**The ecological polycrisis, artificial intelligence and common goods**

**Gaël Giraud SJ, CNRS, Forum St-Michel, Centre Avec**

**1. The severity of the climate crisis and resource scarcity**

The current climate crisis is reaching unprecedented levels of severity. In 2021, insurance experts at Swiss Re issued a stark warning: if we do not meet the Paris Agreement targets, the global economy could be 10 to 18% smaller by 2050 compared to a scenario without climate change. In other words, uncontrolled global warming would have a colossal economic cost, with a loss of growth equivalent to several global financial crises combined. Under the status quo scenario – i.e. if emissions continue at the current rate – Swiss Re models predict warming of around +3.2°C by mid-century, which would lead to an ~18% drop in global GDP compared to a world without warming. Even under more moderate trajectories (around +2.5°C), global wealth would still decline by 11-14% by 2050. These figures give a measure of the existential threat: it is not just about the environment, but also about a global economic and social shock.

Beyond the economy, global warming risks making certain regions simply uninhabitable for humans within a few decades. Recent studies supported by NASA project that by 2050, areas such as South Asia, the Persian Gulf and the Red Sea region could regularly experience lethal heat and humidity conditions – wet-bulb temperatures exceeding 35°C, the threshold beyond which the human body can no longer cool itself. If emissions continue at their current rate, by 2065-2070 these unbearable heat waves will spread to other densely populated regions such as eastern China, parts of Southeast Asia, the Sahel and even central Brazil. In short, parts of the globe that are currently home to hundreds of millions of people could become virtually uninhabitable in summer by the middle of the century, causing massive migration and unprecedented humanitarian crises.

This climate crisis is closely linked to other ecological shortages and destabilisations, forming an environmental ‘polycrisis’. For example, rising temperatures and poor resource management are leading to a severe shortage of drinking water in many regions. Already today, more than 2 billion people do not have permanent access to safe water. Droughts are intensifying and threatening food production. A report commissioned by the Pentagon has even warned that by the 2030s, the United States could face severe water and electricity shortages, with cascading consequences: massive blackouts, epidemics, thirst, famine and armed conflict. This report by the U.S. Army War College (2019) envisions a near future in which, without action, electricity grids would be overwhelmed by extreme heat waves, access to water and food would become critical, and even the US military would see its operational capacity crippled by the effects of climate change. In France and Europe, recent summers have already given us a taste of these water tensions: dry groundwater tables, usage restrictions, conflicts of use between farmers, industrialists and citizens. Water stress is no longer a distant scenario; it is already happening and will worsen as a result of the disruption of the water cycle.

At the same time, we have to deal with the increasing scarcity of mineral and energy resources. Humanity currently extracts around 70 billion tonnes of materials per year from the lithosphere – an unprecedented level in history. This exponential rate of extraction is depleting the most accessible deposits and raises questions about the sustainability of supply in the medium term. For example, critical metals (lithium, cobalt, rare earths, etc.) that are essential for the energy transition are present in finite quantities and concentrated in a few countries; demand for them is skyrocketing and could exceed production capacity within a few decades. Even abundant resources such as copper, nickel and phosphorus are showing signs of strain: declining ore grades, rising extraction costs, severe environmental impacts (deforestation, pollution) and geopolitical rivalries for control of these raw materials. Dependence on imports is an Achilles heel for regions such as Europe, which is a net importer of most industrial metals. This scarcity of minerals is exacerbating the climate crisis: on the one hand, it complicates the deployment of low-carbon technologies (solar panels, wind turbines, batteries) due to the lack of unlimited cheap materials, and on the other hand, it could provoke new conflicts or international power struggles over access to strategic minerals.

