in the Arab societies of tomorrow. “The spark has been ignited,” says Jan. “They won’t give up, they know what they want, and in my opinion, they have taken the right path to get there.”

Produced by the international cultural platform Al Safar (“voyage” in Arabic), the project *In the footsteps of Ibn Battuta* is in progress in partnership with UNESCO, the French digital edition of *National Geographic* and MiSK Art Institute. Discover it on the website www.alsafarproject.org

Jana, 16, a champion climber, often scales the high rocks of Wadi Rum, Jordan, 2018. The protected area is on the UNESCO World Heritage List.







A play of reflections at the El Mechouar palace, Tlemcen, Algeria, 2018, dating from the Middle Ages.



An afternoon at the beach, Aqaba, Jordan, 2018.



The graffiti artist Ed One in action, Casablanca, 2018. The Moroccan city's former slaughter-houses have now been converted into a cultural space dedicated to urban and contemporary arts.



Three young women captured in a suspended moment amidst the perpetual goings and comings of trams in Alexandria, Egypt, 2019.



Rochdi Belgasmi under the Republic Bridge in Tunis, Tunisia, 2018. This young dancer, whose notoriety continues to grow, has had to fight to have his innovative vision of dance recognized.

A peaceful evening on the corniche, Tripoli, Lebanon, 2018. An admirer of the great Orientalist paintings, the photographer composes his shots on several levels. The first view from a distance allows the staging and colours to be observed. Then, as the viewer gets closer, more details can be examined.





Ideas



A Question of Ethics:
AI and the Human Race,
by Australian artist
Pete Kreiner.

© Pete Kreiner / Cartoon Movement

PEK

A tale of two futures



© Alex Falco Chang / Cartoon Movement

Robotics conception,
by Cuban artist Falco.

Sandrine Cathelat and Mathilde Hervieu

Is artificial intelligence (AI) on the verge of becoming completely autonomous? The answer will depend on us alone. It is up to us to define the future of humanity, in harmony with this technological tool that we sometimes perceive as a terrifying monster.

As we have seen for several years now, the latest technological developments are creating a service-based ecosystem that is ever easier to use. Steering this convenient ecosystem, is AI! For the individual, citizen or consumer, it means an increasingly wide range of user-friendly services, available to simplify their lives and make optimized choices. For the worker, self-employed or salaried, it provides the advantage of a more objective assessment, more immediate access to know-how and experts, digital assistance at all times to be up for the task.

For organizations and their managers, it is an opportunity to entrust more and more managerial responsibilities to AI: optimizing purchasing, logistics, the security of installations and databases, selection and recruitment, the distribution of tools and human resources – all this in real time, with maximum flexibility.

But is everything in the capabilities of these algorithms worth accepting? Anything at all, at any price, in the name of efficiency and profitability? The dizzying pace of successive innovations and disruptions, and the increasing concentration of innovation hubs in the hands of a few, must keep us on the alert. Especially since this trend towards the delegation of responsibilities will only increase when AI develops to become more generalized. It is already setting the stage for this by extending its connectivity network to our entire real environment, in a technological trend where interfaces are becoming more invisible and intuitive.

We are at the crossroads of civilizations, and a major challenge is emerging: what status, what place, what use for Homo sapiens in this digitalized ecosystem (hybrid at best) of the twenty-first century? Are we experiencing the opportunity here, to redefine human beings and their humanity in order to better envisage life with AI and its multiple incarnations? What scenarios of the future should we envisage and write (since it is still our responsibility to wield the pen)? It is certainly high time to reflect and to choose which strategy to adopt in the face of digital empowerment: prohibit or regulate, to reverse the course of innovation or at least to slow it down? Should we bet on a new kind of cyborg human species to animate the man-machine competition, on the machine's own playing field? Or demonstrate creative plasticity by imagining a society of complementary collaborations between human and digital capacities?

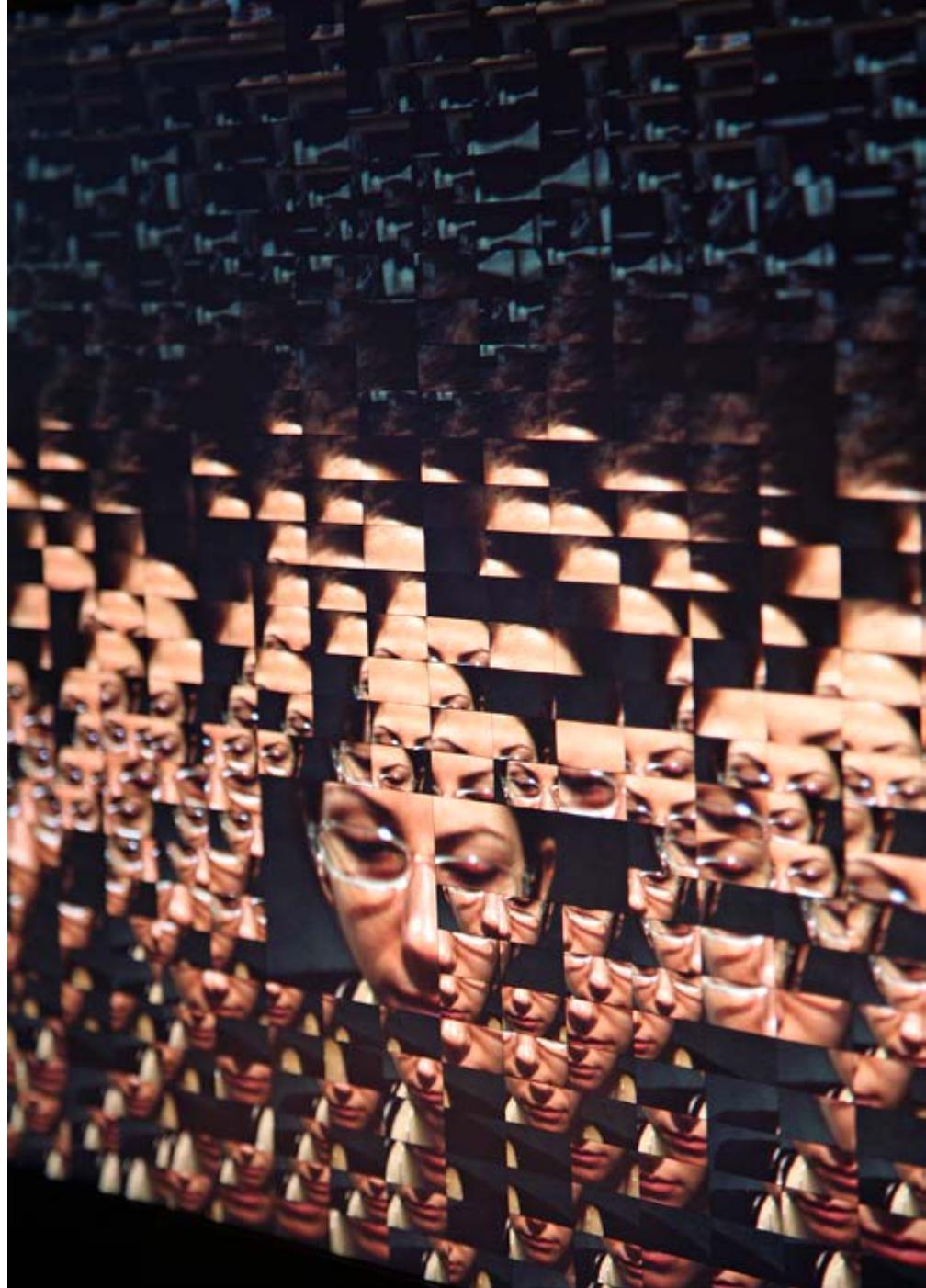
“ AI is, first and foremost, the tool of a project, a vision, a narrative. And today, the dominant narrative is that of efficiency ”

The time of metamorphosis

AI is a hot topic. It catalyses all our anxieties. Some still say it is “weak”. When will we see it as “strong”? Who will own it? Who will have the right to use it? To do what? And above all, what will it look like? Will it be human or human-like? Will it have all our qualities and defects? Will it have a morality and an intention? To evoke it in this way makes it a terrifying monster. However, if AI is monstrous, it is more a monster of efficiency than a monster like Frankenstein! Because AI is a tool, just like a hammer, driven by an external will.

This will is organizational and not human, however. AI is a tool that, since it emerged a few decades ago, has served the objectives of profitability and functionality of an organization. It is thus, first and foremost, the tool of a project, a vision, a narrative. And today, the dominant narrative is that of efficiency.

© Rafael Lozano-Hemmer / photo: Antimodular Research



Blow-Up, Shadow Box 4, 2007. Created by Mexican-Canadian multimedia artist Rafael Lozano-Hemmer, this high-resolution interactive display is designed to fragment the view of a surveillance camera into 2400 virtual cameras that zoom into the exhibition space.

Nevertheless, AI is not a tool like any other. If at first it was tactical software entirely sponsored and programmed by humans, it is now entering a second phase where it is gradually gaining autonomy – becoming capable of choosing, by itself, the method that will allow it to achieve a goal. The goal is still set by a human. Tomorrow, yesterday's software will become autonomous AI in every respect, capable of setting its own objectives and means, capable of operating in a network, capable of modifying people's narratives. For better or for worse.

Given this logical and anticipated metamorphosis (which we cannot deny if we maintain this technological momentum), we are tempted to be frightened by AI, even though we still hold the reins. But we have to face major challenges: the transparency of algorithms and databases; the limits and constraints to be set for the machines and services they can provide; the writing of a narrative that AI can serve in the same way we can. The question is probably less technological than ethical, moral and political: what is our future with AI, what narrative will we write?

“ Is everything in the capabilities of these algorithms worth accepting? Anything at all, at any price, in the name of efficiency and profitability? ”

The cyborg solution

A first scenario is the natural extension of the current narrative. In this tale of efficiency, growth and liberalism, humans have no choice but to develop themselves – not to compete, but to co-operate, with the machine. Because the advent of AI raises the question of human employment and skills versus digital skills. In a profitability model, it is highly likely that the vast majority of jobs will be assigned to machines. In order to hold their ground, humans will increase the number of their digital aids and acquire capacities greater than those conferred on them by nature. Thanks to the osmosis between the human and the digital, humans will become more efficient. They will understand faster, decide faster, act faster. These gifts of hyper-awakening and hyper-consciousness are consistent with the current narrative of efficiency.

The cyborgs – very light, very agile, very chameleon-like – will be ready to co-operate actively and on an equal footing with the machine, provided they get closer to it. They will be augmented by the unlimited resources of the digital intelligence network, but at the same time, their quota of humanity will be diminished. Like AI, the cyborg will then become a monster of efficiency and both will be part of the same network that will connect humans and machines without distinction.

This osmosis with AI has many benefits, mainly functional reassurance and operational efficiency. But it raises major issues. What will happen if the power is “cut off”? Who will have access to the cloud? Will we have to agree to be transparent to have access to it? Will we have to pay for it? Will there be a single cloud for everyone? Or a variety of clouds, but of variable quality? Will the cyborg be synonymous with equality or will it mean a socio-economic divide? One thing is certain: once cyborgs have become fully connected, they will no longer own anything, and especially not their skills. They will be users, merely temporary custodians of available services. What will happen then if their rights are cut off?

A new human narrative

These issues are all the more important because if AI is still in the midst of a metamorphosis, this is also the case for humanity. The cyborg solution is part of the narrative of capitalist liberalism. But is this narrative capable of meeting the challenges we face, even as the planet and its resources are being depleted? Aren't we being ordered to invent a new narrative? Especially since with this powerful tool, AI, we would undoubtedly have the means to implement it.

AI is a powerful tool capable of successfully developing an existing model, but disrupting the established order is not in its DNA. Moreover, our current digital transformation efforts do not invent anything, either, and do not change the narrative in any way. Our catchphrase could then be summed up like this: let's stop innovating and start inventing!

Because it is humans that we can trust (once again) to invent. And their convictions and motivation are multiple sources that fuel efforts to resist the current model. To invent is to speak of a faith, a desire, an intention fixed to the body, a certainty. It means talking about meaning before talking about technological achievement or financial aim. Inventiveness often originates in a singular, unique spirit – in the mind of a woman or a man, in their history, wounds or strengths, desires or needs. Let us not forget that the great geniuses of humanity have drawn from their innermost weaknesses (which they sought to overcome, mostly), the obstinacy necessary for their success.

We are talking here about a scenario that no longer has anything to do with cyborgs, and where there is no mention either of rejecting technology as a tool. We are talking about another narrative, which will use AI, but for other purposes, with other constraints and rules of use. We are talking about a strategy that gives pride of place to what makes us human. And without pitting the human against the machine, we must recognize that in this strategy, what was for the cyborg a weakness, becomes a strength.

We are not talking about standardization here. We are not talking about rational logic. We are not talking about causality, prediction, process. We are not talking about a stereotypical model of efficiency. We will not be able to leave this new scenario to the machines. Their overpowering algorithms have neither faith nor conviction; no anarchist or transgressive spirit, and no fierce desire to survive and see their children happier than themselves! Collaboration with the machine can be beneficial, undoubtedly, but it must be better supervised, better controlled and better understood. All this will be possible if we all agree on the narrative it should serve. Let's pick up our pens today!



Sandrine Cathelat (France) is Partner and Research Director of the Netexplo Observatory and **Mathilde Hervieu** (France) is Editorial Project Manager. Founded in 2007 by Martine Bidegain and Thierry Happe, under the patronage of the French Senate and France's Ministry for the Digital Sector (Ministry of Economy and Finance), the Netexplo Observatory studies the global impact of new digital uses on society and businesses.