Finally, it is important to highlight an often overlooked issue: the planet's limited biocapacity in the face of increasingly heavy human exploitation. Human activity diverts around 30 to 40% of the net primary production of terrestrial ecosystems for its own needs (food, wood, biomass). In other words, of the plant energy produced by photosynthesis each year on Earth, one third is captured by our species. This overall figure masks significant regional disparities: some sparsely populated rural areas consume only a fraction of their local biological production, while other densely populated regions consume several times what their immediate environment produces in biomass. For example, large cities or countries such as Japan, the Arabian Peninsula and certain European nations do not have enough fertile land or forests to meet their needs for food, fibre, timber or biofuels. They are therefore heavily dependent on international trade in biomass – imports of agricultural commodities, fodder, wood, etc.

This interdependence creates vulnerability: if the climate alters global agricultural yields (droughts, heat waves, crop diseases) or if major exporting countries reduce their sales to protect themselves (as we have seen during certain food crises), importing regions will be hit hard by shortages. The ecological footprint is so uneven between countries that today we would need the equivalent of 1.7 planets to sustainably provide the resources that humanity consumes each year. Of course, we only have one Earth: the consequence is the overexploitation of ecosystems, the accelerated disappearance of species, and the degradation of soils and oceans – all phenomena that interact with the climate to form a global ecological crisis.

In short, the climate crisis does not come alone: it is intertwined with a water crisis, a mineral resource crisis and unsustainable pressure on ecosystems. This ‘nexus’ of problems multiplies systemic risks. However, solutions do exist to change these trajectories: this requires profound transformations of our energy and economic models, as we will see with the transition to net-zero carbon, followed by a re-examination of our technological and global governance approaches.

**2. Road to Net Zero: how to finance and achieve net carbon neutrality in Europe**

Given the scale of the climate crisis described above, the question that arises is: how can we act in time and on a large scale to avoid the worst? A recent report entitled ‘Road to Net Zero’ by the Rousseau Institute provides concrete answers. This in-depth study, published in early 2024, outlines a path for Europe to achieve carbon neutrality by 2050. It identifies the levers for action, the necessary investments, the governance changes and the sectoral trajectories to achieve this.

The report's central finding is clear: if we hope to meet our climate targets, we need to invest much more, and we need to do so immediately. In concrete terms, Europe will have to mobilise the equivalent of 2.3% of its additional GDP each year in green investments to decarbonise its economy. This figure represents approximately €510 billion per year in additional public investment compared to current trends (9). In other words, the level of current green public investment in Europe would need to be doubled. This may seem enormous, but let's put it into context: €510 billion per year is about half of what the European Union spent in 2022 on importing oil, gas and coal. It is also less than the amounts spent on post-Covid recovery plans or fossil fuel subsidies over the last decade. In short, the financial effort is significant but entirely achievable when compared to other recent exceptional expenditures. Above all, this effort would be a profitable investment in the medium term: the report emphasises that investing in the ecological transition is ‘a rational economic choice’, with benefits in terms of local jobs, reduced energy bills and strategic independence that far outweigh the costs involved.

What are the priority green investments to be made? The study involved more than 150 experts (economists, engineers, urban planners, etc.) from across Europe, who examined 37 decarbonisation levers and more than 70 possible public policies. Seven major EU countries (France, Germany, Italy, Spain, the Netherlands, Poland and Sweden), representing 75% of European emissions, were studied in detail in order to understand national specificities. This colossal undertaking has identified several key areas for action to transform our energy and production systems:

• Massively renovate buildings to improve energy efficiency. Thermal insulation, replacing fossil fuel heating systems with heat pumps or renewable heating networks, and constructing low-energy buildings are crucial levers, as heating and air conditioning in buildings account for a significant proportion of emissions. The report emphasises the need for a Europe-wide thermal renovation programme, which would create many jobs in the construction industry and reduce household energy bills.

• Decarbonise transport by accelerating the transition to clean mobility. This involves developing public transport (trains, trams, electric buses), supporting the electrification of the vehicle fleet (electric vehicles powered by green electricity), and designing cities to promote soft mobility (cycling, walking) rather than polluting private cars. Investments in rail and public transport are doubly beneficial: they reduce CO2 emissions and improve air quality and quality of life in cities.

• Deploy renewable energies and electrical infrastructure at a much faster pace. Achieving net zero means virtually eliminating fossil fuels from the energy mix by 2050. This means building massive solar and wind energy capacity, both onshore and offshore, modernising and expanding electricity grids (high-voltage lines, European interconnections, smart grids) to integrate these variable sources, investing in electricity storage (batteries, green hydrogen) and perhaps in new nuclear capacity where relevant. Road to Net Zero quantifies these needs and shows that they are technically feasible, but require the removal of administrative barriers (faster permits for renewables, long-term planning).

• Transform industry and agriculture towards low-carbon processes. For heavy industry (steel, cement, chemicals), this involves adopting new technologies: using green hydrogen instead of coal in steelmaking, CO2 capture and storage for processes with unavoidable emissions, increased recycling of materials to reduce primary production, and electrification of processes wherever possible. Agriculture will also have to evolve: better practices for storing carbon in soils, reduction of fossil nitrogen fertilisers, methanisation of organic waste, modification of diets (less meat) in order to reduce pressure on land and livestock. These changes require investment in R&D, equipment and training, which the report quantifies country by country.

Naturally, financing and coordinating such a transformation requires significant changes in governance. The Rousseau Institute emphasises the need to adapt the European budgetary and regulatory framework. For example, current rules limiting public deficits should not prevent states from investing in the transition: it is proposed that green investment expenditure be excluded from the calculation of deficits in European treaties. This would give governments the leeway to finance green infrastructure without violating accounting rules. Similarly, the report suggests creating or strengthening dedicated institutions (public green investment banks, European climate funds) to channel savings towards transition projects. Planning-based governance is highlighted: rather than relying solely on market signals, a piloted strategy is needed, with binding targets by sector, annual progress monitoring and coordination between Member States. The success of the transition also requires the involvement of citizens and local authorities: local mobility plans, support for households in renovating their homes, retraining workers in the fossil fuel sector for green jobs, etc. It is as much a project for society as it is for infrastructure.

In terms of trajectory, the Road to Net Zero scenario would enable Europe to comply with the Paris Agreement. Greenhouse gas emissions would follow a rapid downward curve: -55% by 2030 (in line with the European Green Deal), then net neutrality by 2050. The report insists on maintaining this ambition and even exceeding it if possible, because every fraction of a degree counts. It also details the collateral benefits: between now and 2030 and 2040, massive green investments could create hundreds of thousands of jobs in industry and construction, boost the European economy through innovation, and drastically reduce the EU's dependence on fossil fuel imports. Guillaume Kerlero (project director) sums up the choice before us as follows: "Either we fail to meet our climate targets and continue to spend twice as much money on fossil fuel imports, paving the way for a very uncertain future. Or we choose responsible planning, which will create hundreds of thousands of local jobs, improve our sovereignty and trade balance, and boost Europeans' purchasing power.” In other words, the ecological transition, far from being an economic burden, is more like an investment in the future: the costs of inaction would be much higher than those of action, and the positive benefits would be numerous if we give ourselves the means to achieve it.

To conclude this section, let us remember that the Road to Net Zero report gives us an optimistic but demanding roadmap. Optimistic, because it demonstrates that carbon neutrality in Europe is technically and financially achievable, with net benefits for society. Demanding, because it requires a significant investment effort now, political courage to reform the rules and plan for the long term, and the mobilisation of all stakeholders (government, businesses, citizens) around this transformation. What is being proposed is a genuine European Green New Deal. Given the severity of the climate crisis outlined in the first part, such a planned leap forward seems not only desirable but essential.

**3. Generative artificial intelligence: false miracles and real risks**

Changing our infrastructure and investments is one part of the response to the polycrisis, but what about technology itself, and in particular artificial intelligence (AI), on which many are pinning high hopes? AI is often presented as a major lever for transformation – we imagine it optimising energy networks, inventing new solutions, etc. However, we must take a critical look at the limitations of current AI, in particular so-called ‘learning’ AI based on artificial neural networks. This technology, while powerful for certain tasks, is neither magical nor truly ‘intelligent’ in the human sense of the term. We will see why neural networks do not think, how they manage to function despite their training being based on fragile mathematical foundations, and what risks arise from the uncontrolled growth of recent generative models.