AI innovations to counter social challenges

Interviews by Shiraz Sidhva

Artificial intelligence (AI) is being harnessed to tackle two of the most challenging problems today – the flagrant proliferation of fake news and the increasing invasion of individual privacy. Factmata, which uses AI to fight disinformation and D-ID, which protects identities from facial recognition systems using AI, were two of the ten winners of the 2019 Netexplo awards, presented at UNESCO Headquarters in April.

Dhruv Ghulati: Fighting fake news

What made you set up an AI startup to tackle fake news? Isn't it a daunting task, like fighting corruption?

Yes, it is. If you want to change the world, rather than simply build a business, you need to think about building enabling technology, where, if it does work, the potential impact on everyone everywhere would be astronomical. By combining AI and the human community, Factmata develops explainable algorithms to solve the problem of online misinformation and build a better-quality media ecosystem.

Factmata's scoring system has the ability to digest every piece of online content, read it intelligently and score it on nine signals – including hate speech, political bias and sexism – to give users a deep understanding of the quality, safety and credibility of any piece of content on the web. It builds these classifications in a fair and explainable manner, by deploying a proprietary network of experts who are most suited to assess any given content in question.

Our goal is to build a new universal ranking system for the quality of online content, to be deployed across ad exchanges [a digital marketplace that facilitates the buying and selling of media advertising inventory from multiple ad networks, often through real-time auctions], browsers, search engines, social networks, and more. This will ensure good quality journalism gets ranked higher and monetized more, and low-credibility, unsafe content gets demonetized.

Dhruv Ghulati, CEO and co-founder of the London-based Factmata and Gil Perry, co-founder and CEO of D-ID, based in Tel Aviv (Israel) and Palo Alto (United States), spoke to the *UNESCO Courier* about their innovations.

What is the difference between Factmata and other software out there – the kind that Facebook uses, for instance?

Our technology has the potential to be more accurate because of the proprietary way in which we use expert communities to help build our software and give us unique training data – which is very difficult and time-consuming to maintain – rather than using existing open datasets out there that everyone else has access to. We've figured out a way we can get that data more cheaply and efficiently than others by making users feel they are part of the process.

Who are your primary users?

Our primary users are members of the public who like to challenge their critical thinking via our tools, and then brands and governments who are trying to ensure either they can monitor people spreading rumours that are really bad for societal health, or spread disinformation that can derail a product launch or campaign.

When it comes to weeding out fake news, would you say an AI is more effective than a human?

No. Humans are way better. But humans don't scale. Algorithms running on lots of hardware can scan millions of content items per second to flag them for fake news. But it would take huge numbers of humans to sift through such large volumes of content, who would need to be replaced before they got tired. Besides, only some humans are more effective than other humans. Hence the key is to combine the right humans with the right AI.

Can hackers and fake news-mongers cheat the AI?

Yes, they will try. But the good thing for us is that every time they cheat it, it becomes harder and harder. Soon, the number of cheaters good enough to beat the system is outweighed by the quality of the system. This is how we dealt with email spam, and in fact most spam/fraud/cybersecurity.

The key thing for us is being able to survive long enough with enough funding to build our core technology, whilst having customers that can sustain us, to be able to look to the future. I believe that with enough hard work and time, we will tackle fake news whilst most might give up.



Work created in Copenhagen, Denmark,
part of the Controlled Lives series
by Italian artist Fabian Albertini.

© Fabian Albertini

everywhere and face recognition that is becoming more accurate and easy to obtain – creates a situation where anyone can identify you, track you, and steal your identity.

Face recognition technology can be used to rank citizens' behaviour or to tell you who around you has a debt with the bank. In some countries, you can take a picture of a random person on the street and use face recognition to find out every last detail about him. These apps have been known to be used to harass minorities and protesters. In the United States and other places, face recognition is used to learn about a customer's age, gender, ethnicity, our satisfaction when we shop, and much more.

In short, I think we should all be concerned about our privacy. Luckily D-ID is here to help.

D-ID's proprietary algorithm combines the most advanced image processing and deep learning techniques [which enable a machine to independently recognize complex concepts such as faces, bodies, etc.] to resynthesize any given photo to a protected version. This is extremely difficult to do, and we believe that we're the only ones today who are capable of providing such a technology.

Do you envisage facing any problems with government agencies, who use a lot of facial recognition technology?

No, we don't. In fact, governments and local legislators are pushing for more privacy regulation, which plays well with our vision.

Who are your main customers? Is it individuals who want to protect their identities?

Currently we sell mostly to businesses. Our customers use our technology to protect the images of their management and employees, and to protect the image databases of their customers.

We also target schools to help teachers and students to post and share images that are privacy-protected. As we advance with our technology, we are looking to be able to offer D-ID to everyone – with on-device solutions for smartphones and cameras, so that every picture we take would be de-identified on creation.



Gil Perry: Making faces unreadable

You were a veteran of the Israel Defense Forces Intelligence Corps' elite 8200 unit. What prompted you to create software that protects identities from facial recognition systems?

A group of us came up with the idea during our military service. At that time, we were very much aware of the risks that face recognition technologies can pose to privacy and identity protection. We were not permitted to post our own photos on social media for that reason. After leaving the army, I decided to dive deeper into the issue. I studied computer vision and image processing and worked in the field for several years. Then, about two and a half years ago, I partnered with Sella Blondheim and Eliran Kota, D-ID's co-founders. Together we started writing one of the most complicated and ground-breaking algorithms to protect photos from face recognition technologies. This algorithm is now the foundation of D-ID.

Our faces are now our passwords, but unlike passwords, we cannot change them so they need to be protected. We have developed an AI technology that makes images unrecognizable to face recognition algorithms, while there are no differences perceptible to the human eye. This allows people to store, share and utilize images and videos without having to worry about their faces being picked up, identified and misused by automated face recognition tools.

How important is it to protect facial recognition, and what are the dangers associated with not using software to mask photos?

Firstly, face recognition is everywhere, and the market is booming. Second, we are surrounded by cameras. There are CCTVs everywhere – on the street, in shops, on the train. And then, we all have smartphones and we use them to take pictures and videos. Lastly, our photos are everywhere, on social media, on our company's servers, in government databases, etc. This combination – surveillance cameras



Our Guest



The spirit of competition and open-mindedness are at the core of the eclecticism of Baku's architecture.

© Will Van Overbeek

Baku:

Multicultural city

Fuad Akhundov,
interviewed by Mila Ibrahimova

Several millennia old, the fortified city of Baku, the capital of Azerbaijan, retains traces of the presence of the Zoroastrian, Sassanian, Arabic, Persian, Shirvani, Ottoman and Russian peoples. The modern city, born from the first oil boom in the late nineteenth and early twentieth centuries, has an equally eclectic cultural heritage. Because of its bay and its proximity to caravan routes, the city has always been crossed by multiple currents. The result is an extraordinary harmonious diversity, reflected both in its architecture and its cosmopolitan spirit.

This article is published to mark the occasion of the 43rd session of the World Heritage Committee, held in Baku, Azerbaijan, from 30 June to 10 July 2019.



© Thomas Marsden

Fuad Akhundov in Baku.

When did Baku become a modern city?