First, let's dispel a common misconception: no, current AI does not ‘understand’ the world as we do. It is not autonomous intelligence endowed with consciousness or general reasoning, but extremely sophisticated statistical approximation algorithms. An artificial neural network, such as those behind chatbots or machine vision, is ultimately just a gigantic mathematical formula adjusted to reproduce correlations present in its training data. It has no common sense, no capacity for abstract reasoning, no purpose of its own. Hence the numerous examples of chatbots giving irrelevant answers, autonomous cars thrown off course by a simple plastic bag mistaken for an obstacle, or AI generating convincing absurdities. One developer provocatively said: ‘The term artificial intelligence is far too marketing-oriented... This device is just a big dictionary: it selects an action based on a statistic it has learned, but it is never taught any meaning’. We also often hear: ‘Chatbots are not intelligent, they are stupid because they do not reason’. Indeed, these systems manipulate data, words or pixels without ‘knowing’ what they represent. They do not have the cognitive adaptability of a human being: when faced with a completely new situation, AI has to start from scratch and test millions of configurations, whereas a human being will use their imagination and experience to adapt in a few attempts and formulate an interpretation.

If current AI is not intelligent because it does not interpret anything, how does it nevertheless achieve impressive performance in certain tasks (image recognition, machine translation, video games, etc.)? This is due to a combination of two ingredients: on the one hand, mathematical theorems that guarantee that a sufficiently large neural network can approximate any function (this is the universal approximation theorem – basically, a network can always adjust to the data); and secondly, an empirical training method called stochastic gradient descent (SGD), which allows the network's billions of parameters to be adjusted to minimise errors made on known examples. Without going into technical details, we can simplify by saying that the algorithm starts with an initial ‘random’ network, makes it make errors on a large data set, and gradually corrects the parameters in the ‘right direction’ (the gradient that reduces the error). Repeated millions of times, this process eventually produces a model that works correctly on the training data... and often quite well on new data. The most surprising thing is that this gradient descent method works even though the problem to be solved is not at all ‘convex’, i.e. there is no single correct solution to be reached, but billions of possible configurations with local traps. In optimisation theory, stochastic gradient descent on a non-convex terrain may never converge or fall into a bad local minimum. However, in practice, we find that with very large networks and certain tricks, the algorithm almost always converges to a satisfactory solution, as if by magic. The researchers themselves admit that they do not fully understand this phenomenon: ‘It is quite surprising that, although the objective function of a neural network is non-convex, gradient descent still manages to find a global minimum’. In short, we don't really know why our deep learning recipes work so well – we just know how to make them work, through experience and trial and error. This poses a scientific problem (lack of formal guarantees) and a practical problem (difficulty in anticipating AI failures). We have seen this, for example, with neural networks that, overnight, ‘hallucinate’ things that do not exist or adopt bizarre behaviours without us knowing exactly what internal configuration is causing them. Current AI is therefore powerful, but opaque and sometimes capricious in its functioning.

These intrinsic limitations of neural networks lead to new risks, particularly with the recent rise of generative models (such as GPT-type image or text creation AI). One of these risks is the uncontrolled spread of these models within their own data ecosystem – a phenomenon that some researchers have dubbed ‘algorithmic madness’ by analogy with a form of runaway behaviour. What does this mean? Essentially, it means that AI outputs are beginning to pollute the data available online, which is itself used to train the next generation of models. In other words, AI is increasingly feeding on its own outputs, a bit like a snake biting its own tail – or, to use a more vivid image, like a cow being forced to eat animal meal from other cows, which caused mad cow disease. Current language models, for example, have been trained on huge corpora consisting mainly of human texts. But today, a growing portion of the text published on the Internet is already produced by AI. If we continue to train future models on this data in a loop, we risk a collapse in quality: the model learns from biased artificial productions, gradually forgets reality and ends up delusional. Specialists call this model collapse: ‘a degenerative process in which the data generated by the models pollute the training set for the next generation. Trained on this corrupted data, the models come to misperceive reality’. In practice, it has been mathematically shown that if AI is fed only with text or images produced by other AI, over generations it loses information, its repertoire becomes impoverished (it falls into extreme stereotypes) and may even diverge towards incoherent outputs. Engineers have described this phenomenon with images: a generative AI that retrains itself in a loop on its own images ends up producing nothing but formless noise. For texts, this translates into increasingly irrelevant and erroneous responses. This is not science fiction: we are already seeing signs that this is beginning to happen. An article in Futurism reported that with the explosion of ChatGPT and its ilk, ‘AI models are showing signs of spinning out of control as they gobble up AI-generated data—a form of cannibalism that could threaten the entire industry’. Even attempts to avoid this problem (such as connecting AI directly to the Internet to supplement their knowledge) are hampered by the fact that the Internet itself is filling up with low-quality, automatically generated content. In short, AI risks going round in circles in its own data soup, which would pose serious reliability problems in the future.

Another danger associated with uncontrolled generative models is their large-scale propagation of errors or biases. AI can produce very convincing text, including false statements. If this content is disseminated on a massive scale (on social media, for example) and then picked up by others, we could see an epidemic of machine-fuelled misinformation. We have seen this recently: models have fabricated articles citing false references, doctored images showing events that never took place, etc. When these outputs are consumed by uninformed humans or other algorithms, they can lead to erroneous decisions. Since models have no moral sense or understanding of context, they can also generate toxic or dangerous content (hate speech, incitement to violence, illegal instructions) if pushed to do so. Although safeguards exist, they are far from foolproof. In short, as AI becomes more widespread, we are seeing a dilution of the reliability of information and the possibility of uncontrolled snowball effects (algorithmic feedback loops). Some observers compare this to a form of madness: the algorithm takes its own reflection as reality and locks itself into it, potentially dragging society along in its wake if there is no human intervention to correct the course.

Ultimately, this third part invites us to temper our enthusiasm for AI. Neural networks perform remarkably well in their training domain, but they do not reason and remain vulnerable to grotesque errors. Their empirical success is something of a mathematical mystery (it is not clear why the solutions obtained are so good despite the non-convexity of the problem). And the recent rise of generative models poses new control challenges: the risk of losing touch with reality (models that go off the rails), and the risk of negative societal impact (automated disinformation, amplified biases, etc.). Far be it from me to reject AI – it also offers tremendous potential – but it must be put in its proper place: a powerful but limited tool, to be used with caution, and certainly not an omniscient intelligence that will spontaneously solve our crises. On the contrary, if poorly managed, it could exacerbate them (through its energy consumption, the concentration of power it implies, or its perverse effects on information). That is why the last part of this presentation will not focus on yet another technofix, but on a more systemic approach to overcoming the crisis: that of common goods and cooperation at all levels.

**4. The commons: a structural response to the polycrisis (from local to global)**

To address the intertwined challenges – climate, biodiversity, resources, inequalities, technology – some thinkers advocate relying on the concept of the commons. This approach aims to manage resources and infrastructure collectively and sustainably, neither through the free market (individual profit logic) nor through strict state control, but through cooperation between the communities concerned, with shared rules. In this fourth part, by way of introduction, we will see how the commons can provide structural solutions to the polycrisis by activating solidarity and sustainable management on three scales: micro (local communities), meso (regions, nations) and macro (global commons). We will draw on the work of Elinor Ostrom, a pioneer in the study of the commons, as well as concrete examples ranging from local forests to the governance of oceans, space and global health.