Baku began to become a modern city in 1872, when the Russian tsarist power established what is now called a concession for oil field development. From that moment, known in history as the first oil boom, the city experienced rapid development that resulted in an extraordinary growth of its population – which increased tenfold in the first twenty-five years, then doubled every seven or eight years.

While Baku had 14,500 inhabitants in 1872, it had a population of 215,000 at the beginning of the First World War. Of course, no city can grow at such a speed in a natural way. This demographic growth is due, above all, to immigration, which was attracted by the country's wealth. It should not be forgotten that at the very beginning of the twentieth century, Baku provided more than fifty per cent of the world's crude oil.

That was when a new city began to take shape around the old fortified city, which was several millennia old (a World Heritage Site since 2000). It was planned at the time of the Imperial Russian administration and built thanks to local millionaires, who invested in projects by European architects.

This transformed the city into a real patchwork of cultures.

The oil magnates of Baku were keen to get closer to Europe, and this desire was also reflected in the architecture. They invited renowned architects to the city, who were mainly of Polish descent, among whom were Kazimir Skurevich, Konstantin Borisoglebski, Eugene Skibinski, Jozef Goslawski and Jozef Ploszko.

This new city became so sumptuous that it would be nicknamed the Paris of the Caucasus.

Did turning to the West mean turning away from the past?

In no way were the local oil tycoons trying to erase their past! Quite simply, they were receptive to cultural influences from outside, such as the European spirit that came to them through Russia. But this did not mean that they lost their cultural particularities.

So, for example, the vast majority of the frescoes that I have had the opportunity to see in my life, I found in ancient Azeri houses – although traditionally, they were prohibited by the Islamic religion.



Dmitri Mitrofanov's palace in Baku evokes the imposing appearance of its owner.

An extraordinary interpenetration of cultures took place in Baku, at all levels, including architectural and artistic. For example, Murtuza Mukhtarov, who was a famous drilling wizard, had mosques built in his native suburb of Amirajani near Baku, and in Vladikavkaz (Russia), the hometown of his wife. He later erected a fascinating French Gothic palace for her, which still adorns Baku's downtown.

One detail deserves attention: the imposing shape of this palace takes after the stately image of its owner! Just like the neo-Renaissance palace erected by Dmitri Mitrofanov reflects the sturdy appearance of this other *nouveau riche* (I use this term in its positive sense) man who came from the province of Perm to make his fortune in the oil industry. The same applies to Isa Bey Hadjinski's palace, built on six levels and mixing a variety of styles: from neo-Baroque to neo-Gothic and Modern.

These similarities are so striking, they inspired this verse by the Russian poet Alexander Gorodinsky: "I am there, not knowing where to go, / standing, in the morning wind of Baku, / among its houses so similar to their masters, / from the outside, as from the inside."

To a certain extent, this challenging individuality resulted from the wish of the newly rich Baku elite to outdo each other.



© Courtesy of the National Photo and Cinema Documents Archive, Republic of Azerbaijan and personal archive of Fuad Akhundov

The orders they placed were more or less like this: "I want the same entrance as Taguyev, the same balcony as Mukhtarov, the same dome as Dadachev and the same window, say, as Mitrofanov, and something more of my own inspiration!" From this competition between millionaires, who wanted to impress their competitors, emerged the unusual style of Baku architecture of the late-nineteenth and early-twentieth centuries – which is impossible to classify in any of the known genres of Western architecture.

But who was actually doing the work?

The local craftsmen, of course. The architects were able to take full advantage of the ambitious orders of the Azeri millionaires, equipped with unlimited resources, to enhance the value of stone – the only construction material available in this desert region.

The stonemasons of Baku enjoyed a great reputation at that time. They were said to be born with chisels in their hands! But they did not have knowledge of figurative art, which is forbidden by Islam, according to some interpretations. An Italian sculptor, Antonio Franzi, was brought in to teach them this skill.

Although the architects borrowed motifs from different cultures, their approach was never a 'copy-paste' one. It was perceived through deeply-rooted local traditions and executed in fine local sandstone in quite an impeccable manner. The different influences coexist side by side, so to speak. This gives a special cachet to Baku's architecture, which

reflects the multicultural dimension of its population, from the first oil boom to this very day.

What was the ethnic composition of the city at that time?

At the beginning of the First World War, the majority ethnic groups each represented about a third of the population: thirty-six per cent Russians and thirty-four per cent Azeris, about one third of whom came from Iran. There was also a rich and prosperous Armenian community in Baku, representing nineteen per cent of the population. About four and a half per cent of them were Jewish, followed by Germans, Poles, Georgians, Greeks, Tartars, etc.

The Jewish community enjoyed a tolerant environment in Baku and did not fear persecution. They provided the city with nearly forty per cent of the doctors and more than thirty per cent of the lawyers. The Rothschild, Landau, Cohen and Itskovich families were among them. Together with the Poles and Germans, they constituted Baku's upper middle class.

The Azeris, for their part, were the core of the middle class. They owned eighty-one per cent of the real estate during Baku's oil boom. The billionaire Moussa Naghiyev, for example, who had started as a field worker and ended up as the richest Azeri oil baron, was also one of the local real-estate moghuls. Many of them had grown rich very quickly, without having had the time to obtain any formal education. Often, these first-generation local industrial magnates could barely read or write. One of these

illiterate oil barons was Hadji Zeynalabdin Taghuyev, who nonetheless founded the first secular school for Muslim girls in 1901, and the first European theatre in Baku.

How did these communities relate to each other?

The Azeris in general did not take a negative view of the foreigners who came to settle in the city. This made it possible for the different communities to live together in peace, and even solidarity. Local Muslim millionaires frequently made donations for the shrines of other faiths. For example, for the consecration of the Alexander Nevsky Cathedral in Baku – the largest Orthodox church in the South Caucasus (demolished by the Communists in the 1930s) – Hadji Taguyev donated 10,000 roubles.

The process of Azerbaijan's integration into the Soviet Union started in the early 1920s. What changes did this bring to Baku?

In terms of architecture, the Soviet influence was first felt through a set of landmarks with strong Oriental influence in the 1920s. The Sabunchi train station in Baku is vivid proof of this National Romantic style, conveying the desire of the new Soviet administration to win the hearts of the local population

by turning back to their architectural past. This trend gave way to constructivism in the 1930s, which introduced modern buildings with cubic shapes and flat roofs into the Baku landscape. Many felt that this architecture was a harmonious addition to traditional architecture, of which the flat roof was one of the main features. Thus Baku easily assimilated this novelty, as it had so many others in previous decades.

The Stalinist Empire style of the 1940s and 1950s was heavily impacted by a plethora of architects trained at the Soviet school, such as Mikhail Useinov, Sadik Dadachev, Konstantin Sentshikhin, Elbay Gasimzade and others. They managed to adorn this very heavy and pompous style with elaborate details featuring the Oriental legacy, and thus made the Stalinist era architecture in Baku very site-specific, interpreting it through a local prism.

If you had to summarize the main feature of Baku's architectural heritage in one word, what would you say?

Eclecticism! And I would add immediately: a very site-specific eclecticism that is due to the deeply-rooted local traditions on the one hand, and the spirit of competition and openness on the other. And it is this

openness of spirit which explains, for example, the strange similarity between the flamboyant Gothic Venetian Ca'd'Oro and the sumptuous Ismailiyya palace which Moussa Naghiyev donated to the Muslim Charity Society of Baku, to honour the memory of his son, Ismail.

The "city of winds" well deserves its nickname in the literal sense, but also in the figurative sense of the term – swept as it was by these winds that came from elsewhere, yet, never losing its unique and cosmopolitan identity.



A great lover of Baku, **Fuad Akhundov** is known for his unusual tours of the city, during which he presents each place by juxtaposing his photographs of yesterday and today, using the hundreds of archive photos he carries in his immense portfolio. Akhundov is the author of articles, films and television shows, including *The Baku Secrets*.

Isa Bey Hadjinsky and his palace in Baku.



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Current Affairs

Johannesburg Inner City, 2013, part of a series by South African photographer Graeme Williams, which highlights the country's social polarization.

© Graeme Williams / Agence VU

Mandela's South Africa: Reality or distant dream?

Jody Kollapen, interviewed by Edwin Naidu, South African journalist

Twenty-five years after attaining democracy, South Africa has taken giant strides towards forging a united nation. But overcoming racism and realizing Nelson Mandela's vision of a nation that belongs to all who live in it, remains a wonderful ideal – which still requires a lot of work, according to Justice Jody Kollapen. Both an arbitrator and a victim of racist cases (he was refused a haircut as recently as in October 2003!), this human rights defender maintains that there is enough goodwill to build on Mandela's vision.

Nelson Mandela has left his stamp on the twentieth century. More than that, he has given it a meaning. Human but not all too human, and obsessive in his respect for law and justice, he has succeeded in being a unique individual at the same time as the symbol of a people who recognized themselves in him before they had even chosen him through the democratic channel of the ballot box. In Africa and beyond, in the memory of those who suffer, those whose voices still carry the echo of a wound that has never healed, the voices of those tossed into the mass grave of ordinary massacres or suffocated in a jute sack thrown from an express train, Mandela exemplifies a determination that nothing could crush, a passion that nothing could discourage.

Prison, humiliation, petty harassment and attempts to undermine his morale did not succeed in shaking his conviction that freedom could not be achieved without a struggle. And he had a particular kind of freedom in mind, not one that is deceptively packaged to look attractive, yet is actually full of illusions. In his eyes, freedom is a non-negotiable value, inseparable from dignity and pregnant with responsibility.

Tahar Ben Jelloun,
the *UNESCO Courier*,
November 1995

Twenty-five years after South Africa's hard-won freedom, has the country made progress in the fight against racism?

I think that the answer to that must be yes, simply because the racial divides that characterized South Africa during apartheid were quite stark, suspicions because of race ran deep, and instances of gratuitous violence against black people had almost reached a level of social acceptability. Things have changed dramatically since then. But that does not mean that there aren't any serious instances of racism. The difference is that when these happen, large numbers of South Africans, black and white, are outraged. In addition, there is a legal framework to deal with racism.

Are the legislative measures proposed in the new bill to criminalize acts of racism necessary to promote a united South Africa?

Ideally, we would like to combat racism through voluntary initiatives, appealing to the better sense of people. Historically, most South Africans would agree that in the absence of criminal sanctions, the new laws could be important, giving license to act strongly against those who think they can get away with paying a fine, since no current processes provide for criminal action.

Based on a legal and constitutional framework where we are willing to send someone to jail for stealing a loaf of bread, why, considering the hierarchy of seriousness of the acts, do we not send someone to jail for racist behaviour? You can't be racist and pay your way out of it. The idea is to use the law to deal with extreme cases – one hopes it is used sparingly.

Analysts refer to racism as an unresolved problem, inherited from the past, which the nation has failed to adequately address. What is your view?

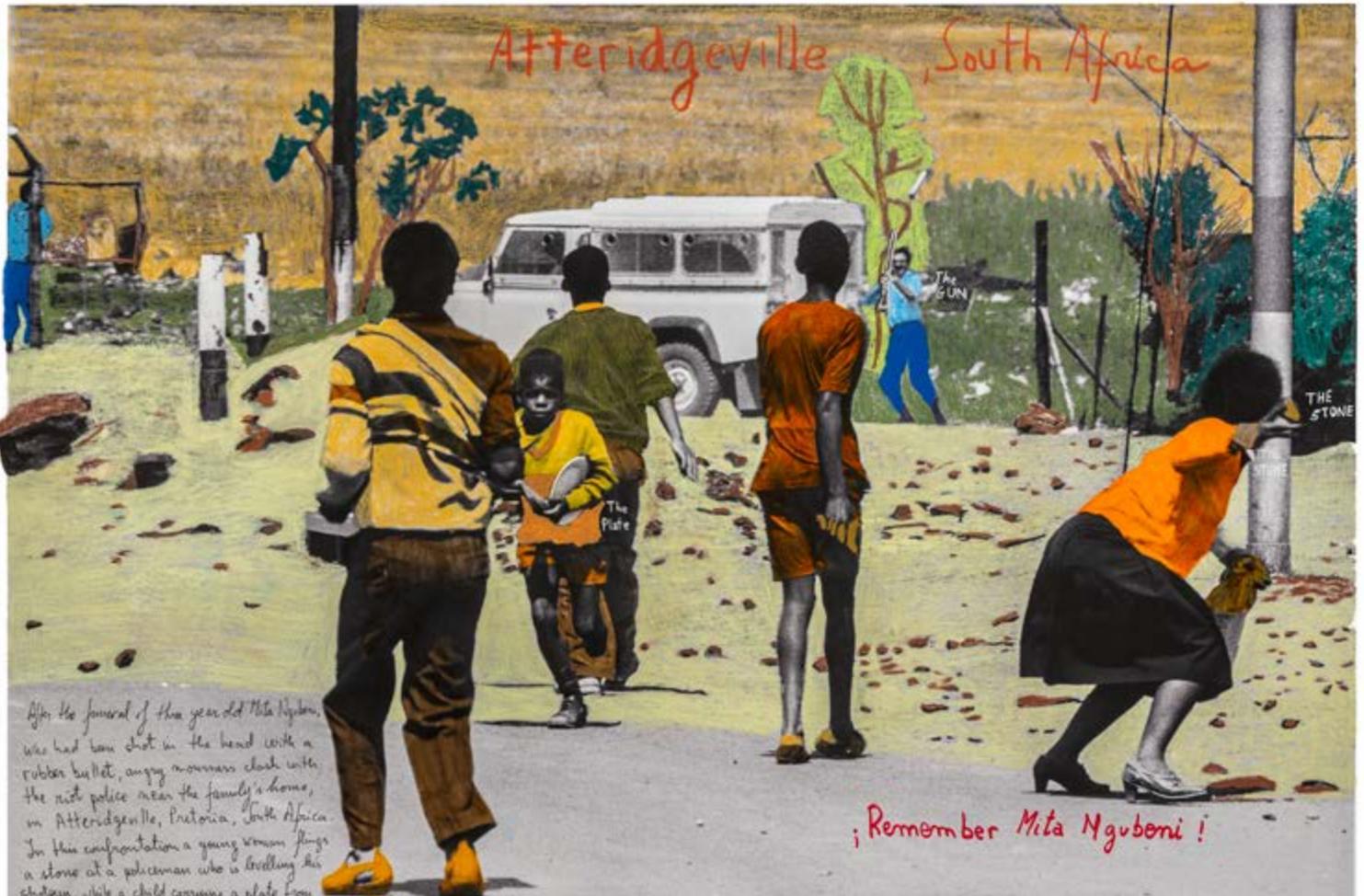
I agree that the Truth and Reconciliation Commission (TRC) has never dealt with the issue of racism. It dealt with crimes of apartheid but not apartheid as a crime. The large majority of South Africans who were victims and perpetrators never appeared before the TRC to talk about racism under apartheid. Sadly, the TRC may have got caught up with the romantic notion of reconciliation without addressing apartheid, discrimination – and the fact that there can be no reconciliation without social and economic transformation. It was a missed opportunity. But I don't think it can be addressed via legislative means.