Elinor Ostrom, the first woman to receive the Nobel Prize in Economics (2009), devoted her career to studying communities around the world that successfully manage shared resources in a sustainable manner: fisheries, irrigation systems, forests, pastures, etc. She showed that, contrary to popular belief (the ‘tragedy of the commons’ where each user overexploits the common good to the point of destruction), many societies have developed effective self-governance rules to preserve these resources for generations. Ostrom identified eight key principles that are found in viable commons. In simple terms, these principles are: (1) clearly defining the boundaries of the commons and the community of authorised users, (2) adapt the rules of use to local conditions, (3) involve users in the development of rules, (4) monitor the use of the resource (through guards, collective self-discipline), (5) apply gradual sanctions in the event of abuse, (6) provide mechanisms for resolving local conflicts, (7) guarantee the autonomy of the community vis-à-vis external authorities (legal recognition of local rules) and (8) coordinate governance with other levels (networking of several commons, or links with the state). Ostrom illustrated these principles with concrete examples: for example, fishing villages that define who has the right to fish and where, adapt fishing techniques to the season and monitor that everyone respects quotas; or irrigation communities that meet to decide on water rotations, collectively maintain canals, and punish free riders with kindness but firmness. Far from the stereotype of the ‘communist commons’ without rules, we see that commons operate with strong internal organisation and a sense of shared responsibility.

What can these ideas of commons bring to our global polycrisis? First, at the micro level, reviving local commons can strengthen the resilience of our societies. Numerous initiatives are already emerging: urban farming cooperatives, short food supply chains, renewable energy cooperatives where citizens produce and manage their green electricity together, open-source digital commons to create collaborative IT tools (Linux, Wikipedia, etc.), local currencies, citizen-run water utilities, and more. These bottom-up experiences show that by directly involving users and residents, we often achieve more sustainable and equitable management. For example, forests managed jointly by indigenous communities often have lower deforestation rates than those concessioned to private companies. Local commons also make it possible to experiment with innovative solutions in real-world contexts and then disseminate them. This is a way of rebuilding social ties around concrete projects, which is crucial at a time when the polycrisis can tend to polarise or discourage citizens. This is known as commoning: the act of ‘doing common’, i.e. organising collectively to take care of a resource or a need. Commoning gives people back the power to act on issues that directly affect them (their food, their energy, their living environment).

Then, at the meso (regional, national) level, the commons approach can inspire more participatory and transparent governance. For example, a state can officially recognise a commons and support its functioning rather than ignoring or replacing it. We are seeing the emergence of the idea of ‘urban commons’: cities that give residents participatory budgets for the management of parks, gardens and shared facilities, or that create data commons (open urban data managed collectively to improve services). Some local authorities are also experimenting with trusts or common land funds to remove land from speculation and make it available for sustainable agriculture or social housing projects. At the national level, we can imagine the state acting as a guarantor of the commons: for example, recognising water or biodiversity as the nation's common heritage, access to which must be preserved for all, and delegating part of its management to local multi-stakeholder assemblies (citizens, associations, scientists, etc.). This ties in with the notion of ‘rights of nature’: treating certain critical ecosystems as entities to be collectively protected, and not simply as commodities. In the energy transition, it is often recommended that citizens be more involved in projects (through renewable energy cooperatives, for example) so that they are both beneficiaries and guarantors of the common resource that is clean energy.

Finally – and this is perhaps the most important point in the context of the global crisis – we need to think about common goods on a global (macro) scale. The climate, for example, is a typical global common good: the stability of the climate system concerns everyone, and no one person or group has ownership of it. Similarly, oceans beyond national jurisdictions, outer space, the high seas, Antarctica, and even scientific knowledge and global health can be considered planetary commons. Recent history shows attempts to manage them as such. As early as the 1970s, the UN introduced the principle of the ‘common heritage of mankind’ into international law. For example, the UN Convention on the Law of the Sea states that the international seabed (the deep ocean outside territorial waters) and its mineral resources ‘are the common heritage of mankind’. This means that no state can claim exclusive ownership of these resources, and that their exploitation – if it takes place – must be carried out in such a way as to share the benefits equitably and preserve the marine ecosystem. The same idea is found in the 1967 Outer Space Treaty, which stipulates that space, including the Moon and celestial bodies, belongs to no one and must be used for the benefit of all peoples. Admittedly, practical implementation remains complex (as shown by the current debates on the regulation of future deep-sea metal mining and the commercial exploitation of space), but the legal framework sets out an ideal of global common management rather than a race to be first come, first served.