What must be done to ensure that a sense of unity prevails in South Africa?

As long as South Africa remains the most unequal society in the world, and as long as we trace that back to having its roots in colonialism and apartheid, we are not going to reach that sense of unity. Even if we do not succeed in creating the egalitarian society which some of us wish for, we can certainly achieve a more equal society.

But for that to happen, we need to be mature in the debates on issues such as resources, affirmative action, access to land, and we can't be defensive. If we don't transform society in a meaningful way, that sense of unity may evade us.

Atteridgeville, South Africa



After the funeral of this year-old Mita Nguboni, who had been shot in the head with a rubber bullet, angry mourners clash with the riot police near the family's home, in Atteridgeville, Pretoria, South Africa. In this confrontation a young woman flings a stone at a policeman who is leveling his shotgun, while a child carrying a plate from

Remember Mita Nguboni!

The funeral feast runs away. Two weeks after this clash, Philip Dlamini, another child, was wounded in the leg when a soldier was bitten by the boy's pet dog and he responded with a volley of shots. The dog was killed. A forgotten aspect of South Africa's violent state of emergency was its devastating impact on the country's children. An estimated two thirds of the thousands detained under the State of Emergency were juveniles under 20. Funerals were a key place of resistance and action during the Anti-Apartheid rebellion. This one is in September 1985. Photo by Gideon Mendel - Africa Series. Marcelo Brodsky/Gideon Mendel. 1/2 x 2 1/2

Atteridgeville, a work from *The Stone, the Gun, and the Plate*, the first of a series of collaborative projects by South African photographer Gideon Mendel – who took photos of riots in his country in 1985-1986 – and Argentinian artist Marcelo Brodsky, who is updating them today with colours and words, to narrate history and convey its meaning to new generations.

© Marcelo Brodsky & Gideon Mendel / ARTCO

In the 8 May 2019 elections, some politicians used race as an election tool. What is your opinion on their conduct?

Unfortunately, race continues to define our social and economic order, so it defines the political order as well. It is easy to use the notion of race to stir up anxiety. This is not unique to South Africa – we've seen it in Europe and the United States as well. But given our history, it is easy to evoke feelings of insecurity among people. When people have these feelings, I'm not sure that they are able to make the right electoral choices.

I hope we reach a level of maturity to deal with this. The long-term damage caused by the use of race as a campaign tool may not be quantifiable, but it serves to divide, and runs counter to the argument of the united nation we seek.

In his inaugural speech on 10 May 1994, Nelson Mandela called for reconciliation and an end to racism. Have we made progress towards achieving his vision for South Africa?

We've made considerable progress. Naked acts of racism still occur, but they're not the norm, and attract universal condemnation, which is very good. However, I see a real problem in the fact that there are no anti-racism campaigns in schools, public or private. We have programmes to deal with gender-based violence, xenophobia, etc. but I'm not aware of any campaigns against racism – surely we need these.

According to the Freedom Charter, South Africa belongs to all who live in it. But this remains a wonderful ideal, and we remain far from achieving it. Yes, in some respects we have made progress. Certainly, we are a better society today, we must take solace from that, we're not a society at war with each other, and there remains enough goodwill to build on the vision that Madiba has left us.



An acting Justice of the Constitutional Court of South Africa since July 2017, **Jody Kollapen** has served as a Judge of the High Court of South Africa, in Pretoria, since 2011. He is also the Chairperson of the South African Law Reform Commission. Kollapen served as the head of the South African Human Rights Commission, from 2001 to 2009, prior to his appointment as a judge.

Dmitry Mendeleev:

The teachings of a prophet

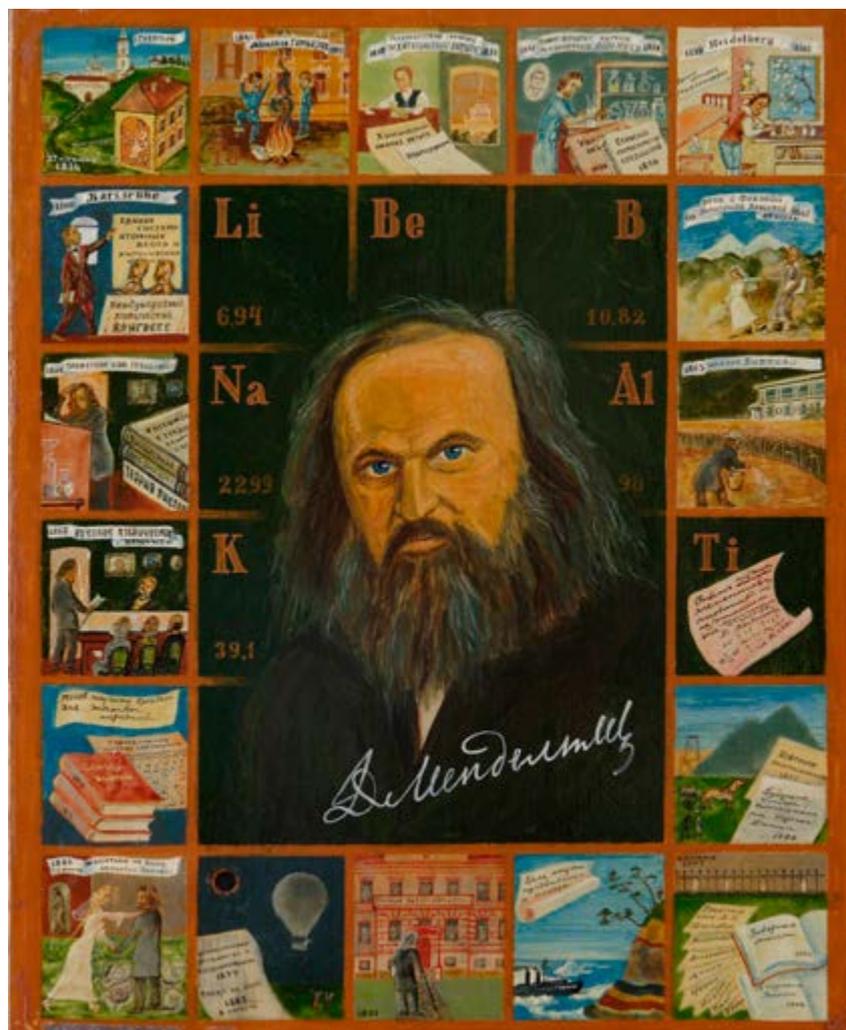
Natalia Tarasova and Dmitry Mustafin

1 March 1869 is the date of a discovery that changed the course of science in the world. On that day, Dmitry Mendeleev completed his work on the periodic table of elements, which would play a fundamental role in the future of chemistry – but also in physics, biology, astronomy and geochemistry. Even more interesting is that he revolutionized the ideas of what is now termed sustainable development.

The United Nations proclaimed 2019 as the International Year of the Periodic Table of Chemical Elements. It marks the 150th anniversary of the publication of the first model of the periodic table in the *Review of the Russian Chemical Society* by the illustrious Russian scientist Dmitry Mendeleev, considered one of the fathers of modern chemistry. At that time, when knowledge of the structure of the atom was largely imprecise, periodic law could only be formulated by a man endowed with an extraordinary predictive power, the intuition of a genius.

Yet, in Mendeleev's bibliography, less than one-tenth of his research is devoted to chemistry. The overwhelming majority of his work concerns other scientific fields, including aeronautics, meteorology, Arctic exploration, ice-breaker design, popular education, the denunciation of spiritualism, legal expertise and economics – to name a few of the issues in which this encyclopaedic mind was interested.

Much of his research was devoted to what we now term sustainable development, the rational management of natural resources and ecology. Although, obviously, these fields of knowledge and academic



© Yuri Konev / The Museum of Nature and Man

A portrait of Dmitry Mendeleev by Yuri Konev, a Russian painter from the second half of the twentieth century.

disciplines did not exist at the time, the scientist perceived the need to prevent the excessive exploitation of natural resources – to inform people about the exhaustibility of minerals, and to call for the parsimonious consumption of oil, water and coal. Mendeleev stressed the need to focus on coal gasification and to change the methods of extracting and transporting oil. He advocated the respectful use of the soil in order to improve its fertility. He reflected on the modernization of Russia.

Mendeleev was fiercely critical of what we now call oligarchy and corruption. He believed that any possibility of a monopoly of natural resources should be eradicated. But these warnings were not heeded either at the time or in the twentieth century, when Russia privatized its oil and mining deposits. In the nineteenth century, the powerful oil and coal oligarchy fought an implacable and victorious battle against Mendeleev, to prove that he was not a great scientist.

Even the members of the St. Petersburg Academy of Sciences eventually chose Fedor Beilstein (whom only a few specialists can remember today) over Mendeleev when they had to elect a new colleague to their institution. They cited the modest amount of research Mendeleev had carried out in the field of chemistry.

No one is a prophet in his own land! Mendeleev is no exception. Even so, his prophecies about natural resources management – and sustainable development in general – are just as important as the periodic law and the periodic table of elements, which raised his name to the ranks of the most famous Russian scholars.

The International Year 2019, and the worldwide recognition of the periodic table of elements, underline once again the need to develop systems in our chaotic world. After all, it is systems that allow us to understand the very idea of regularity and give us the predictive capacity to meet the challenges of sustainable development.



Co-chair of the International Year of the Periodic Table of the Elements Inter-union Management Committee, Russian scientist **Natalia Tarasova** is director of the Institute of Chemistry and Problems of Sustainable Development at the D. Mendeleev University of Chemical Technology of Russia. She is one of the pioneers of sustainable development research in Russia.

A Russian chemist and professor at the D. Mendeleev University of Chemical Technology of Russia, **Dmitry Mustafin** is an author, presenter, scientific editor and guest expert on numerous television programmes and films for the general public.

A little history

Excerpts from “That chart on the laboratory wall”, an article published in the *UNESCO Courier*, June 1971.

The formulation of the periodic law marked the passing of the study of chemistry from almost medieval trial-and-error methods to a modern science capable of predicting elements not yet seen, heard, touched or smelled by man. The coherent arrangement of the elements by Dmitry Mendeleev crowned the efforts of men of science in many countries, to discover a meaningful system in the properties of these basic substances.

Mendeleev’s idea was to be virtually a quantum jump from the simple table laid out in the eighteenth century by the French chemist Antoine Lavoisier, who had included, besides physical elements, what he called “imponderable fluids” – such as light, or the energy derived from heat.

Although a far cry from Mendeleev’s rigorously logical approach, Lavoisier’s effort succeeded in conditioning other scientists to reject the theory of phlogiston. This was the ancient chemical concept, dating from early Greek civilization, that fire in its various forms was a physical or material component of nature.

Lavoisier’s analysis was improved upon in 1803 by the British chemist John Dalton and his atomic theory, which attributed a distinctive atomic “weight” to each of the twenty-three elements recognized by Lavoisier. Characteristics such as this and the “equivalent weight” concept of another British scientist, William Wollaston, paved the way for other chemists who have subsequently been able to perceive a cohesive order among all the elements found in nature.

But until Mendeleev’s time, even notions of what constituted an element were vague and subject to individual interpretation.

By 1850, an additional thirty elements had been recognized, bringing the total known to somewhat more than sixty, and novel forms of classifying the elements were proposed, which were all steps in the right direction. But some men of learning considered them as little better than mental games, and viewed the correlation of properties of the elements grouped in triads, octaves or along a telluric spiral as nothing more than happenstance – and therefore little better than superficial analogy.

Even as the English chemist John Newlands was presenting a paper on his “law of octaves” before Britain’s prestigious Chemical Society, he was asked, ironically, if it would not be possible to obtain the same results by arranging the elements in their alphabetical order!

Mendeleev’s contribution

What, then, was Mendeleev’s theory all about? Briefly, he proposed arranging the elements in lines and columns (also called “periods” and “groups”) inside a rectangle, with their atomic weights rising in number from left to right along the same line, one line following the other down the page.

The columns were determined by elements possessing analogous properties, in the same way that an oxide was formed, for example. The fewest atoms of an element (R) combining with the fewest of oxygen (O) would appear in the first column, augmenting in combining proportions towards the seventh column.

Mendeleev knew from the outset that he had developed a scientific device to lay out the chemical elements in a convenient system. More than that, he realized he had discovered an objective, natural law. Yet, just as Newton had been popularly said to understand universal gravitation when struck on the head by a falling apple, or Watt realized that a boiling kettle could be transformed into the steam engine, there were still those who thought that Mendeleev had come upon the periodic law as the result of a dream.

Man tends to overlook that while scientific truth may suddenly strike one man’s mind as a flash of lightning, that same scientist may have spent years of arduous research on his subject. Indeed, it was Pasteur who later commented that “chance favours only the prepared mind”. If we take a look at Mendeleev’s activities before 1869, it becomes fairly clear that the emergence of the periodic table was no mere accident.

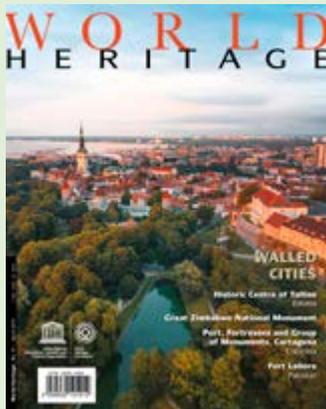
Guenrij Teterin (Ukraine) and Claire Terlon (France), specialists in physics and authors of many popular science articles



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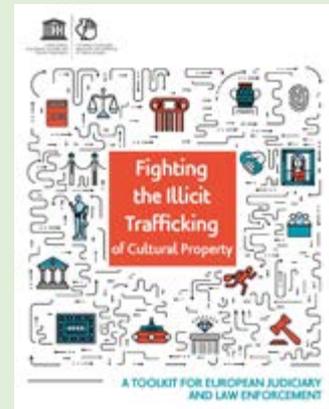
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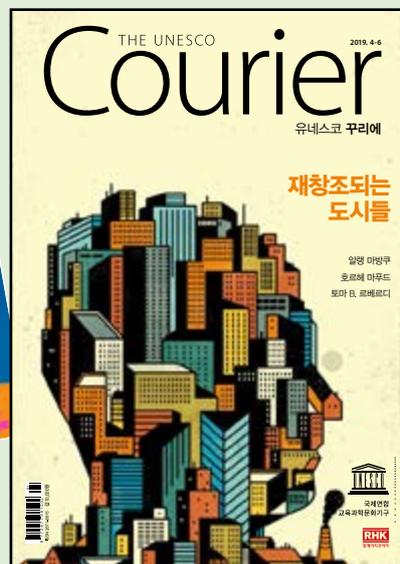
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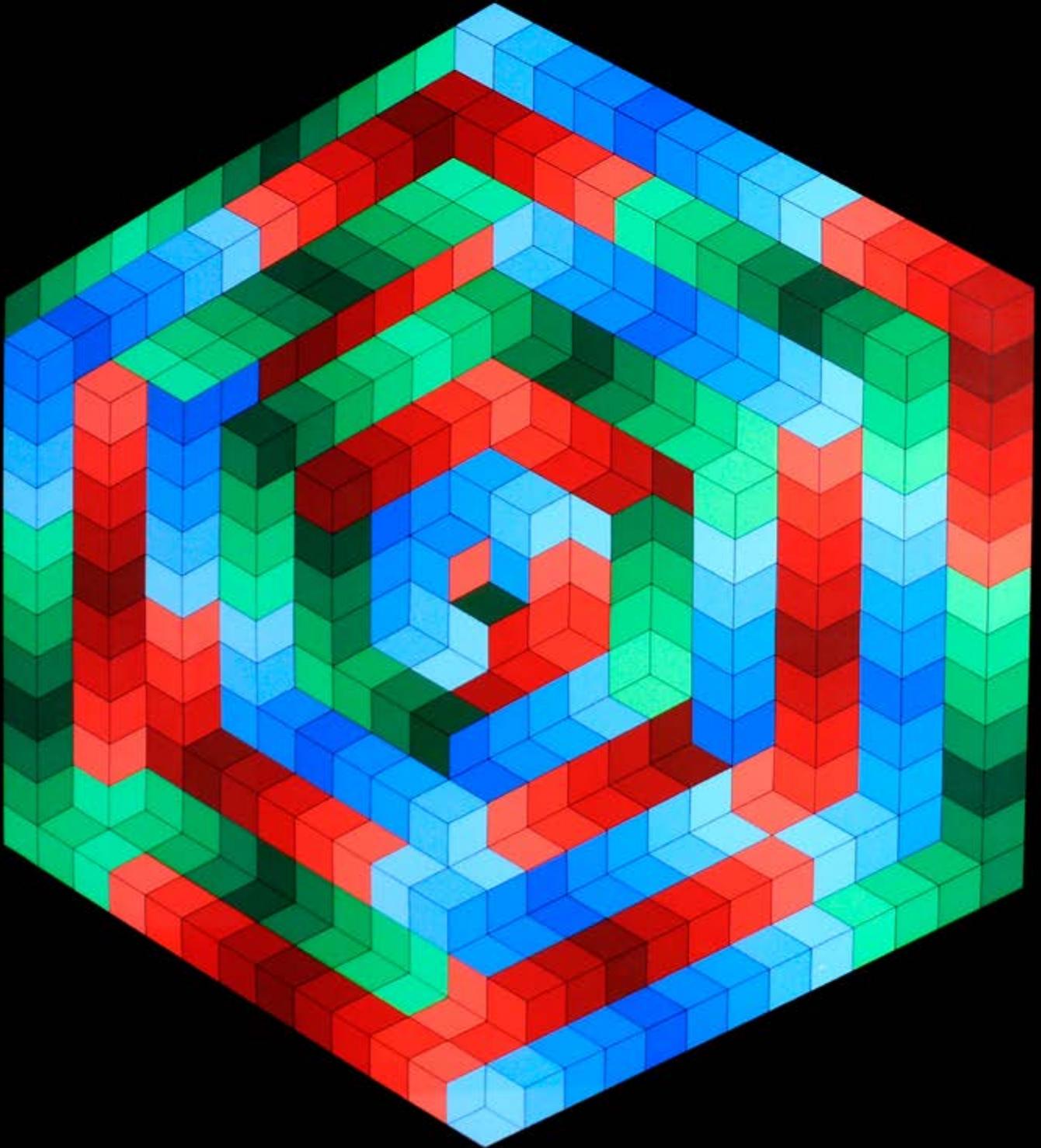
**Many voices,
one world**



The Courier welcomes the Korean language!

With its April-June 2019 issue, the *UNESCO Courier* has been enriched with a new language: Korean. Officially launched on 4 March 2019 at the offices of the Korean National Commission for UNESCO in Seoul, this is a joint publication with Random House Korea. The *Courier* had previously been published in Korean from August 1978 to December 1996, when the journal was a monthly. Relunched in April 2017, the *Courier* is now a quarterly, published online and in PDF format, and with a limited number of copies in print. Korean has become the tenth language in which it is now published.

Discover the *Courier* in Arabic, Chinese, English, Esperanto, French, Korean, Portuguese, Russian, Sicilian and Spanish on our website: <https://en.unesco.org/courier>



Composition, by Victor Vasarely, the Hungarian-French artist who is widely known as the father of the Op Art movement. This serigraph has been part of UNESCO's Works of Art Collection since 1985.

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