Another example of a global commons under construction is global public health. The Covid-19 pandemic has dramatically illustrated the extent to which health is interconnected on a global scale, and that it would be logical to consider it a common good of humanity – with obligations to cooperate and share. Instead, we have seen uncooperative behaviour (vaccine nationalism, patents blocking access to vaccines for poor countries, etc.). Voices have been raised to propose making essential vaccines and medicines global public goods, freely accessible through shared intellectual property mechanisms or international purchasing funds. The COVAX initiative was a step in this direction, but it was incomplete. Nevertheless, there are organisations that embody the spirit of the commons in health: this is the case with the DNDi (Drugs for Neglected Diseases initiative). DNDi is a non-profit organisation that develops drugs for neglected diseases (malaria, sleeping sickness, etc.) outside the traditional patent model. Its goal is to ‘provide affordable treatments so that no one is left behind.’ For example, DNDi is working on a new, simple and inexpensive treatment for hepatitis C to increase access to care and reduce the financial burden on patients and healthcare systems. An interim clinical trial in Malaysia showed a 97% cure rate among treated patients. This kind of success proves that a shared pharmaceutical innovation model, where knowledge is shared and medicines are distributed at cost price, can work. DNDi is supported by governments, foundations and public laboratories, and embodies the idea that health is a global commons: everyone should be able to benefit from medical advances, and no human life should depend solely on market forces.

Similarly, knowledge and technology can be seen as commons to be cultivated rather than exclusive properties. The open source movement in software (Linux, Wikipedia, etc.) has shown that by pooling knowledge and allowing a global community to contribute, robust tools that are accessible to all can be produced. In the context of AI, as mentioned above, some are calling for greater transparency and sharing (open source models, public databases) to prevent power from being monopolised by a few private actors. Digital commons are a good example of cooperative solutions to complex problems: the Internet itself, in its early days, was designed as a global, open, and decentralised common resource. Perhaps it is time to reconnect with this spirit in order to tackle the challenges of the 21st century.

In summary, the commons approach offers a different framework for thinking about how to emerge from the polycrisis. Rather than viewing each resource or problem from a competitive perspective (between states, between companies, or each for themselves), it invites us to build cooperative institutions where stakeholders jointly manage what is vital to them, with fair rules and a long-term vision. At the local level, this strengthens resilience and social justice. On a global scale, it is undoubtedly utopian in the short term, but it is a necessary direction: climate, oceans, biodiversity, health, peace... all of these know no borders and can only be safeguarded through the joint efforts of humanity. As Ostrom said, ‘There is no silver bullet’ – no single policy imposed from above that will solve all problems – ‘we have to tinker at all scales’. The commons offer a range of adaptive, inclusive and sustainable solutions, from small village communities to international institutions.

In conclusion, this presentation has taken us through a wide range of topics: from the severity of the climate crisis to the requirements of a planned energy transition, via the limitations of current AI and finally the idea of the commons as a horizon of hope. If there is one common thread to take away, it is perhaps the need for a paradigm shift in our relationship with the world. We cannot tackle the polycrisis with the same solutions that caused it: the endless pursuit of material growth, the illusion of all-powerful technology, or the overexploitation of resources as if they were infinite. We need to reinvent the collective, democratic regulation and sharing. The climate requires solidarity between peoples to reduce emissions, AI requires wisdom in its deployment, and the commons provide us with a framework for organising this solidarity and wisdom. This will be the challenge of the coming decades: learning to ‘do common’ on a global scale, without denying the diversity of local contexts. Utopia? Perhaps, but yesterday's utopias are sometimes tomorrow's realities. In any case, in the face of urgency, lucid hope lies in our ability to cooperate intelligently. It is together, by pooling our knowledge, resources and efforts, that we will be able to weather these crises and build a future.

*We thank deepl.com for the translation.*